Contents

■ EDITORIAL
  ▪ Rising Tide of Life Style Disorders
    Madiha Durrani ........................................................................................................... 43

■ OPHTHALMIC SECTION - ORIGINAL ARTICLES
  ▪ Rediscovering Old Drug: Atropine
    Prof. Marianne L. Shahsievanyan .................................................................................. 45
  ▪ Microtract Filtration - A minimally invasive glaucoma surgical procedure by Fugo Plasma Blade
    Sameera Irfan .................................................................................................................. 48
  ▪ Role of Ocular Coherence Tomography in Glaucoma Diagnosis
    Suhail Mashtaq et al ........................................................................................................ 55
  ▪ Prevalence of Computer Vision Syndrome (CVS) amongst the Students of Khyber Medical University, Peshawar
    Afshan Hassan et al ......................................................................................................... 59
  ▪ Different Patterns of Central Serous Chorio-retinopathy on Fundus Fluorescein Angiography
    Muhammad Tariq Khan et al .......................................................................................... 65
  ▪ Clinical Presentation in Retinoblastoma
    Prof. Zia ul Islam et al .................................................................................................... 68
  ▪ MYOPIA: Increasing Prevalence in Children & Adolescents (Current Concept)
    Mohammad Arif et al ....................................................................................................... 71
  ▪ Treatment of Diabetic Macular Oedema with Intravitreal Bevacizumab (Avastin) (A Current Approach)
    M Rafiq et al .................................................................................................................. 74
  ▪ Different Patterns of Retinal Vein Occlusion on Fundus Fluorescein Angiography
    Sidrah Riaz et al .............................................................................................................. 77
  ▪ Occlusion Therapy in Older Children with Amblyopia (Efficacy of part-time occlusion vis-à-vis full time occlusion)
    M Rafiq et al .................................................................................................................. 82
  ▪ Convergence Insufficiency & its Relation to the Use of Cellular Phone
    Mohammad Arif et al ....................................................................................................... 87
  ▪ YAG Laser Posterior Capsulotomy in less than 4 years old Children
    Mahfooz Hussain et al ..................................................................................................... 90
  ▪ Change in Ocular Axial Length after Encircling Scleral Buckle in Rhegmatogenous Retinal Detachment
    Adnan Aslam Saleem et al ............................................................................................. 93
  ▪ Association of ABO Blood Group with Glaucoma
    Muhammad Kashif et al ................................................................................................. 97
  ▪ Incidence of Raised of Intra Ocular Pressure amongst Non Glaucomatous Patients after Yag Capsulotomy (A randomized controlled trial)
    Zahir Gul et al ............................................................................................................... 100
  ▪ An Eye to Hand Dominance (A study based on health Professionals)
    Imran Khalid et al ......................................................................................................... 104
  ▪ Effect of Incision Site on Central Corneal Thickness after Pediatric Cataract Surgery
    Mariya Nazish Menon et al ............................................................................................ 108
  ▪ Complications and Outcomes of Phacoemulsification in Cataract Surgery (A different experience in Saudi Arabia)
    Suhail Mashtaq et al ....................................................................................................... 112
  ▪ Surgical Outcome of Modified Trabeculotomy in primary Congenital Glaucoma Patients
    Shabeer Ahmed Bhattu et al .......................................................................................... 116
  ▪ Efficacy of Nepafenac 0.1% VS Topical Ketorolac 0.5% in Phacoemulsification Surgery in terms of Maintaining Pupil Dilatation
    Maria Sultan et al ............................................................................................................ 119

■ GENERAL SECTION - ORIGINAL ARTICLES
  ▪ Post Mortem Artifacts (An autopsy based study)
    Riaz Qadeer et al ............................................................................................................ 122
  ▪ Diagnostic Accuracy of Color Doppler Ultrasonography in Evaluation of Breast Lumps for Malignancy (A diagnostic comparative study)
    Maira Khan et al .......................................................................................................... 126
• Study of Anaemia which turns out to be Cases of Leukemia at D.H.Q Hospital, Mardan (KPK)
  Shaukat Ali ............................................................................................................................................... 131
• Outcome of Open Reduction & Internal Fixation of Fracture Shaft of Humerus with Dynamic
  Compression Plate in Early Post Operative Wound Infection & Radial Nerve Injury
  Umar Hayat et al ....................................................................................................................................... 135
• Fractures of the Skull (an autopsy based study)
  Raz Qadeer et al ........................................................................................................................................ 138
• Management of Complicated Circumcision in Children
  M. Younas Khan et al .................................................................................................................................. 141
• Thirty Days in-Patient Outcome of Negative Pressure-therapy in Chronic Non-Healing Ulcers: (A Kaplan-Meier Analysis)
  Rumman Khan et al ...................................................................................................................................... 146
• Efficacy of Epidural Steroid Injections in Management of Low Back Ache & Sciatica
  Muhammad Salman et al ............................................................................................................................... 151
• An Audit of Management of Blunt Abdominal Injuries in Children: (5 Years single institutional study)
  Muhammad Uzair et al .................................................................................................................................. 155
• Outcome of Ponseti Method in Correcting Neglected Idiopathic Club Foot upto 5 Years of Age
  Umar Hayat et al ........................................................................................................................................ 158
• Effectiveness of Maitland's Mobilization vs. Mulligan Mobilization in Patients
  with Cervical Radiculopathy (A double blinded randomized clinical trial)
  Abdus Samad Khan et al ........................................................................................................................... 161
• Study of Cases of Acute Febrile Illness in Children Diagnosed as Malaria at T.H.Q, Hospital, Katlang, KPK
  Shaukat Ali ................................................................................................................................................ 165
• Management of Complicated Appendicitis in Children
  M. Younas Khan et al .................................................................................................................................. 168
• Comparison Between two Different Modes of Central Venous Catheterization in Patients Undergoing Cardiac Surgeries
  Nasreen Laiq et al ......................................................................................................................................... 172
• Revision of Admission Criteria for Medical Colleges in Pakistan
  Fatahiya Kashif et al ...................................................................................................................................... 175
• Waistline Obesity with Reference to Serum Triglycerides
  Jariya Wajahat et al .................................................................................................................................... 180

OPHTHALMOLOGY NOTEBOOK.................................................................................................................. 185

Islamabad Congress of Ophthalmology
OSP Federal Branch
28-30th April'2017 at Bhurban (Murree)
Contact: Dr. Shakaib Anwar
General Secretary
Email>: ospfederal@gmail.com
Dear Doctor,

Your Quarterly ‘Ophthalmology Update’ is being regularly published from Islamabad since 1998. The subscription of the journal expires by 31st December every year and needs to be renewed immediately.

Since the journal is fully indexed with Pakistan Medical & Dental Council (PMDC) and Higher Education Commission of Pakistan (HEC) & EBSCO (USA) as a standard scientific journal entirely devoted to Medical Sciences and to the welfare of visually handicapped; it highlights the most current research, scientific articles, reviews and interesting case reports in Medicine especially in the field of Ophthalmology with updated information around the world.

The journal is being subscribed by the doctors practicing in the field of Medicine, Ophthalmologists, postgraduates, the health professionals and they are making full use of scientific material in it. The doctors serving in your institutions can contribute their research papers, thesis, articles and interesting case reports for publication in the journal. The journal is being published on a beautiful English Matt paper by a first class printer of the country.

Fresh and renewed annual subscription of the journal is Rs.1200/- which is very nominal and can be remitted through money order/cheque/bank draft and on line to A/C: 145-20620-714-126749 maintained at Summit Bank Code: 145 (code for other banks: 010405, Markaz F-10, Islamabad in the name of Ophthalmology Update, or to the managing editor at 267-A, St: 53, F-10/4, Islamabad. Single copy of the journal is supplied freely to the principal author on complimentary basis, while the additional copies can be had on payment of Rs.400/- per copy. Members are ensured regular and uninterrupted supply of the journal at their doorstep. Our sole motto is SERVICE TO MEDICINE and we assure you our fullest cooperation with highest considerations for regular and well-in-time supply of the journal. Wishing you good health, happiness and a prosperous professional life. With profound regards.

Subscription Manager

SUBSCRIPTION FORM

Name: Prof/Dr/Mr/Mrs...................................................................................................................................................

Institution........................................................................................................................................................................

Address...........................................................................................................................................................................

Phones: Hospital/Clinic/Res...............................................................................................................................................

Cell .......................................................... E-mail..............................................................................................................

Submission through Cheque/Bank Draft/transfer on line: Single copy. Rs. 400/-
Annual Rs. 1500/- for 2 years: Rs. 3000/- for 5 years: Rs. 8000/-
For Institutions: Rs. 3,000/-

Dated................................................................. Signature ..........................................................
Editorial

Rising Tide of Life Style Disorders

What is a life style? How it affects the quality of our life? In fact, a life style is a way of life, we may call it behavior of the people which governs our actions and activities of daily life. In view of the socio-economic changes, coupled with the stress and complexities of modern life which has considerably changed our attitude towards life. Pakistan has approximately 80 million people who are suffering from life-style related illnesses and the number is increasing, by about 10% a year. The prospective parents are more likely to pass on these diseases to the next generation. These are few questions which needs interventions to change people’s behavior towards self-inflicted ailments.

Lifestyle-related diseases are on the rise in our country. These preventable chronic diseases are the outcome of our unhealthy choices. Identifying them is the need of the hour and elimination of such causes is the only way to achieve enhanced good health which is a basic requirement of life. Diet and life style are major factors thought to influence the susceptibility to many diseases. We are wastefully squandering in the face of rising tide of life style diseases like Diabetes, Hypertension, Cancer, Stroke, Arthritis, Sleep Disorders, Musculoskeletal Disorders, Gallbladder Disease, Kidney, Liver Disease, Chronic Respiratory Disorders, Gastric, Geriatric, Mental disorders and Computer Vision Syndrome (CVS) in our youngsters, having no respite even from adequate treatment in most of the conditions.

According to a recent “International Conference on Stress and Conditioning Impact on Maternal & Generation Health” held at Agha Khan University, the experts noted that economic, social and psychological pressures lead to stress and high level release of stress hormones effecting the fetus during the gestation period. Moreover, these chemicals can trigger genetic changes which stalls the genetic trajectory of the brain and heart of the fetus resulting in a lifelong child’s learning capabilities, social functions and immunity of the body to fight diseases as evidenced in most neurological disorders like Autism.

Innovations in the neuro-sonographic imaging of the fetus helps in early detection of the delays in the development of important organs of the body like heart and brain that may lead to diseases in adulthood. The first five years of the child’s life are extremely important, any intervention in the adult life is significantly less effective as irreversible genetic modifications have already taken place.

Since the last decade, a global study of diseases has revealed that the death rate due to poor life style has increased by 14%, which means 7 out of 10 deaths. Meanwhile, deaths due to infectious diseases has fallen by 20%. No doubt, modern medicine has successfully treated viruses and bacteria but it seems to be completely helpless in combating the diseases arising from the changed life style, that threatens our future generations. We spend millions in treating these diseases but very little on educating the people for changing their behaviors rampant in the society.

People, whose diet depends largely on low sugar with little meat or fat have lower rate of cancer, diabetes and heart diseases. Afflictions due to poor life style are preventable if these steps are considered as a routine in our daily life otherwise it will impact us later in life. A change to a balanced and healthy life style through healthy eating with exercise, will save our generation to a better and healthier future. Moreover, our health professionals should lay more stress on the preventive side of the diseases along with curative steps, this will bring a positive change to a robust life style.

It seems we are completely ignorant of today’s health issues like obesity, smoking, use of alcohol, drugs, intoxicants, lack of exercise, excessive use of computers (CVS) and many other superfluous habits like dining out in restaurants at the weekends and taking high caloric diet rich in cholesterol and sugary contents. Are we unconscious of our actions or deliberately do it? In fact, it has roots in our supercilious behaviors, easily influenced by the family environment, visual cues and attractions. How can we tackle these challenges to reshape our life style, is a difficult question. It has been
observed that people who are conscious of their weight and high blood pressure practice dieting, undertake exercises for a short or long periods. This is a temporary measure to reduce the body mass. But as soon as you stop the exercise, one is likely to put on weight again. Clinically speaking, it is like wasting energy in treating obesity. The best and ideal course is to control obesity right from the very childhood and we must regulate our life style in such a way that our intake is according to the body needs coupled with regular exercise.

Our behavior is strongly influenced by what we observe others doing in the same situation. Evidence shows that many ailments are linked to the social network of our society, for example, if an elderly member of the family quits smoking, the other members follow him, according to one study. The question arises how can we influence the social network? In fact, when our behavior becomes a social norm, it spreads quickly and it becomes difficult to reverse such norms of the society. It ultimately becomes a powerful and a perpetual custom of the society, for others to follow; whether one can afford it nor not without knowing its future risks or benefits, as the impinge is stronger and appears indefensible. However, identification of these behaviors is important in order to save the society from the impending bad influences, it is the real answer to our problems.

With the advent of new technologies, especially the computer, our life pattern is completely changed. Previously, our young generation used to play and take more interests in outdoor activities. Now, the youngsters, even the elders, are more busy in playing computer games rather than going to parks and clubs to undertake more physical exercises as playing on computers is an easy way to accomplish our routine practice. The rising trend of sedentary life, fast foods rich in cholesterol and starchy contents have prompted to weight gain, ultimately leading to such ailments like Diabetes, hypertension and other allied afflictions in the long run.

Today, we treat every 3rd youngster with some type of head ache especially the migraine type of visual disturbances, head ache and generalized tiredness mostly due to excessive use of computers and mobile phones. In good olden days we never heard of such afflictions. Currently, we have come across increasing incidence of myopia in youngster group to the tune of 85%, which is the net result of all these factors.

Recently, a “World Innovation Summit for Health” was held at Doha to identify these problems. It was a sincere intervention to bring a change in our life style. Some salient factors were considered as:

1. To change the size of the food packages in moderate quantity and avoid frequent meals especially the fast foods.
2. Restraining sweet dishes, candies, sweetened drinks, high cholesterol and starchy diet to the minimum especially on weddings and birthday parties.
3. Avoiding frequent visits to restaurants and restraining from over-cooked meals with high condiments.
4. Regular exercise.
5. Encouraging home-made foods.
6. Cut down the maximum workload on computers and undertake in piece-meal.
7. Have full sleep and avoid going late into the bed.

**Summarizing:** People, whose diet depends largely on low sugar with little meat or fat have lower rate of cancer, diabetes and heart diseases. In fact, life style diseases are preventable if taken care from the early part of the life, otherwise it will impact us later on in life and if these steps are considered as a routine in our daily life it will be a positive step in curtailing the increasing incidence of crippling diseases caused by the poor life style. A change to a balanced and healthy life style through healthy eating with exercise, will save our generation to a better and healthier future. Moreover, our health professionals should lay more stress on the preventive side of the diseases along with curative aspects, this will bring a positive change to a robust life style.

**REFERENCES**


Dr. Madiha Durrani, FRCS  
Dr. Anum Arshad MBBS  
Farheen Toor M.A.,  
Mashal Abbasi & Zainab Inam.  
E.Mail>Ophthalmologyupdate@gmail.com  
Website: www.ophthalmologyupdate.com  
0092 333 5158885
Rediscovering Old Drug: Atropine

Prof. Marianne L. Shahsuvaryan, M.Sc., Ph.D.,
Professor of Ophthalmology, Yerevan State Medical University,
Republic of Armenia

Background: Atropine is the most commonly used pharmacologic agent as a cycloplegic and a mydriatic. Recently Atropine eye drops have been shown to be effective in slowing the progression of myopia, acting not by eliminating accommodation, but by anti-muscarinic receptor binding that causes a local retinal biochemical change which slow eye growth. Based on currently available findings the new properties of Atropine and new avenue of intervention in myopia are being explored.

INTRODUCTION

In the past few years there has been an increased interest in drug re-profiling due to sustained high failure rates and the rising costs involved in attempts to bring new drugs to the market [1]. Currently repurposing or “rediscovering” of approved drugs is widely accepted by the industry and encouraged by worldwide regulatory agencies. The goal of this review is to highlight new properties of Atropine and their clinical implications in modern ophthalmology.

Atropine, was extracted from Atropa Belladonna- a perennial herb with dark purple flowers and shining purplish-black berries. Belladonna translated from Italian means beautiful lady. Atropine is a anticholinergic agent - nonselective antagonist of the muscarinic acetylcholine receptor types M1, M2, M3, M4, and M5; and is the most commonly used pharmacologic agent. The drug has a hydrophilic nature and can easily penetrate the sclera and reach the choroid. Topical atropine is used as a cycloplegic, to temporarily paralyze the accommodation reflex, and as a mydriatic, to dilate the pupils. It works by blocking the chemical acetylcholine, which relaxes the ciliary muscle of the eye and causes the pupil to dilate. Atropine degrades slowly, typically wearing off in 7 to 14 days, so it is generally used as a therapeutic mydriatic. Cycloplegic properties of Atropine drops are widely used in the treatment of corneal disorders and uveitis therapy. In refractive and accommodative amblyopia, when occlusion is not appropriate, sometimes atropine is given to induce blurring in the good eye and is equally effective as occlusion in improving visual acuity. Currently, the new indication of atropine based on new properties was discovered.

Predictably rational current use of Atropine: Atropine now is considered as a most potent drug to control the progression of myopia in children, with strong supporting evidence from well-conducted clinical trials[2-4]. However, the exact site and mechanism of action of atropine in slowing myopia progression is still insufficiently understood[5,6]. One of the proposed mechanism is an impact of Atropine on choroidal thickness. The study of Karapetyan et al.[7] reproduced previously found relations between thinner choroids and longer axial lengths, and increasing myopic refraction.

Atropine can be effective for progressive myopia in daily clinical practice and should be considered as a viable treatment option for myopia control anywhere in the world. Following the statement “Everything new is well forgotten old”, Atropine was rediscovered enriching by new properties and new avenues of intervention in myopia is being explored.

In a longitudinal study, Read and associates [8] reported that a significant increase in sub-foveal choroidal thickness of myopic and non-myopic children was observed over 18-month follow-up, and children showing faster axial eye growth exhibited significantly less choroidal thickening over time compared with children showing slower axial eye growth. The results suggested that there may be a potential role for the thicker choroid in the mechanisms inhibiting eye growth in childhood. In this respect, if the choroid of children is thickened by atropine, which might be a part of mechanism to slow the progression of myopia. Similar to the iris, which is also a part of the uvea, the choroid may also likely display certain changes following the use of a mydriatic agent. The latest study conducted by Zhang et al.[9] found that the use of topical 1% atropine gel administration for a week significantly increased the choroidal thickness under the fovea and at all parafoveal locations.
Another various mechanisms have been proposed for Atropine in myopia: increased dopamine release by atropine binding to muscarinic receptors of amacrine cells; reduction of γ-aminobutyric acid (GABA) levels; atropine binding to muscarinic receptors on scleral fibroblasts and interfering with scleral remodeling. Moreover, it is possible that atropine may indirectly affect the retina, by causing the release of dopamine or other neurotransmitters and it has been reported that dopamine can cause increase in choroidal thickness. Atropine eye drops have been quite extensively used in clinical practice in Asian countries.

The landmark Atropine in the Treatment of Myopia (ATOM) study performed their large randomized clinical trial in 400 children of Asian ethnicity and found a beneficial effect for 1% atropine. This 2-year study found 75% reduction of myopic progression with atropine 1%, and did not report serious side effects. Cochrane review on atropine studies reported that myopia progression can be reduced by 0.80–1.0D after a year of treatment of atropine 0.5 and 1%, respectively.

The ATOM2 study relied only on historical controls. It was conducted in a Singaporean population between 6-12 years of age, which both racially and in terms of pattern of myopic progression is very different to Europe. Chia et al. randomly assigned myopic children to 0.5%, 0.1%, and 0.01% atropine eye drops. Over 2 years, myopia progressed −0.30±0.60 D for the 0.5% group, 0.38±0.60 D for the 0.1% group, and −0.49±0.63 D for the 0.01% groups. All were significantly slower than the historical placebo control group.

There are also questions regarding the effect on axial length from the study data, although a recent network meta-analysis indicates that low-dose atropine had significant effect on axial length. One year after discontinuation of the various concentrations of atropine eye drops, the most effective myopia control was provided by 0.01% atropine. There is potential for myopia control with fewer side effects using lower concentrations, because as speculated by authors, the accommodative tonus returned to normal, negating the stronger myopia control effect due primarily to changes in tonic accommodation. The general consensus is that a low concentration of atropine, which has less severe side-effects, is also effective.

Atropine is the preferred practice pattern for progressive myopia in Taiwan. As early as the year 2000, the Ophthalmological Society of Taiwan advised to use atropine to slow down myopia progression. This treatment is prescribed to nearly 50% of Taiwanese children with progressive myopia. Although topical use of atropine is known to cause photophobia and accommodation lag, these adverse events do not appear to hamper its implementation in Taiwanese children. By contrast, the lighter iris color in Europeans is generally considered as a barrier for its use in the Western world. Moreover, some studies have suggested that atropine is less effective in persons of non-Asian descent.

Several recent studies also have shown that lower concentrations of atropine slow the progression of myopia control with fewer side effects than 1% atropine. Lee et all investigated topical use of low concentration atropine (0.125% and 0.25%) and concluded that in one year its effectively retards myopic progression and does not induce ocular hypertension, but further large scale studies are necessary to validate the long term safety and efficacy. Five-year results of atropine use by Chia et al. evidenced that low dose atropine 0.01% may provide clinically meaningful myopia control while minimizing side effects. Huang et al. based on meta-analysis concluded that low dose atropine - 0.01% is still one of the most effective interventions and has been found to induce minimal clinical symptoms for myopia control in children. These findings were reconfirmed by Morgan and He.

The general consensus is that a low concentration of atropine 0.01% showed great promise for myopia control. Taken into account that there are well-recognized differences in the effect of atropine between heavily pigmented Asian eyes and Caucasian eyes, Loughman and Flitcroft initiated the study aimed to determine the acceptability and tolerability of 0.01% atropine (by measuring visual performance and quality of life) as a treatment for myopia control in a Caucasian population exhibiting light irides. The authors evidenced that overall, 0.01% of atropine was generally well tolerated bilaterally and no serious adverse effects were observed, concluding that this dose appears to provide a viable therapeutic option for myopia control among Caucasian eyes. Similar effectiveness study was performed by Polling et al. in Rotterdam, the Netherlands evaluating 77 children (mean age 10.3 years±2.3), of European (n=53), Asian (n=18), and African (n=6) descent with progressive myopia and spherical equivalent at baseline -6.6D (±3.3), whom were prescribed atropine 0.5% eye drops daily. The majority (60/77, 78%) of children well tolerated treatment for 12 months, but 11 of the 17 children discontinued therapy within 1 month after the start of therapy due to adverse events manifested.
Rediscovering Old Drug: Atropine

dominantly by photophobia and reading problems. Obtained results suggest that the progression rate of spherical equivalent before treatment (-1.0D/year±0.7) diminished substantially during treatment (-0.1D/year±0.7) compared to those who ceased therapy (-0.5D/year±0.6; P=0.03). The authors highlighted that despite the relatively high occurrence of adverse events atropine can be an effective and sustainable treatment for progressive high myopia in Europeans.

**Summarising** lower concentrations of atropine may provide clinically meaningful myopia control while minimizing side effects.

**CONCLUSION**

Based on currently available findings Atropine can be effective for progressive myopia in daily clinical practice and should be considered as a viable treatment option for myopia control anywhere in the world. Following the statement “Everything new is well forgotten old”, Atropine was rediscovered enriching by new properties and new avenue of intervention in myopia being explored.

**REFERENCES**

INTRODUCTION

Glaucoma is the second leading cause of blindness worldwide, after cataract. 1, 2 No age is exempt from its occurrence as it affects newborns, children, adults and the elderly. The word “Glaucoma” is derived from the Greek word, glaukose, (blue, grey or green). 3 In English, the term was adopted following the invention of ophthalmoscope in 1850 which enabled ophthalmologists to visualize the optic disc and see the damage caused in this disease. 4

Micro-Tract Filtration performed by the Fugo Plasma Blade is an easy and efficient surgical technique with a short learning curve to control IOP for pediatric, juvenile and chronic open angle glaucoma, with minimal post-operative complications in comparison to the conventional trabeculectomy. A very careful watch both by the surgeon as well as by the patient is mandatory in the first 3-4 weeks post-operatively.

The aim of glaucoma surgery is to drain the internal reservoir of aqueous in such a manner that the optic nerve head blood supply is not disturbed. This depends on a delicate balance between the IOP and the pulse pressure (Systolic-diastolic BP). The process by which the aqueous drains out of the eye naturally is by two routes: an anterior route that goes through the canal of Schlemm and a posterior route, called the “uveo-scleral outflow”. While the former route has been studied and discussed thoroughly for over a century, the latter mechanism has been discovered only recently and is talked about more as a functional

ABSTRACT:

Aim: To find out the efficacy and safety of Microtract Filtration (MTF) in controlling IOP and optic nerve damage in glaucoma.

Material & Methods: A prospective, interventional study was conducted at a tertiary referral centre from Jan 2014 till July 2016. Thirty seven (37) consecutive cases (56 eyes) referred for advanced glaucoma, uncontrolled on triple anti-glaucoma medication were included, comprising of Buphthalmos age 6 months - 10 yrs (28 eyes), young adults with steroid-induced glaucoma, age 10 -25 years (11 eyes), juvenile glaucoma age 12-26 years (6 eyes), and adults with Chronic open angle glaucoma (COAG) from age 40 - 55 years, (11 eyes). All cases had MTF by Fugo Plasma Blade by a single surgeon (SI) and were followed up meticulously for a minimum period of one year, monitoring the IOP, VA and the optic disc.

Results: Minimal post-operative complications were noted and only 5 cases (8.9%) needed re-operation. AGT (single drug) had to be added to only 4 cases with an overall surgical success of 91.02%.

Conclusion: MTF was found to be a simple, safe surgical technique offering a long-term control of glaucoma.
rather than an anatomical entity. When the natural drainage mechanisms get stressed for any reason, the intraocular pressure rises proportionately. The dearth of knowledge about the involvement of an extensive lymphatic channel system in aqueous drainage, has unwittingly/unknowingly encouraged the surgeons to perform extensive dissections on the conjunctiva, episclera, sclera and use Bipolar cautery with impunity.

The techniques of glaucoma surgery are limited by the tools that are employed to achieve them. For the last one century, these tools are basically the same - forceps, scissors, knife and cautery. Only they are finer and sharper now. Excellent light and magnification are recent helps for the surgeon. Tissues are cut and dissected in layers, which are sutured back, after making a large opening in to the anterior chamber. All this surgical trauma leaves a rather large footprint by destroying the lymphatic system of the eye, not only by direct tissue cutting, dissection and cauterrization intra-operatively, but by post-operative inflammation, healing and resultant scarring.

Lymphatic networks in the cornea, conjunctiva and sclera were discovered by Singh. A network of corneal channels drain into a circular sinusoidal channel at the limbus, called the Lucid Interval or the Sinusoid of Singh, which is a large circular channel located anterolateral to the Schlemm’s canal; this, in turn, drains into 30-40 channels at the limbus which lead to the limbal conjunctival lymphatics, Fig 1. It is now confirmed that about 50% of aqueous drainage is via this route. The uveoscleral outflow, which was previously assumed to be via diffusion into perforating channels out of the sclera, is now confirmed by Singh that these perforating channels are in fact lymphatics at the level of sclera, episclera and conjunctiva, all freely communicating with each other. The lymphatics drain the extravascular fluid, coming out of the arterial ends of the capillaries, leakage from the aqueous veins and the uveo-scleral outflow. The drainage occurs all around the limbus. When a filtration surgery is performed, initially there is a huge local outflow of aqueous which can only be handled by flood-drain like function of the lymphatics. Their sizes and capabilities match the changing needs after filtration surgery. After the discovery of conjunctival lymphatics, it made sense to assume that any surgical technique which utilizes cutting incisions and caoagulation of tissues will damage these lymphatics, thereby creating areas of scarring and is liable to fail.

To preserve the lymphatic networks of the eye, the need to devise a minimally invasive glaucoma surgical procedure arises. In 1989, Fugo plasma blade (Medisurg, Norristown, Pa) was invented by Richard Fugo, an ophthalmologist as well as a nuclear physicist. This is a solid state electronic system that operates on four rechargeable batteries. It focuses electromagnetic energy to a blunt metal tip and produces sufficient plasma field which incises tissue not like a knife but ablates or erases tissue into a mist of water vapors producing a pristine incision. Since the cut tissue is vaporized, there is a minimal necrotic debris, less tissue inflammation and the incision heals without scarring. At the same time, the plasma energy stimulates the coagulation cascade and activates platelets which secrete adrenaline to constrict blood vessels in the cut area. Hence a non-cauterizing homeostasis is produced along the incision line, which became blood-less. The working of Fugo Plasma Blade is analogous to an excimer laser. It was approved by the FDA, USA for iridotomy, capsulotomy and oculoplastic surgery in 2004. The introduction of Fugo blade as a surgical tool, allowed ophthalmologists to perform minimally invasive glaucoma surgery in many different ways. Fugo blade when activated, produces plasma on the tip of a steel filament, which performs like an excimer laser, Fig 3. Plasma energy is transferred to the tissue molecules by resonance, whose molecules go to a higher energy level and shatter/evaporate. Clinically this phenomenon appears as ablation or incision. It becomes possible to drain the aqueous from the anterior chamber (Micro-Tract Filtration) or the posterior chamber (Trans-ciliary Filtration), without making tissue flaps. In other words, we enter the realm of minimally invasive glaucoma surgery.

A minimally invasive glaucoma surgery utilizing the Fugo Plasma blade was developed by Singh in 1999. In this technique, a micro-tract, 200 microns diameter, was used to drain either the anterior or the posterior chamber of the eye into the sub-conjunctival space, and out via the undamaged conjunctival lymphatics. Trans-ciliary filtration (Singh’s Filtration) was considered a revolutionary alternative to trabeculectomy, which is still considered the gold standard glaucoma surgery. The procedure was approved by FDA in 2004. After this, it was performed by other surgeons too with good results. The author (SI) conducted a study to find out the long-term efficacy of Trans-ciliary filtration in draining the aqueous out of the eye to maintain an IOP around 15 mm and preventing glaucoma progression in both children and adults.

The lack of awareness about lymphatic network that drains the aqueous normally, that works like flood drains after filtration surgery, and the failure to appreciate new possibilities of glaucoma surgery...
that are opened up with Fugo plasma blade, keeps the modern glaucoma surgery at a standstill. This prospective clinical study was conducted to show the long-term efficacy of minimally invasive glaucoma surgery, called Micro-Tract Filtration, by the Fugo blade for paediatric, juvenile, steroid induced and chronic open-angle glaucoma in all types of glaucoma children, adults and the elderly.

**MATERIALS & METHODS:**

This was a prospective, interventional study performed at Mughal Eye Trust Hospital, Lahore, Pakistan, (a tertiary referral centre) from Jan 2014 till July 2016. In this, 37 consecutive cases (56 eyes) referred for advanced glaucoma which was uncontrolled on triple anti-glaucoma medication were included. These included 14 cases of bilateral congenital glaucoma (*Buphthalmos*) from age 6 months and 10 yrs (28 eyes), young adults with *steroid-induced glaucoma*, from age 10 - 25 years (11 eyes), juvenile glaucoma in 6 eyes, age 12-26 years and adults with *Chronic open angle glaucoma (COAG)* in 11 eyes, from age 40 - 55 years, as shown in Table 1. All cases of secondary glaucoma like pseudo-exfoliation, pigmentedary, traumatic and chronic angle-closure glaucoma were excluded from the study. After a thorough history and ophthalmic examination. After a thorough history and ophthalmic examination, including best corrected visual acuity, IOP measurement, fundoscopy and Gonioscopy, Visual field testing and OCT were performed in all adults and co-operative children. Out of these 56 cases, 41 eyes (78.84%), already had a failed glaucoma surgery (trabeculectomy) performed elsewhere. In all cases, the topical anti-glaucoma medication as well as the oral acetazolamide were continued till the day of surgery, except Latanoprost which was stopped in all cases at least 1 week prior to surgery. Any adult patient on blood thinning medication like aspirin was stopped 1 week prior to surgery. Micro-Tract Filtration (MTF) by Fugo Plasma Blade was performed by a single surgeon (SI).

All cases were followed up meticulously on the first and third post-op day, then weekly for a month and then two monthly for at least 2 years, with a minimal follow-up of 18 months. At each visit, their BCVA and IOP were recorded; slit-lamp examination was performed by the surgeon to note the state of filtration bleb, Seidel’s test was performed to note bleb-leakage, status of the cornea, anterior chamber depth and any intra-ocular inflammation, fundus examination to note choroidal effusion and status of the optic disc. All patients received a combination of mild steroid-antibiotic eye drops 4 times a day along with ansaid eye drops four times/day, continued for a month and then gradually tapered and stopped after a further one month.

**Microtrack Filtration: Surgical technique:** A Microtrack Filtration (MTF) means a 200 micron track between the anterior chamber and the anterior most area of sub-conjunctival space, traversing the cornea at upper limbus. If such a small filtering track could be sustained without an internal block (by iris, its pigment, blood or inflammatory debris) or any external scarring, the aqueous continues to seep out and gets drained via the unharmed network of lymphatics in the conjunctiva and sub-conjunctival space and the problem of glaucoma is solved.

Adult patients were operated under a local anaesthesia (a retrobulbar block) while a general anaesthesia was used for children and young, uncooperative adults. After draping the eye, the eyeball was fixed with a 4/0 silk suture passed through the episclera, close to nasal and temporal limbus at 3 and 9 o’clock, and the eyeball was turned downwards. In children, the surgical limbus lies quite posterior to the anatomical limbus as visualized. It was marked between 11 and 1 o’clock, depending upon where the conjunctiva was unscarred, by a fibre-optic light pipe placed at the limbus at 9 o’clock.

Since the IOP was mostly high in such cases, aqueous was slowly allowed to drain a little bit via a small paracentesis at 9 o’clock limbus, and anterior chamber was reformed by visco-elastic injected through the same site. Then an opening/hole was made in the conjunctiva at 11 o’ clock about 6-8 mm from the limbus with a Fugo blade 100 micron tip. After this, a 200 micron tip of Fugo blade was passed through the hole in conjunctiva towards the marked site at the surgical limbus, with the direction of tip downwards towards the anterior chamber. The Fugo blade machine was set at the desired energy and power level. The point of the tip lightly pushed the limbal tissues while it was activated by the foot switch. In a fraction of a second, the tip passed through the limbus and into the anterior chamber. As the tip was withdrawn, the aqueous followed along with the visco-elastic, raising an enlarging conjunctival bleb. Thus a track gets formed anterior to the corneoscleral trabeculae. Use of highest energy setting produces a 200 micron track.

Next a peripheral Iridectomy was performed to avoid closure of this tract internally by the peripheral Iris when pupil dilates in the dark. This was achieved by a small incision into the cornea with a No11 Bard-Parker blade anterior to the tract of MTF, the peripheral iris grasped with a uterattes forceps and excised with a
pair of fine Venas’s scissors. Any released iris pigment or a micro-bleed was washed away by BSS irrigating the anterior chamber at the iridectomy site. The corneal incision at the iridectomy site was either closed by hydro-dissection or a 7/0 vicryl suture. The anterior chamber was reformed by a medium sized air bubble. Fig 4-A, shows MTF, 1 year after surgery and 4-B showing an OCT picture of the patent tract into the cornea at the limbus. In cases where a previous trabeculectomy and a peripheral iridectomy had been performed, this step was easily avoided if limbal conductive was unscarred adjacent to the PI site.

In all cases, mitomycin C (MMC) 0.01% or 0.02%, was injected through the conjunctival hole made by the Fugo Blade, into the sub-conjunctival space, with the cannula directed parallel to the upper limbus (and away from the MTF tract). A sub-conjunctival injection of dexamethasone + gentamicin was given in the lower fornix. An eye pad was lightly placed on the eye for 24 hours.

RESULTS

When the dressing was removed on the first post-operative day (Table 3), all eyes remained white and showed a minimal reaction in the anterior chamber (4-8 cells). A small hyphaema was seen in 3 eyes only which cleared up in 2-4 days. Anterior chamber was well-formed but on the shallower side due to a well-draining bleb in all cases for the first post-operative week which then gradually normalized. However, a flattening of AC due to an over-draining bleb was noted in 4 cases (7.1%: 2 eyes with buphthalmos+2 with end-staged COAG). They were managed by keeping the pupil fully dilated and a pressure dressing for two days, after which the AC gradually reformed. Bleb leakage was not noted in any case. On the second or third post-operative day, a shallow choroidal detachment was detected in 52 eyes (92.86%) which gradually settled over the next one week without the need for any active intervention. The two cases (7.1%) already mentioned with an over-draining bleb and a flattening of AC were also noted to have huge choroidal detachment but they also settled following pressure dressing. No bleb leakage (Seidel negative) or post-operative bleb infection was noted in any case. Cystic blebs were seen in 5 adult cases (8.9%) but their IOPs were around 12-14 mmHg. The procedure failed in 5 eyes (8.9%) with buphthalmos and they needed repeat surgery. Four (4) eyes (7.1%) with advanced glaucoma had an IOP approaching 16-21 mmHg about 6 weeks post-operatively. They were managed with topical beta-blockers only. This
was still regarded as a partial success as they were on triple AGT pre-operatively with the IOP of 34-40 mm Hg prior to the MTF. In 6 cases (10.71%), peripheral iris blocked the MTF opening internally and they needed Yag Iridotomy, after which the IOP remained under 14 mm Hg. In remaining 47 eyes, the IOP remained below 15 mm without any AGT on 1 year follow up. The optic disc cupping showed improvement in children and young adults in 29 eyes (51.78%). This was also confirmed by OCT parameters. Hence, apart from the 5 cases of buphthalmos, MTF was successful in controlling IOP and further optic nerve damage in 51 cases and actually the optic nerve function improved in 51.78% cases; this was considered as an overall success rate of 91.07%.

In all cases, in the initial post-operative period lasting for 4-6 weeks, the visual acuity reduced from the pre-operative level as a result of shallow of AC and forward movement of iris-lens diaphragm (due to an initial excessive outflow of aqueous). But within 4-6 weeks, the drainage of aqueous slowed down and IOP gradually stabilized at 10-12 mm. Hence the visual acuity gradually returned to the pre-operative level in all cases and then slowly improved within 6 months following surgery (Table 3); it improved from hand movements to counting fingers in 11 eyes with buphthalmos with opaque corneas pre-operatively. In children with clear corneas, it improved from HM to 6/24 in 13 eyes. In all cases of juvenile and steroid induced glaucoma, visual acuity either remained stable at 6/9 - 6/6 and improved from 6/12 to 6/6. In 2 adult cases 2 cases with pre-operative advanced, end-stage glaucoma and a cup: optic disc ratio of 0.9, visual acuity reduced from 6/60 to NPL. In the remaining 9 adults, VA remained stable during the one year follow up period.

### Table 1: Clinical types of Glaucoma included in the study

<table>
<thead>
<tr>
<th>No</th>
<th>Glaucoma Type</th>
<th>Age</th>
<th>No of eyes/cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Buphthalmos</td>
<td>6month-10 yrs</td>
<td>28</td>
</tr>
<tr>
<td>2</td>
<td>Juvenile Glaucoma</td>
<td>12-26 yrs</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>Steroid-Induced</td>
<td>10-25 yrs</td>
<td>11</td>
</tr>
<tr>
<td>4</td>
<td>COAG</td>
<td>40-56 yrs</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>TOTAL No of Eyes</td>
<td></td>
<td>56</td>
</tr>
</tbody>
</table>

### Table 2: Complications noted following MTF

<table>
<thead>
<tr>
<th>No</th>
<th>Complication</th>
<th>No of Eyes</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hyphaema (small = 3 eyes)</td>
<td></td>
<td>5.3%</td>
</tr>
<tr>
<td>2</td>
<td>Uveitis (cells 4-8 = 56 eyes)</td>
<td></td>
<td>100%</td>
</tr>
<tr>
<td>3</td>
<td>Shallow AC</td>
<td>56 eyes</td>
<td>100%</td>
</tr>
<tr>
<td>4</td>
<td>Type</td>
<td>4 eyes</td>
<td>71%</td>
</tr>
</tbody>
</table>

**DISCUSSION**

In an uncontrolled congenital or juvenile glaucoma, the scleral coat is stretched due to a constantly raised IOP and the attachment of ciliary body is pushed far backwards from the anatomical limbus. Hence it is very important to mark the exact site of the ciliary body and the surgical limbus, which was done in all our cases by trans-illumination with a fibre-optic light. By this modification, accidental vitreous tap or vitreous prolapse was avoided in all cases. We injected 0.5 cc Mitomycin C (0.02%) into the subconjunctival space in all eyes at the end of surgery. This was done because they all had advanced glaucoma, had been treated with triple anti-glaucoma medication, and more than 50% of our cases had a failed glaucoma surgery performed elsewhere. As a result, we did have cystic blebs in 5 adults (8.9%) but no bleb leakage was seen in any case. Mitomycin can be avoided in virgin eyes in which no glaucoma surgery has been performed and in whom IOP is not being controlled by one anti-glaucoma drug only.

**Post-operative course following MTF:** Immediately following the MTF, the normal subconjunctival tissues offer some resistance to the outflowing aqueous. This little resistance kept the anterior chamber formed, even though it was noted to be on the shallower side. Lymphatics play a natural role in the drainage of aqueous as well as offering some resistance to its free passage. Initially, they act as flood-drains as the outflow of aqueous was excessive and a large conjunctival bleb was noted for at least 2-3 weeks. Later, when the initial rush of aqueous was over, a balance was reached between the outgoing aqueous and the tissue resistance (offered by the Tenon, the conjunctival and sub-conjunctival lymphatics) so the anterior chamber was noted to deepen. But in cases it deepened too fast, the bleb began to dry up and was a sign of a partial or complete closure of internal opening by the iris and needed early correction. In cases with the a complete blockage of the internal opening, the IOP rose and the patient experienced pain and reduction of vision (as...
noted in our 6 cases). The tiny internal blockage with iris shuts down the drainage. The earlier fluid filled subconjunctival tissues start shrinking and become capable of greater resistance. The internal block can be easily opened with a shot of YAG laser. Once the filtration restarts, the chances of its closure for the second time are much reduced. If the internal block is not opened for many days and weeks, the external opening and possibly the track too get closed by the healing process. Healing starts when fluid movement stops. A few days of internal closure does not cause irreversible damage to the filtration track and YAG laser of the iris block can restore fluid movement after a week or even longer. During this period, the raised IOP can be reduced by oral Diamox and local Pilocarpine drops. The moment the tiny piece of iris is detached with a shot of YAG laser, the filtration starts as evidenced by ballooning conjunctiva.

To keep the iris away from internal opening of the track, a large peripheral iridotomy should be done and pupil should be kept constricted by pilocarpine 2% three times a day for the next 3-5 post-operative days. In our 6 cases that developed an internal block of MTF opening, and IOP suddenly soared to 45 mm Hg, the iridotomy was small and the pupil was kept dilated with cyclopentolate in the first post-operative week. These were the initial cases in the study following which cyclopentolate was avoided in the remaining cases and pilocarpine given instead during the immediate post-operative period.

Post-operative complications like a persistent hypotony which for lasted one month post-operatively was seen in only 2 cases (9.6%) due to over-draining bleb. Large choroidal detachment was also noted in these 2 eyes and was managed with pressure dressing of the eye for two days followed by wearing a bandage contact lens for a week. Both these cases were high myopes. After one month post-operatively, their vision stabilized to the pre-operative level. Both these cases developed cystic blebs but bleb leakage was not seen in any case as confirmed by a negative Seidel’s test at each follow-up visit. A bleb leakage is not to be expected after this procedure as a conjunctival flap is not made. No bleb infection was seen in any case either. In all other cases, the hypotony was seen only in the initial first week to 10 days following surgery after which it gradually improved.

An addition of anti-glaucoma medication was needed in only 4 adults as filtration was tardy in these cases and the IOP did not come below 20 mm which was controlled by adding Timolol 0.5% eye drops twice a day. In paediatric glaucoma, mostly the AGT does not work and in 5 such cases, the external opening of the tract got gradually blocked during the first 3-4 months post-operatively. In this age group, tenon is very thick and healing takes place very quickly so re-operation was the only choice. It was easy to make a second tract of MTF since most of the conjunctiva along with lymphatics was not disturbed during the previous procedure.

As regards visual acuity shown in Table 3, 11 eyes with buphthalmos had opaque corneas. Even in these cases, vision improved from PL only or hand movements to Finger counting at 2 feet. The 3 infants started following and fixing light while 8 children were able to recognize colors and walk without feeling their way. In children with clear corneas, VA gradually improved over one year follow-up. This was mainly due to improved optic nerve function as evidenced by improved optic disc parameters noted in 29 cases (51.79%).

CONCLUSION

Since the discovery of conjunctival lymphatics as the major draining conduits for aqueous, any surgical procedure that prevents or spares them should work. Micro-tract Filtration performed by the Fugo Plasma Blade was found to be an efficient surgical technique to control IOP for pediatric, juvenile and chronic open angle glaucoma. It was found to be an easy technique with a short learning curve. Though there were minimal post-operative complications in comparison to the conventional trabeculectomy, a very careful watch both by the surgeon as well as by the patient is mandatory in the first 3-4 weeks post-operatively. The vigilance is relaxed but not given up altogether after that and a regular two - three monthly follow up needs to be continued.

Acknowledgements: I owe my gratitude to my teacher and mentor Prof. Daljit Singh of Amritsar, India for teaching me this useful technique and for giving me Fugo Blade as a gift to save the sight of hundreds of Pakistani children and adults. I owe my special thanks to Dr Richard Fugo for this brilliant discovery which is an amazing surgical tool with unlimited applications.

REFERENCES

3. Leffler, CT; Schwartz, SG; Giliberti, FM; Young, MT; Bermudez, D"What was Glaucoma Called Before the 20th Century?". Ophthalmology and eye diseases. (2015). 7: 21–33
4. Leffler CT, Schwartz SG, Stackhouse R, Davenport B, Spetzler
Actinic granuloma

A 50-year-old woman came with a history of asymptomatic skin lesions on her forehead and dorsum of hands. The differential diagnosis could be: Necrobiosis lipoidica, Actinic keratosis, Tinea capitis, Actinic granuloma and Cutaneous sarcoidosis.

It is actinic granuloma which is an asymptomatic granulomatous reaction that affects sun-exposed skin areas commonly on the face, neck, and scalp. It is characterized by annular or polycyclic lesions that slowly expand centrifugally and have an erythematous elevated edge and a hypopigmented atrophic center. *Curtesy: Nejam, UK*
Role of Ocular Coherence Tomography in Glaucoma Diagnosis

Suhail Mushtaq FCPS,FRCS1. Naeem Munir FCPS,FRCS.2
Department of Ophthalmology, King Saud Hospital Unaizah, Al-Qassima, Kingdom of Saudi Arabia

ABSTRACT
Purpose: To emphasize the importance of ocular coherence tomography in the diagnosis and appropriate management of glaucoma.

Materials and Methods: This was retrospective hospital based study conducted from February 2016 to June 2016 in King Saud Hospital Unaizah, Al-Qassim, Kingdom of Saudi Arabia. Total 57 eyes of 30 patients were evaluated. The age range of the patients was 20 to 70 years. The thorough examination of anterior and posterior segments of eyes was performed. In each patient, spectral domain ocular coherence tomography (OCT) was done with Cirrus HD-OCT Zeiss Meditac.

Results: There were 14(46-66%) male and 16(53-33%) female patients. The mean age was 50.27 years. There was 12(40%) patients of glaucoma suspect. The average nerve fiber layer thickness (RNFL) was between 81-104um. Four (4) patients had early onset glaucoma with RNFL thickness between 60-80um. There were 14 chronic cases of primary open angle glaucoma (POAG) and the RNFL thickness was between 15-80um.

Conclusion: There is an important role of OCT in the management of glaucoma patients.

INTRODUCTION
Glaucoma is a multifactorial neurodegenerative disease characterized by loss of retinal ganglion cells (RGCs) and their axons, resulting in changes to optic nerve head (ONH) and retinal nerve fiber layers (RNFL), accompanied by visual function deterioration. The intraocular pressure is usually a key modifying factor in this disease. On word wide basis, glaucoma is second leading cause of blindness. The loss of visual function in glaucoma is generally irreversible and without proper management the disease can progress to blindness.

Visual field analysis has been widely used for the evaluation and monitoring of the glaucoma. But in many patients, visual field losses are detectable when a substantial number of retinal RGCs has been lost. In previous studies, it is reported that 25% to 35% RGCs would need to be lost for significant abnormalities to appear on standard automated perimetry.

The early diagnosis of glaucoma is crucial because vision loss in this disease is irreversible and appropriate treatment can slow the disease progression to preserve the vision. Clinical examination of the optic nerve and automated perimetry is still the gold standard for the management of glaucoma.

Now the OCT, a non-invasive imaging modality that uses low coherence light to obtain high resolution cross-section of biological tissue, has changed the field of ophthalmology and it was described by Huang et al in 1991. The current spectral-domain (SD) OCT technology collects up to 55,000 A-scan per second with axial resolution of 5 µm and it has 100 times improvement over earlier generation of time domain (TD)-OCT. It has a pivotal role in the early detection of glaucoma while abnormalities have not still appeared on standard perimetry.

Ocular coherence tomography is very helpful for early detection and management of glaucoma patients.

The clinical utility of SD-OCT in glaucoma has primarily focused on the evaluation of RNFL parameters because it enables a comprehensive assessment of RGCs axons as they approach the ONH. The measurement of the peripapillary RNFL is most utilized parameter until now and the macular thickness parameters have not been commonly used in glaucoma because it is inferior to peripapillary RNFL in the diagnosis of glaucoma.

Now the potential to access ONH parameters for glaucoma evaluation is with greater accuracy and improved progression detection. So, we can evaluate and manage the glaucoma patients in a better way with the use of relatively new imaging modality like (SD)-OCT. (SD)-OCT offers significant advantages over the previous time domain (TD)-OCT, allowing 3D imaging of the retina and optic disc with ultra-high acquisition...
speed and ultra-high resolution while providing a higher accuracy in identification of glaucoma.\[7\]

**MATERIALS AND METHODS**

This was retrospective hospital based study conducted to evaluate the cases of glaucoma from February 2016 to June 2016 at King Saud Hospital Unaizah, Al-Qassim, Kingdom of Saudi Arabia. The study was approved ethically by the hospital. There were total 30 patients including 27 with both eyes and 3 with only eye. So, in total 57 eyes were evaluated. The age range of the patients was from 20 to 70 years.

**Inclusion Criteria:** Patients with clear cornea and crystalline lens, primary open angle glaucoma (POAG), glaucoma suspect with normal look of retinal vasculature and macula.

**Exclusion Criteria:** Patients with corneal opacities, cataract, primary angle closure glaucoma (PACG), retinal vasculature problems like; retinal artery occlusion and retinal vein occlusion. Patients with history of diabetes mellitus, hypertension and on topical or systemic steroid use.

Thorough examination of patients was done by recording visual acuity and measuring intraocular pressure (IOP), anterior segment was evaluated with slit lamp and gonioscopy was also performed. The dilated fundus examination was carried out by slit-lamp biomicroscopy technique with the help of +78D lens. Spectral domain ocular coherence tomography was done with Cirrus HD-OCT Zeiss Meditec.

**RESULTS**

There were 14 (46.66%) male and 16 (53.33%) female patients. Fig.1. The mean age was 50.27 years. There were 12 (40%) patients of glaucoma suspect. In these cases, 6 (20%) patients had cup/disc (CD) ratio between 0.6 to 0.7 while the IOP was ranged from 16 to 20 mm of Hg. The other 6 (20%) patients had CD ratio between 0.2 to 0.5 and the IOP was ranged from 22 to 24 mm of Hg. The (SD)-OCT of these patients was done. The average RNFL thickness was between 81 to 104µm.
that was within normal range. Fig.2. The 4 patients had early onset glaucoma with CD ratio between 0.2 to 0.5 and IOP between 18 to 21mm of Hg but RNFL thickness was between 60 to 80µm Fig.3. There were 14 chronic cases of POAG. The CD ratio was between 0.5 to 0.9. The IOP was between 22 to 30mm of Hg and RNFL thickness was between 15 to 80µmFig.4, Table 1.

**DISCUSSION**

Glaucoma is the second leading cause of blindness worldwide. The early detection of glaucoma is crucial because vision loss is irreversible and appropriate treatment can preserve the vision. OCT has played an expanding and valuable role in glaucoma detection especially in cases where the diagnosis was uncertain. We used (SD)-OCT in our study. The cirrus RNFL map represents a 6x6 mm cube of A-scan data centered over optic nerve in which 3.4 mm diameter circle of RNFL data is extracted to create TSNIT map (temporal, superior, nasal, inferior and temporal). The TSNIT map displays RNFL thickness values by quadrants and clock hours. Fig.2. So the sensitivity and specificity of these parameters in terms of glaucoma progression can be determined with reference to assessment of optic disc/RNFL photographs and we had also got the photographs Fig.2,3,4.

In our study there were 4 (13.33%) cases of early onset POAG. Their CD ratio was between 0.2 to 0.5 and IOP ranged from 18 to 21mm of Hg. RNFL thickness was from 60 to 80µm as the normal RNFL thickness is above 80µm. These cases were picked up earlier on (SD)-OCT maps. Shin JW, Uhm KB and Seo S had emphasized the relationship between RNFL defect area and structural functional parameters. So the (SD)-OCT is good to detect the early glaucoma while viewing the RNFL parameters. In our study, there were 14 (46.66%) cases of chronic POAG. The inferior and temporal RNFL thickness was affected and this was also noticed in the study of Hua Z, Fang Q, Sha X etal. In our cases the disc was pallor. The optic disc pallor is a predictor of RNFL thinning showing fair sensitivity and specificity for glaucoma.

Our study shows, there were 4 (13.33%) cases of early onset POAG. These were the preperimetric glaucoma cases and could be picked up due to higher diagnostic ability of cirrus HD OCT as Huang L, Fan N, Shen X etal had also the same opinion. Lisboa R, Leite MT, Zangwill LM etal study also showed similar results.

(SD)-OCT is a good diagnostic modality because it can track eye movements, has a faster acquisition time and higher resolution. The sensitivity and diagnostic ability of (SD)-OCT is also much better and very helpful to detect the preperimetric RNFL defects. In our study, as the table showed, the RNFL was thickest in glaucoma suspect cases and thinnest in chronic POAG cases. This variability of the thickness reflected the level of damage of RNFL. So the diagnosis of glaucoma at

**Table 1:**

<table>
<thead>
<tr>
<th>Distribution of patients</th>
<th>No. of patients (%)</th>
<th>CD ratio</th>
<th>IOP mm of Hg</th>
<th>RNFL thickness µm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glaucoma suspect</td>
<td>12 (40%)</td>
<td>6(20%)</td>
<td>0.6-0.7</td>
<td>16-20 mm of Hg</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6(20%)</td>
<td>0.2-0.5</td>
<td>22-24 mm of Hg</td>
</tr>
<tr>
<td>Early POAG</td>
<td>4 (13.33%)</td>
<td>0.2-0.5</td>
<td>18-21 mm of Hg</td>
<td>60-80 µm</td>
</tr>
<tr>
<td>Chronic POAG</td>
<td>14 (46.66%)</td>
<td>0.5-0.9</td>
<td>22-30 mm of Hg</td>
<td>15-80 µm</td>
</tr>
<tr>
<td>Total</td>
<td>30 (100%)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

POAG= Primary open angle glaucoma, CD ratio= Cup disk ratio
IOP= Intra ocular pressure RNFL= Retinal nerve fiber layer
Role of Ocular Coherence Tomography in Glaucoma Diagnosis

any stage could be done by studying the maps of RNFL thickness and if we take the RNFL maps of normal individuals, it would be thickest.

CONCLUSION

Ocular coherence tomography is very helpful for early detection and management of glaucoma patients.

REFERENCES


Tinea imbricata

An 18-year-old Fijian woman presented with a 3-year history of a concentric scaly rash on her trunk and upper and lower limbs. Her brother had similar skin findings. Differential diagnoses are: Erythema gyratum reopens, Tinea corporal, Discoid eczema, Tinea imbricate and Erythrasma.

It is tinea imbricate is a rare, superficial fungal infection caused by Trichophyton concentricum and is endemic to the regions of Central and South America. The lesions, which are often pruritic can develop on any part of the body. The infection tends to follow a chronic or recurrent and relapsing course, although it is not invasive. Courtesy: Nejam. UK
Prevalence of Computer Vision Syndrome (CVS) amongst the Students of Khyber Medical University, Peshawar

Afshan Hassan B.Sc., (Optometry & Orthoptics), MPH
Muhammad Kashif BVS, FAAO, FIACLE, MPH
Zubair Masud FCPS
Mohammad Arshad Raza FCPS

ABSTRACT

Aims and Objectives: To determine the prevalence of Computer Vision Syndrome (CVS) and those factors associated with it.

Methods: This was a cross-sectional study conducted at three undergraduate constituent institutes of Khyber Medical University, Peshawar from Aug.2015-Jan.2016. Three hundred and five (305) undergraduate students selected through simple random sampling were enrolled in the study. CVS and associated factors were assessed through reliable and valid questionnaire. Statistical package for social sciences (SSPS v 16) was used for data analysis. Chi square test (Fisher exact test wherever necessary) was used to evaluate association between various factors and CVS. A p-value <0.05 was considered statistically significant. Students having squint, wearing glasses and those who were not user of computer were excluded.

Results: Of the 305 students enrolled in the final analysis, male: 168 in which 149 (48.8%) positive to CVS and 19 negative and female: 137 in which 127 (46.0%) were positive to CVS and 10 negative were surveyed whom ages were between 18 and 24 years. High prevalence of CVS symptoms (one or more) was observed (90.5%); as shown in figure. Among the underlying factors like type of screen (P<0.03); use of antiglare screens (P=0.04), taking break (P=0.01), screen distance (P<0.02), Screen level (P=0.04) all were statistically significant as shown in Table. Upon cross tabulation between CVS and associated symptoms, headache (53.4%) (P<0.00), dry eyes (P=0.001), watering eyes (P=0.000), redness of eyes (44.9%) (P<0.00), eye tiredness (60.7%) (P<0.00), itching (34.8%) (P<0.00), blurring of vision (34.4%) (P<0.00) and burning sensation (P=.000) were statistically significant, and were more likely associated with computer use.

Conclusion: This study concludes that more than 90% of the students complained of any one of the symptoms of CVS while working on computers. Students were at higher risk of developing CVS, using computer continuously for more hours compared to students who spend fewer hours and took frequent breaks. As the use of computer had become universal, the subject of the prevention of CVS and associated discomfort should be made part of the curriculum with preventive strategies.

INTRODUCTION

Computer Vision Syndrome (CVS) is defined as “the combination of visual symptoms related to the use of computers for more than 3 hours a day, like redness, tiredness, watery, strain, foreign body sensation, irritation, itching, blurred vision, headache and dry eyes”. The condition is called ‘computer vision syndrome.’

Computer monitor has evolved from the cathode ray tube (CRT) in those days which is now obsolete, to the better quality liquid crystal display (LCD) and subsequently the light-emitting diode (LED) monitor in recent years, which has much better resolution and viewing angles, thus provides better eye comfort. This development hardly affect the prevalence of CVS.

The excessive use of computer leads to the symptoms related to Computer Vision Syndrome (CVS) irrespective of age, gender and profession. The extent to which the individuals experience such symptoms often depends on the level of their involvement and the time spent looking at the screen. Most of the students use computers continuously for more hours as compared to other students who spend fewer hours and took frequent breaks, are at a higher risk of developing CVS, which leads to reduced efficiency of work and productivity of work. Prevention of CVS and associated discomfort should be made part of the curriculum in academic institutions with preventive strategies through awareness campaigns.

Note: Afshan Hassan is a young and a promising Optometrist in KPK. She has made a very lucid study of CVS, which is, currently, a very important subject for the computer users who are ignorant of the vagaries of computers and suffer quietly, seeking treatment for symptoms. The computer users, especially the students in general should read this article and follow the instructions in letter and spirit.

Correspondence. Ms. Afshan Hassan Resident Optometrist, Hayatabad Medical Complex Peshawar E-mail: afshanhassan.opto@gmail.com

Original Article
Hence, the use of computer technology in education and other fields and international regulations have been devised with regard to health and safety requirements for workers using VDT’s (Visual Display Terminals). To minimize these disorders and for improvement of technological literacy, certain organizations are working in close collaboration: These are American association of school librarian (AASL), Internet society of technology in education (ISTE), International technology education association (ITEA), United Kingdom Health and Safety (display Screen Equipment) (DSE) regulations and Australian Occupational Health & Safety Act of 2000.

About sixty million people suffer from CVS globally and a million new cases occur every year [14]. According to 2001 United States Census report states that more than 143 million Americans spend time on a computer every day, and 54 million of them are children[41]. According to the National Centre for Education Statistics, 95% of schools and 62% of all class rooms in the USA have had computers since 1999[3]. According to Thompson (1998), the prevalence of ocular symptoms in a computer user, as part of CVS ranges from 25-93%[42]. Since childrens’ visual systems is immature; therefore long periods in front of monitors may retard their visual-spatial awareness [21].

CVS is caused by decreased blinking reflex while working long hours, normal blink rate is about 16-18 times per minute. Studies show that blink rate decreases to as low as 6-8 blinks per minute (about 1/3rd the normal rate) which leads to dry eyes [21]-[24]. Also the near focusing effort puts strain on the ciliary muscle of the eye. This introduces symptoms of asthenopia leading to feelings of tiredness.[24] Diseases that widen the interpalpebral fissures or lid retraction, such as thyroid disease may lead to increased tear evaporation, thereby worsening dry eye symptoms [3].

The human focusing system responds well to images that have well defined edges with good contrast between the background and the letters. The characters on a computer screen are made of tiny dots called pixels. Pixels are the result of electronic beam striking the phosphor-coated rear surface of the screen. These characters have blurred edges as compared to letters on a printed page with sharply defined edges. This makes it difficult for the eye to maintain focus, thereby leading to eyestrain and fatigue [25]-[26].

Large angle of gaze, short and long viewing distance, low and excess screen illumination may exacerbate symptoms of CVS. Computer users open their interpalpebral fissures to look at their monitors, as opposed to others who look downwards at their reading materials. Therefore computer users may have more eye surface exposure to environmental factors, which may lead to increased tear evaporation [3]. Symptoms associated with CVS are diminished when computer users gaze downwards at angles of 14 degrees or more [9]. An upward gaze exposes 40% more of the cornea, which dries out the tear film and compounds the effects of the already dry environment in most offices [21]-[27]. The visual complaints were more pronounced with people employing a viewing distance of less than 10 inches from the computer.

Long non-blinking phases may cause the surfaces of cornea to dry out which can lead to discomfort and reduction in visual clarity [21]. Many patients with CVS also complain of light sensitivity which is worsened by high wattage of fluorescent or flickering lights at the workplace [3]. It is unlikely that use of computers cause permanent damage to the eyes. However, some users of computer may experience continued reduced visual disabilities even after work. [27] Patients with CVS should undergo a comprehensive evaluation that includes the best corrected visual activity and a comprehensive evaluation for any visual pathology

MATERIAL AND METHODOLOGY

This is a cross-sectional study conducted in the Khyber Medical University Peshawar at the Institute of Paramedics, Institute of Nursing and Institute of Physiotherapy for period of 6 months, on under graduate students according to WHO formula, out of N = 1134, paramedics = 538, nursing = 330, physiotherapy = 266, Estimated taken sample size was 130 + 80 + 90 = 300 after simple random sampling. All computer users were included except students having squint and non user of computer.

RESULTS

Of the 305 students enrolled in the final analysis, male: 168 in which 149 (48.8%) positive to CVS and 19
negative and in female: 137 in which 127 (46.0%) were positive to CVS and 10 negative were surveyed, aging between 18 and 24 years. High prevalence of CVS symptoms was observed (90.5%); as shown in figure.

Among the underlying factors like type of screen computer which contributes more in developing CVS, 268(87.9%) of subjects were using LCD type screen and 37(12.1%) of subjects were using CRT type of screens about 94 (30.8%) of the students were using antiglare screening and 211 (69.2%) never used. Nearly 244(80.3%) of the students use to take frequent breaks. Students 60(19.7%) who did not took frequent breaks were at higher risk of developing CVS symptoms. Nearly 128(42.2%) of the students reported they practice a viewing distance of between 20 and 24 inches on studying and experienced symptoms of CVS and 136 (44.7%) who were viewing the computer at a distance of less than 20 inches and students 36 (12.9%) who were viewing computer at a distance of more than 20 inches. Screen level Assessment of the way of viewing computer screen revealed that 136 (44.7%) looked at the screen at the same level, 150 (16.4%) look upward 118 (38.8%) looked downwards (P=0.04) all were statistically significant shown in Table :1

<table>
<thead>
<tr>
<th>Variable</th>
<th>Percentages</th>
<th>P values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer Vision Syndrome Status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>155(53.4%)</td>
<td>p=0.00</td>
</tr>
<tr>
<td>Negative</td>
<td>112(36.6%)</td>
<td></td>
</tr>
<tr>
<td>Type of Computer Monitor Used</td>
<td></td>
<td>.037</td>
</tr>
<tr>
<td>LCD</td>
<td>246(82.1%)</td>
<td></td>
</tr>
<tr>
<td>LRT</td>
<td>30(9.9%)</td>
<td></td>
</tr>
<tr>
<td>Anti-glare Use with</td>
<td></td>
<td>.041</td>
</tr>
<tr>
<td>Computer Monitor for Protection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>138(44.9%)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>9(2.9%)</td>
<td></td>
</tr>
<tr>
<td>Level of Computer Screen</td>
<td></td>
<td>.042</td>
</tr>
<tr>
<td>Above</td>
<td>134(44.3%)</td>
<td></td>
</tr>
<tr>
<td>Same</td>
<td>79(25.9%)</td>
<td></td>
</tr>
<tr>
<td>Below</td>
<td>63(20.7%)</td>
<td></td>
</tr>
<tr>
<td>Break taken during use of</td>
<td></td>
<td>.016</td>
</tr>
<tr>
<td>Computer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>155(53.4%)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>23(7.6%)</td>
<td></td>
</tr>
</tbody>
</table>

DISCUSSION

Amongst 305 who participated (65.8%) were male and 54.1% youngsters (18-24 years old). As a result, 90.5% of the participants were CVS positive. This is in line with the study done in United States. Our findings did not show any significant association between socio-demographic factors. Sara & Joseph reported that attitude towards computer are modifiable regardless of age and gender. Therefore, although majority of our respondents were young male, our results showed that there was no significant association between age, gender, ethnic, working experience and daily computer usage. An increase in the number of hours spent on computer increases the risk of CVS significantly. Statistically eye tiredness followed by headache and burning of eyes. Computer users who spend less than 1 hour on computer daily reported the lowest visual symptoms[15]. Shaivastava and Bhabate found that visual symptoms increased with the increase in working hours on the computer[16] and studies have also shown that less computer users are at low risk of CVS.

Raymond A.T. in a study in Nigeria nearly 60 million people suffer from CVS globally[20-28]. Studies conducted by Agarwal and Sheedy revealed that CVS may result in increased error at work, reduced job satisfaction and lowers productivity by 40%. Similarly, in a study by Indian Ophthalmologists,[20] reported the major symptoms as eyestrain (97.8%), headache (82.1%), tiredness, burning sensation (79.1%), watering (66.4%) and redness (61.2%).

Anshel J. (2006) reported that 75 to 90% of those who work on computers experience at least some of the symptoms of CVS. Nearly 80% of those who work on a computer for more than two hours a day suffer from the symptoms of CVS [21]. He also reported that in the United States, 54 million children use a computer at home or at school. Kesavachandran reported that approximately 22% of computer users have musculoskeletal disorders, such as back pain, back ache, shoulder problems or Carpal tunnel syndrome [22].

In our study nearly 30.8% of them said they avoid glare and reflections while working on computer.
and one fifth of them used antiglare while working on computers. Sen et al reported in his study 30% were using anti-glare screens. A WHO press release (1998) mentions that glare and reflections from VDT displays can be a source of eyestrain and headache. Use of antiglare filters over VDT screens has been associated with less eye complaints. Significantly lower prevalence of visual complaints in the subjects who used antiglare screen was also observed by Bhandari et al and Saurabh et al. Three fourth of the students said they took break after every hour of working on computers. Taking short breaks of 30 min or so every hour, has been shown to decrease discomfort without impeding productivity. Students 19.7% who did not take frequent breaks are at higher risk of developing CVS.

The assessment of practice of the students on the correct use of ergonomics principles while working on computer revealed only by 42.2% of them, They were practicing the ideal viewing distance of 20 to 40 inches while 44.9% working on larger distance and 12.9% on lesser distance. Stella C. et al reported in her study that 26.2%, of respondents employ a viewing distance of 20-30inches. Jaschinski reported in his study the participants preferred viewing distances was between 60 and 100 cm. Different Researchers based on their study, recommended viewing distance of 50 to 70 cm. Recent studies demonstrate that farther placement of the monitor (90 to 100 cm) may produce even fewer symptoms. In our study those students who view at a distance of less than 50 cm were at higher risk of developing CVS.

In our study nearly 118(38.8%) of them said they looked downward to view the screen, 136(44.7%) of them said at the same level and 150(16.4%) said upward. In our study increased odds ratio was seen for all the symptoms of CVS among students who looked upwards compared to students who viewed at the same level or slightly below and increased odds ratio was seen for redness, burning sensation and dry eye. Jaschinski et al. in their study, found that high screens result in greater eyestrain as compared to low screens.

About 163(53.4%) students reported headache in computer work. Lower prevalence of 29.9% was reported by Sene and Richardson reported 61% among undergraduate. Kesavachandra et al. reported 17% of the students at information technology suffered from headache. In our study nearly 185(60.7%) students having eye tiredness because of continuous long term looking to screen develop asthenopia. Nearly 105(34.4%) students reported blurring of vision, other studies also supported the association of blurred vision with computer use. Rosenfeld had reported in his study, a significant difference in the median score.

About 75 (24.6%) reported dry eyes following computer use. Uchino et al., observed symptoms of dry eyes in 10.1% of male and 21.5% of female Japanese office workers using VDTs. Our study showed that there was a statistically significant difference in prevalence of dry eyes between female and male students indicating that the engineering students were at greater risk of developing dry eyes compared to the medical students. When seated in front of a computer for an extended period, blinking may drop by 60%. The reduced blink rates while sitting at a computer monitor contributes to poor tear production resulting in dry eyes. Nearly 150(49.2%) students having complained of watery eyes due to prolonged looking to screen rays reflected from screen to our eyes may cause watering from eyes.

136 (44.6%) students reported burning sensation. Lower prevalence of 28.9% was reported by 55% among the students. Similar findings of 54.6% of prevalence of burning sensation were reported among call center workers in Brazil. In our study 137(44.5%) having Redness complain in students using computer because of more exposure of eye surface to outer environment.

CONCLUSION:

Treatment needs ocular therapy, workplace adjustments, education for good preventive vision care habits and proper computer use. Making changes in workplace ergonomics, like use of anti glare, light adjustment, taking frequent breaks, screen distance and screen level adjustment etc. are mandatory. Frequent use of artificial tears and lubricants can reduce the effects of dry eyes in CVS. The subject of the prevention of CVS and associated discomfort should be made part of the curriculum in institutions, campaigns and training on visual ergonomics should be organized by management so as to reduce prevalence of CVS. Although CVS has not been found to cause any permanent damage to the eyes, yet it’s painful symptoms can affect performance at work.

Recommendations:

i) Lighting - Position the computer screen to avoid glare, particularly from overhead lighting or windows. Use blinds or drapes on windows and replace the light bulbs in desk lamps with bulbs of lower wattage.

ii) Anti-glare screens - If there is no way to minimize glare from light sources, consider using a screen glare filter. These filters decrease the amount of light reflected from the screen.

iii) Seating position - Chairs should be comfortably
padded to conform the body. Chair height should be adjusted so that your feet rest flat on the floor. If your chair has arms, they should be adjusted to provide arm support while you are typing.

iv) **Short breaks** - To prevent eyestrain, try to rest your eyes when using the computer for long periods for short breaks of 15 minutes after every two hours of continuous computer use.

v) **Blinking** - To minimize your chances of developing dry eyes while using a computer, make an effort to blink frequently. Blinking keeps the cornea moist.

vi) **Regular eye examinations** can help to prevent or reduce the development of the symptoms associated with Computer Vision Syndrome.

**REFERENCES**


Persistent pupillary membranes

A 15-year-old boy presented with decreased vision in both eyes. His best corrected visual acuity was 20/20 in RE and 20/60 in LE, with anisometropic amblyopia in the left eye. Differential Diagnosis are: Juvenile xanthogranuloma, Persistent hyperplastic primary vitreous, Protruding iris collarette, Iris duplication and Persistent pupillary membranes.

It is a case of persistent pupillary membranes, remnants of the tunica vasculosa lentis, responsible for the blood supply of developing lens of the fetus. Remnants of the capillaries may persist as small strands attached to the collarette of the iris. Vision is usually unaffected, but occasionally thick membranes can cause deprivation amblyopia, which can be managed with mydriatic agents, surgical excision, or laser-induced lysis. This patient was treated with application of a patch to the right eye for a few hours each day. At follow-up after 3 months visual acuity improved to 20/40.

By courtesy: Varada Gokhale, D.N.B., Sumita Agarkar, M.S., Sankara Nethralaya, Chennai, India.
Different Patterns of Central Serous Chorio-retinopathy on Fundus Fluorescein Angiography

Muhammad Tariq Khan FCPS1, Sidrah Riaz FCPS, FRCS2, Zaheer-ud-Din Aqil Qazi FCPS3, Riaz Qadeer MBBS, DM4, Shahroze Shaukat. MBBS5, Prof. Abdul Majeed Malik FCPS6

ABSTRACT

Purpose: To study the different patterns of central serous chorioretinopathy (CSCR) on fundus fluorescein angiography (FFA).

Materials and Methods: The hospital based descriptive study of 16 male patients was conducted in department of ophthalmology in Akhtar Saeed trust hospital from January 2014 to June 2016. These patients were selected from outpatient department (OPD). The diagnosis was clinical. All patients who have clinical diagnosis of CSCR were sent for FFA (fundus Fluorescein Angiography). Serial photographs were taken up to 30 - 45 minutes with Topcon digital fundus camera.

Results: In the hospital based study 16 male patients with clinical diagnosis of CSCR were included. The age range was 26 – 50 years with a mean age of 30.62 years. Total numbers of eyes were 17, out of which 15 had unilateral disease and one patient had bilateral disease. The clinical features of patients with CSCR were blurred vision, positive central scotoma, decrease in contrast sensitivity, increasing hypermetropia and dome shaped elevation at macula. The duration of visual symptoms on presentation was from 7 days to 2 months (average 2 weeks). On FFA ink blot pattern was seen in 13 eyes and 4 eyes showed smoke stack appearance.

Conclusion: On FFA ink blot pattern is seen more frequently than smoke stack pattern in patients of CSCR.

Key words: Central serous chorioretinopathy (CSCR), fundus fluorescein angiography (FFA), Retinal pigment epithelium (RPE), ink blot pattern, smoke stack pattern, Neurosensory detachment (NSD), Foveal avascular zone (FAZ)

INTRODUCTION

Central Serous Chorioretinopathy (CSCR) is characterized by idiopathic circumscribed serous retinal detachment, usually confined to central macula, caused by leakage of fluid through retinal pigment epithelium (RPE) leading to neuro-sensory detachment (NSD) occasionally associated with retinal pigment epithelial detachment (RPE) as defined by fundus fluorescein angiography (FFA)1,2. Hyper permeability and leakage of RPE and choriocapillaris can be demonstrated on FFA and indocyanine green angiography (ICG)3. The NSD can be visualized and quantitated using optical coherence tomography (OCT). CSCR typically affects people between ages of 20 – 55 years. Risk factors as described by retrospective studies include male gender, psychological stress, elevated levels of endogenous steroids4,5 and Helicobacter pylori6.

FFA findings include patterns of hyperfluorescence within the area of NSD. These typically include an expensive dot pattern in 62-72% of patients and smoke stack pattern in 10-25% or diffuse hyperfluorescence without a definite leakage point in minority of patients7. Zonal hyperperfusion or hyperpermeability of choriocapillaris as a contributing factor in pathophysiology of this disease. In CSCR, there is a breakdown of outer blood retinal barrier which allows the passage of free fluorescein molecules into sub retinal space. Various patterns of dye leakage are seen but most common are ink blot & smoke stack. The unusual forms are inverse smoke stack, diffuse RPE leakage (ooze) and RPE atrophic tracts8. The objective of this study was to identify and see the different patterns of CSCR on FFA.

On FFA in patients with CSCR, ink-blot pattern appear more commonly than smoke-stack pattern. Male patients with single leakage spot involving peri-foveal area as site of predilection of leakage is noted in majority of cases.

MATERIALS AND METHODS

The hospital based descriptive study of 16 patients was conducted in ophthalmology department in Akhtar saeed trust hospital. The patients were

ORIGINAL ARTICLE

Ophthalmology Update Vol. 15. No. 2, April-June 2017
selected from OPD. After history and complete ocular examination clinical diagnosis of CSCR was established. The fundus photographs and fluorescein angiography was done in all 16 patients. Pupils were dilated with 1% tropicamide and 10% phenylepherine. 3ml of 25% intravenous fluorescein was injected after checking sensitivity and fundus serial photographs are taken using digital fundus camera. The patterns of CSCR on FFA were observed and recorded. Early in angiogram, there is a focal dot like hyperfluorescence representing sensory retinal detachment (RD) but does not extends outside the borders of detachment. Two pattern of leakage are seen, first the more common ink blot pattern of dye leakage occur in 90% of cases and second smoke stack leak, described firstly by Shimizu and Tobari in 1971\(^9\) where leakage arises superiorly resembling smoke stack and then plumes our laterally. The later is thought to be related to convection currents and a protein gradient with protein concentration increasing in fluid accumulating under neuro-sensory detachment\(^10\). Smoke stack leaks are usually associated with larger areas of RD. The second and most common pattern of dye leaks occurs in 10% of cases. Focal leaks are more common nasally than temporally, superiorly than inferiorly\(^11,12\). Most leaking points are 1 mm wide ring, starting 0.5 mm from centre of foveal a vascular zone (FAZ).

**RESULTS**

Seventeen (17) eyes of 16 patients were included in study. All of them were male with age range between 26-45 years, with a mean age of 30.62 years. 15 cases were unilateral with one leakage spot and one case showed bilateral involvement, smoke stack pattern in right eye and ink blot in left eye (Figure 2 and 3). All presented with blurred vision, mild hypermetropic refractive error, positive central scotoma and dome shaped central elevation. The duration of visual disturbances was from 1 week to 2 months. On FFA hyperfluorescence with ink blot appearance was seen in 13 (76.47%) eyes and smoke stack appearance in 4 (23.53%).

<table>
<thead>
<tr>
<th>Patient Data</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Number of pt.</td>
<td>16</td>
</tr>
<tr>
<td>Male</td>
<td>16</td>
</tr>
<tr>
<td>Female</td>
<td>Nil</td>
</tr>
<tr>
<td>Age Range</td>
<td>26-50</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FFA Pattern</th>
<th>Number of Eyes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ink Blot 76.47%</td>
<td>13</td>
</tr>
<tr>
<td>Smoke Stack 23.53%</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Laterality in CSCR</th>
<th>No. of Pt.</th>
<th>%age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unilateral Cases</td>
<td>15</td>
<td>93.75</td>
</tr>
<tr>
<td>Bilateral Case</td>
<td>1</td>
<td>6.25</td>
</tr>
<tr>
<td>Total</td>
<td>16</td>
<td>100</td>
</tr>
</tbody>
</table>

Figure 1. Left eye CSCR involving macula; ink blot pattern

Figure 2. Left eye CSCR 4DD size macula involving; Ink blot pattern on FFA

Figure 3. Right eye macula involving CSCR; Smoke stack pattern
DISCUSSION

FFA is an important ocular investigation for eye diseases of vascular origin. A good knowledge of different pattern on FFA is required for correct diagnosis and management of ocular diseases. Our present study was conducted to determine different angiographic patterns in patients of CSCR. Age range was between 26-50 years (mean age 30.62 years) and 15 male patients were affected unilaterally while 01 was suffering from bilateral CSCR.

Castro-Correia et al. studied the evolution of retinal pigment epithelial lesions in CSCR in series of 150 patients with age range 29-49 years. It was seen that the disease was predominantly found in male gender (83.3%). Thus the male preponderance was quite similar to that in our study. In ink blot pattern, the leakage spot increased in size symmetrically to all sides, while in smoke stack pattern, instead of spreading evenly in all directions, the dye first ascends and upon arrival at upper limit of blister, expands laterally in a mushroom or umbrella like picture. An ink blot pattern was seen in 13 (76.47%) and smoke stack pattern in 4 (23.53%). The former being three times more common than later. Ink blot lesion was also seen in 72 % cases and smoke stack in 34.4% in study of 80 eyes of 64 patients conducted by Jamil et al. in Lahore.

Kanski, Stephen J. Ryan and American Academy of Retina and Vitreous have reported that ink blot pattern on FFA is more common. The macula was most common site of fluorescein leakage seen in 76.47% (13) of patients in this study. It was similar to study by Shahin et al in Egypt, who analyzed FFA of 86 patients with CSCR and incidence of involvement of Pappillomacular bundle was 79%.

CONCLUSION

Ink blot pattern appear more commonly than smoke stack pattern on FFA in patients with CSCR. Male patients with single leakage spot involving perifoveal area as site of predilection of leakage is noted in majority of cases.

REFERENCES

Clinical Presentation in Retinoblastoma

Prof. Zia ul Islam FRCS1, Mohammad Arif FCPS2

ABSTRACT

Background: Retinoblastoma is the most common childhood malignancy of the eye. It has become one of the most curable paediatric tumor. Early diagnosis and treatment can stop the disastrous outcomes, in terms of sight and life.

Objective: To determine the trends in demography and presentation of retinoblastoma children, in NWFP Pakistan & Afghanistan.

Study Design: Prospective study

Place of study: Referral center for retinoblastoma, Eye “A” Unit, Department of Ophthalmology, Khyber Teaching Hospital, Peshawar KPK,


Materials and Methods: Patients were registered and admitted in eye ward for evaluation, who presented with leukocoria and other related features suspecting retinoblastoma. EUA, C.T Scan, and ophthalmic scan was done to confirm diagnosis and document details. Face photographs and data were put on record.

Results: 25 paediatric patients, who presented with clinical features of retinoblastoma were registered; 16 patients were male, 09 were female. Mean age was 0.5-7 years. 23 were from lower socio-economic group. 05 patient after diagnosis lost follow up, 20 children received full treatment and have regular follow up. 07 patients developed metastasis and one died.

Conclusion: Meticulous understanding of features of retinoblastoma and acquiring skill to diagnose as well as treat retinoblastoma at first sight, increases survival and prevents loss of vision.

INTRODUCTION

With increasing advances in our understanding of both clinical and molecular genetics of retinoblastoma it makes it important to appreciate the trends in demography and presentation, in retinoblastoma patients, which has become one of most curable childhood cancer. Reported incidence rate for retinoblastoma varies around the world, fluctuating between 1/15,000 and 1/20,000 live births and making it about 3% all childhood cancers. Leukocoria is the most common presentation in the united states about 56% of all retinoblastoma cases detected after observation of leukocoria. Parents use different words, glow, shine, glare for this features. Males and females are equally affected. Incidence of bilateral cases is between 25-40%. Most children present in the first two years of life, but one should be alert not to miss diagnosis throughout first decade of life. In time diagnosis and management plan saves priceless sight and precious lives. Referral to designated regional centers for this purpose helps for good care for better results.

Awareness and repeated eye examination is essential in order to recognize the early sign of retinoblastoma. This will help in detecting the disease at an earlier stage, contributing towards saving the precious vision and valuable life of these children.

PATIENTS & METHODS

This study is based on prospective synthesis of data from 25 registered children, admitted for retinoblastoma, between 31st January, 2007 and 1st January, 2009. All these patients provisionally diagnosed with retinoblastoma were admitted in referral centers. A plan for diagnostic and clinical management in each child was drawn. A detailed history from the parents or close relative was taken in chronological order of events. Fundus examination was carried out under general anesthesia at the fully equipped and staffed, separate eye operation theatre, using indirect ophthalmology with 20 D lens. Both eyes were evaluated for pattern of tumors, including number, size and location of tumors, observational consistency of tumors and feeding vessels also looked for. A diagrammatic view was drawn for both eyes. Face, photograph was also taken. Subsequently staging based on Rees-Elsworth and international classification, was done. C.T Scan and blood profiles including serum LDH was performed. On the basis of the detailed data
and supporting evidence, treatment protocol was decided, which included enucleation, chemotherapy and adjuvant therapy. At the same time parents were counseled for treatment options. Liaison with oncologist and paediatrician was essentially maintained for a better outcome, and effective management.

RESULTS

Total number of newly diagnosed patients was 25 during 31st January, 2007 to 1st January, 2009. The regional strata of retinoblastoma cases is presented in table (1). 25 cases age range was 0.5-7 years. Mean age was 2.7 years. 03 presented at 05 years one at 07 years. Three at 03 years of age, 04 at 04 years of age, 04 at one year of age. 03 at 02 years of age, and the 02 at 2.5 years of age and the rest below 02 years, the youngest are at a 5 months. There were a total number of patients for Afghanistan.

Table 2 presents distribution of unilateral and bilateral retinoblastoma on the basis of sex and age. 16 patients have unilateral disease 9 are bilateral. Unilateral were more common in female. 05 females children had bilateral disease compared to 04 males. (Photo 1)

There were 02 bilateral cases at 02 years of age. 09 were above 03 years of age, in unilateral cases. 03 unilateral were below one year of age.

Table 03 patients presentation pattern of retinoblastoma in patient during January, 2007 to January, 2009. 17 patients presented as leukocoria. 03 as proptosis, 2 as endophthalmitis and one each conjunctivitis, hyphema and buphthalmos. (Photo 2) C.T scan and B. Scan revealed calcification in most of the cases. Seven patients developed metastasis one child died while one patient developed ataxia and meningeal disease. 05 patients lost follow up in the middle of treatment.

DISCUSSION

Reported incidence rates for retinoblastoma vary around the world. A part from genuine ethnic variation, it may also reflect differences between various studies. On the average retinoblastoma occurs approximately one in every 20,000 live births. Males and females are equally affected and the incidence of bilateral involvement ranges between 25% and 40%.3,4,5

Most patients present in the first two years of
Clinical Presentation in Retinoblastoma

life but diagnosis should be accepted throughout the 1st decade. Bilaterally affected children present earlier than those who are unilaterally affected. Most common presenting feature is leukocoria, (cat’s eye reflex), in 56% patients. This crucial sign should be taken very seriously. It can also present as strabismus, buphthalmos, rubeosis, pseudohypopyon and hyphaema.\(^{6,7,8}\) Amongst European and north American patients extraocular spread is very rare event and survival is 95%. But in developing poor countries extraocular extension and distant spread is a frequent phenomenon. Because of that reason in comparison to developed states, survival rate is also poor.

Survival has also been related to physician density and human development index.\(^{11,12}\) In a study by shield et al, it has been reported that lesions simulating retinoblastoma can also occur. In his cohort study 22% patient presented with pseudo retinoblastoma.\(^{16}\) In another series of patients by author the percentage of leukocoria in retinoblastoma patient was 57.4%. In addition 14.3 % presented as proptosis. This is quite deviating from the figures of clinical presentation in developed countries.\(^{15}\) In the series of 80 patients studied by author 25% patients were presented with metastasis. With the mean age of 3.5 years. This unfortunate scenario in a developing country is because of late diagnosis.\(^{18}\)

In another series of 176 patients by Arif and Zia-ul-Islam 31 patients had orbital recurrence after enucleation. Lack of follow up and poverty of patients were the main factors.\(^{19}\)

In our study mean age presentation was 2.7 years, 11 patients presented above 03 years of age, out of which 9 were unilateral which is quite late presentation as compared to recognized studies internationally. Range was 0.5-7 years, 17 patients presently as leukocoria most common presentation in the series. Patients also presented as edophthalmitis proptosis and one patient presented as buphthalmos, was treated with antiglaucoma drugs for one month initially.

Most of the child originates from very poorly economic strata of Afghanistan and adjacent tribal belt. 07 cases were at risk of metastasis which also included optic nerve in vision on histo-pathological examination. The reason for late presentation in this part of the world is poverty, lack of transport to remote regions and lack of awareness amongst people and also medical personnel.

CONCLUSION

Awareness and repeated eye examination is essential in order to recognize the early sign of retinoblastoma. This will help in detecting the disease at an earlier stage, contributing towards saving the precious vision and valuable life of these children affected by the disease.

REFERENCES

17. Muhammad Arif, Zafar Iqbal, Zia-ul-Islam, RETINOBLASTOMA IN NWFP J Ayub Med Coll Abbottabad 2009;21(4) 60
INTRODUCTION

Myopia is generally defined as a spherical refractive error caused by excessive refractive power or increased axial length of the eye, resulting in anterior displacement of focus of rays on retina\(^1\). Patient is considered myopic for refractive error of \(-0.5\)D spherical error which is a future predictor of progression and high myopia is more than \(-6\)D. It is gaining an epidemic level throughout the world touching above 90\% level in south Asian countries like Korea and China\(^2\). Cross-sectional study on pre-school children in America between the ages of 6-7.2 months revealed 3.7\% myopic refractive error in Hispanic, 3.94\% in Asian, 6.6\% in African-American \(^3\). In East Asian and south-east there is an increase in trend in myopia e.g. in southern China there was 38.1\% myopic refractive error in the similar age group \(^4\). In Singapore refractive error between the ages of 7-9 years myopic refractive error was 36.7\%\(^5\). But in Mongols between the ages of 7-17 years myopic refractive error was 5.8\%. Similarly in Nepal between the ages of 5-15 years refractive error was 1.2\%\(^6\). The incidence of myopia in older age is lower than in younger age group. Similar finding was supported in Beaver-Dan eye study. In Finland the incidence of myopia is lower than the other regions mentioned above \(^7\). The risk factors suggested to be involved in development of myopia include parental, gender, ethnicity, education, occupation, income, near work, outdoor activity and axial length of the eye ball \(^8\). As far as parental myopia is concerned its incidence is 6.3\% if both parents are Emmetrope, 18.2\% if one parent is myopic and 32.9\% if both parents are myopic. In relation to near work reading, writing and computer use are important variables\(^9,10,11,12\).

There is an increasing incidence of myopia in children and young adults due to many factors. Near work and use of optical devices by children and teenagers is adding to the complexity of myopic frequency. The incidence of amblyopia particularly in anisometropia and high myopia is an alarming factor particularly because of the growing age.

Axial length has significant increase in patients with prolonged near work particularly in early onset myopia\(^13,14,15\). It has been determined that increased outdoor activity in children results in decrease incidence of myopia. It has been suggested to be due to release of dopamine with increased outdoor activity resulting in controlled axial length\(^16,17\). Quality of life and socio-economic conditions are also important factors in visual
impairment. The challenge to ophthalmologists facing now, is steps to be taken to slow down its prevalence and progress. It needs to be determined what significant factors are contributing to it. Myopia has individual, social and national implications, relating to its economic, psychological and intellectual impacts.

This pilot study is conducted to assess the prevalence of myopia and to find out its correlation to axial length as well as amblyopia in children and young adults.

PATIENTS AND METHODS

Prospective case controlled longitudinal pilot study was conducted at Kuwait Teaching Hospital and Peshawar Medical College, Peshawar, from 1st August-30th November 2016.36 Patients were enrolled with myopia between age group 5-25 years after screening 500 patients in eye OPD. And in another group 13 patients with myopia were selected from a group of 97 school going children at an orphanage between the age of 5-14 years and sent for visual assessment to eye OPD. Brief history was taken, visual acuity was recorded, refraction was done by auto-refraction. Axial length, ACD, VIT depth, were also recorded. Amblyopia if present was also noted.

RESULTS

From the first group of patients 36(7.2%) had myopia. Mean age was 14.99 years, range 5-25 years, median-18 years; 19 were male, 17 were female. Best corrected visual acuity was 6/6 in both eyes in 14 patients. Anisometropia was present in 5, and amblyopia in 7(5.1%) patients. Final refraction revealed high myopia in 17 patients. 11 patients had moderate myopia and 8 patients had low myopia. Mean axial length was in range of 22-27mm.

K1 K2 reading was between 42 and 47D, ACD was between 2.85 and 3.60mm. 30 patients (83%) were involved in near work. 25 patients had nutritional malhabits, 3(12%) patients had family history of myopia. In the other group of school going children 13 (13.4%) had mild myopia. No amblyopia was found due to refractive error in this group of patients.

DISCUSSION

In this current pilot study which was conducted in order to feel the pulse of increasing myopia in Asian countries, particularly in young children and adolescents. In our present study we addressed its relation to axial length and amblyopia, anisometropia and amblyopia and high myopia, which is increasingly threatening the vision of young adults. Ironically ignoring the consequences in these children and teenagers is not fair to these patients. Lack of awareness and non existence of public motivation is further aggravating it. In addition career selection in critical profession in relation to increasing prevalence of myopia will deplete the talents willing to join them.

Present study reveals a correlation between axial length and myopia. Gross difference between axial lengths in both eyes also has correlation to anisometropia and amblyopia. O’connor AR Stephenson et al worked on AL and change of refractive state to eye size in addition to low birth weight (13). JM Huynh SC Kifley also related axial length to oculometric parameters to refraction (14). Our study has the same finding related to high myopia specifically.

Melissa Wagner-schuman et al worked on senior school children to stop the progress in myopic children through fitting of modified glasses (16). Seo-welleo et al also worked on stopping the progression of myopia (15). In our pilot study we didn’t carried out the issue of stopping the progress of myopia. Quek TP, Chua CG, Chong CS also worked on refractive errors in teenage high school students in Singapore (5). On the same subject.

CONCLUSION

There is an increasing incidence of myopia in children and young adults due to many factors. Near work and use of optical devices by children and teenagers is adding to the complexity of myopic frequency. The incidence of amblyopia particularly in anisometropia and high myopia is an alarming factor particularly because of the growing age. It needs further study in a larger group of patients.

REFERENCES

1. Frick TR, Holdan BA, Wilson DA, Schenther G, Naidoo KS et al. world health organ2012;90(10) 728-738
9 Lisa O’Donoghue, Venediktos V et al. risk factors for childhood myopia: findings from the NICER study. Invest ophthalmol and vis sci, march 2015;vol.56,1524-1530
10 Pan CW, Ramanurthy D, Sams M. worldwide prevalence and risk factor for myopia. Ophthalmol physiol opt 2012;32 (1) 3-16
15 Melissa Wagner-schuman, Maureen Neitz et al. slowing the progression of myopia in children. Journal of vision December 2008;vol.8, 90
17 Jenny M. Ip; seang-mei saw et al. Role of near work in myopia: findings in a sample of Australian school children; july 2008;vol.49,2903-2910
18 Seo-wee lo et al. an evidence based update on myopia and interventions to retard its progression. JAPOS.2011 apr;15(2):181-189
20 Charman N. Myopia, its prevalence origins and control. Ophthalmic physiol opt 2011; 31 (1) 3-6.

---

Notice to Advertisers. Please Hurry Up!
Advertise in time to avoid disappointment
For July’2017 Issue of Ophthalmology Update,
to be published & Distributed by 1st July’2017.

Tariff for each advertisement A-4 size:

Inside pages..................................................Rs. 10,000/- for each page per issue
Front inside & back outside/inside.............Rs.15,000/- for each issue
Annual package (4 issues)..........................Rs.35,000/- (discounted rate).

For advertisement details, Please contact:
Advertisement Manager, 267-A, St 53, F-10/4, Islamabad
Cell: 03335158885. E.Mail>ophthalmologyupdate@gmail.com
ABSTRACT

Purpose of the study: To see anatomic and visual outcomes after treatment of diffuse diabetic macular edema intravitreal bevacizumab (Avastin).

Study Design: Prospective case series study.

Materials and Methods: In this study, we included 20 eyes of patients from outpatient department (OPD) of ophthalmology in Rehman Medical Institute who had controlled diabetes mellitus (DM) with diffuse diabetic macular edema with a mean age of 65 years. They were treated with three intravitreal injections of bevacizumab 1.25 mg in 0.05 ml, 01 month apart. Outcome was measured mainly in terms of visual acuity (VA) and central macular thickness seen with optical coherence tomography imaging. Patients were examined at baseline and follow-up visits.

Results: All the patients in the study received three injections of intravitreal bevacizumab with an interval of one month per eye. No complication like endophthalmitis, inflammation and increased intraocular pressure or thromboembolic event occurred in any patient. In our study, the mean baseline acuity was measured as 20/494 (log Mar=1.338±0.455) and the mean acuity at three months follow up turned out to be 20/295 (log Mar=1.094±0.254) which was highly significant (P =0.008). In the same manner, mean central macular thickness decreased to 369 µm at three months from 492 µm at baseline (P =0.001)

Conclusion: Intravitreal bevacizumab resulted in a significant improvement in visual acuity and decrease in macular oedema in diabetic patients at three months. Though effect was reduced at 06 months interval but still significant statistically.

INTRODUCTION

Diabetic macular edema (DME) is an important cause for decreased vision in diabetic population. If remains untreated, it can lead to profound visual loss. Vascular endothelial growth factor (VEGF) has got an established leading role in developing neovascularization and increased vascular permeability in diabetic eyes. Ocular levels of VEGF are directly related to formation and permeability of new vessels.

Increased VEGF levels have been shown in vitrous of patients with DME. Bevacizumab is a humanized monoclonal antibody which inhibits all active isoforms of VEGF. Intravitreal injections of bevacizumab is also been used for macular edema associated with central retinal vein occlusion (CRVO), proliferative diabetic retinopathy (PDR), neovascular age-related macular degeneration (ARMD), rubecosis irides, and retinopathy of prematurity. Intravitreal injection of bevacizumab is an off-label use that has risen significantly due to its efficacy and economic considerations. Keeping in view these findings, we evaluated intravitreal bevacizumab in DME because VEGF seems to be the main culprit in these cases.

Intravitreal bevacizumab resulted in a significant improvement in visual acuity and decrease in macular oedema in diabetic patients at three months. Though effect was reduced at 06 months interval but still significant statistically.

MATERIALS AND METHODS

This study included 20 eyes with diffuse DME whose best corrected visual acuity was ≤ 20/200. They were given intravitreal bevacizumab. Out of these, six eyes also had active proliferative diabetic retinopathy (PDR). Eyes that exhibited the following features were excluded:

- Focal macular edema due to leakage from microaneurysms.

- Presence of any other macular pathology like ARMD or any vascular occlusive diseases affecting macula,

- Those with evidence of vitreo macular traction. Patients with uncontrolled diabetes, hypertension, chronic renal failure and history of stroke were excluded from the study.

Cells in anterior chamber were examined for ocular inflammation using slit lamp beam (2x1mm). They were graded as zero cells if none was found in any optical section,0.5 + cells indicated that one to three cells were observed, 1 + cells three to 10 cells, 2 + cells 10 to 25 cells, 3 + cells 25 to 50 cells and 4 + cells > 50 cells and or hypopyon present.
Each patient underwent best corrected distance VA measurement with early treatment diabetic retinopathy (ETDRS) chart and ophthalmic assessment including slit-lamp biomicroscopy. All the patients underwent anterior segment examination, fundus examination with non contact + 78D lens. Central macular thickness was measured with optical coherence tomography. The study parameters were evaluated three months and six months after the thirdintravitreal injection. The intravitreal dosage of bevacizumab was 1.25mg/0.05cc. All the injections were performed in a strict aseptic fashion and prophylactic topical antibiotics were given for ten days post injection. Study parameters included:

**Visual acuity measurement:**

Central macular thickness as measured by OCT and incidence of side-effects which included rise in intraocular pressure (IOP), inflammation and endophthalmitis.

Systemically all the patients were monitored for blood pressure rise, chest pain and thromboembolic events (weakness in limbs). Statistical analysis for descriptive statistics was performed using SPSS statistical software. Repeated measures analysis of variance test (2 ways ANOVA) was applied for the analysis.

**RESULTS**

The baseline characteristics included a mean VA of 20/494 (logMAR=1.338±0.455), mean central macular thickness of 492.8±167.2 µm and mean IOP of 15±3 mmHg. All the eyes had diffuse macular edema diagnosed by OCT at baseline.

**Three-month outcomes:** statistically significant changes in VA and central macular thickness were observed at month 3 after third intravitreal injection. VA at month 03 improved to a mean of 20/295 (logMAR= 1.094±0.254), a difference from baseline that was highly significant (P =0.008). Mean central macular thickness at month 03 was 377.3±113.57 µ, a difference from baseline that was also highly significant (P =0.001). The mean IOP was 16.0 mmHg. There was no incidence of significantly raised IOP in any eye . No systemicadverse events were seen . None of the injected eyes had 2+ or more cells.

**Six-month outcomes.**

The mean VA was 20/304 (logMAR=1.124±0.219). Though the mean VA worsened marginally the difference was still statistically significant compared to baseline (P =0.029). The mean central macular thickness was 379±104 µ at the end of six months' follow-up (P =0.001). The mean IOP was 17.00 mmHg at the end of six months. During the entire follow-up of six months, there were no cases of clinically evident inflammation, endophthalmitis, increased IOP or retinal detachment.

<p>| Table 1: Patient characteristics including visual acuity and CMT changes |
|-----------------|----|----|----|----|---|</p>
<table>
<thead>
<tr>
<th>Age</th>
<th>Previous laser</th>
<th>ET 0</th>
<th>ET 3</th>
<th>ET 6</th>
<th>CMT 0 microns</th>
</tr>
</thead>
<tbody>
<tr>
<td>61</td>
<td>Grid</td>
<td>20/2000</td>
<td>20/800</td>
<td>20/800</td>
<td>830</td>
</tr>
<tr>
<td>47</td>
<td>Focal</td>
<td>20/800</td>
<td>20/400</td>
<td>20/400</td>
<td>917</td>
</tr>
<tr>
<td>58</td>
<td>PRP+Focal</td>
<td>20/800</td>
<td>20/800</td>
<td>20/400</td>
<td>353</td>
</tr>
<tr>
<td>53</td>
<td>Grid</td>
<td>20/400</td>
<td>20/300</td>
<td>20/200</td>
<td>329</td>
</tr>
<tr>
<td>69</td>
<td>Focal</td>
<td>20/320</td>
<td>20/200</td>
<td>20/250</td>
<td>421</td>
</tr>
<tr>
<td>68</td>
<td>Grid</td>
<td>20/250</td>
<td>20/160</td>
<td>20/200</td>
<td>314</td>
</tr>
<tr>
<td>69</td>
<td>PRP+Focal</td>
<td>20/200</td>
<td>20/200</td>
<td>20/250</td>
<td>452</td>
</tr>
<tr>
<td>68</td>
<td>Grid</td>
<td>20/800</td>
<td>20/400</td>
<td>20/400</td>
<td>618</td>
</tr>
<tr>
<td>68</td>
<td>PRP+Focal</td>
<td>20/200</td>
<td>20/250</td>
<td>20/250</td>
<td>601</td>
</tr>
<tr>
<td>64</td>
<td>Grid</td>
<td>20/320</td>
<td>20/250</td>
<td>20/200</td>
<td>378</td>
</tr>
<tr>
<td>57</td>
<td>Grid</td>
<td>20/300</td>
<td>20/200</td>
<td>20/200</td>
<td>388</td>
</tr>
<tr>
<td>58</td>
<td>Focal</td>
<td>20/200</td>
<td>20/125</td>
<td>20/160</td>
<td>418</td>
</tr>
<tr>
<td>61</td>
<td>PRP+Focal</td>
<td>20/800</td>
<td>20/400</td>
<td>20/320</td>
<td>415</td>
</tr>
<tr>
<td>63</td>
<td>Focal</td>
<td>20/400</td>
<td>20/400</td>
<td>20/800</td>
<td>510</td>
</tr>
</tbody>
</table>

**Figure 1:** Mean logMAR visual acuity at various time intervals

**Figure 1:** Mean macular thickness at various time intervals
DISCUSSION

We report the results of 20 consecutive eyes with diffuse DME treated with intravitreal bevacizumab which resulted in both anatomic and functional improvement. Our results also show that bevacizumab was well tolerated and no systemic adverse events were noticed during the study. Ocular tolerance was also high and no ocular inflammation was noted. Intravitreal steroids reduce macular edema for which several theories were proposed, including local reduction of inflammatory mediators, lower levels of VEGF, increased diffusion by an effect on calcium channels and improved blood retinal barrier function;\(^ {16}\) it however remains plagued by a considerably high percentage of side-effects, namely cataract progression in a number of eyes and rise in IOP (10 to 50%).\(^ {17}\)

Another finding that had surfaced during this study, which has already been shown by other studies, is the prompt regression of neovascularization in the five eyes with active PDR. These eyes underwent a milder form of PRP four to six weeks post intravitreal bevacizumab injection.

In this small study, the mean central macular thickness reduced to 369 µ from 492 µ and the visual acuity also showed a modest improvement from a baseline of 20/494 to 20/295 at the end of six months.

Bevacizumab has already been used for DME.\(^ {17}\)

The capillary permeability seen in DME is secondary to release of VEGF, primarily VEGF-A whose release is inhibited by the pan anti-VEGF monoclonal antibody, Avastin.\(^ {5}\)

Similar to the study published by Haritoglou et al.\(^ {17}\) our study also demonstrated significant improvement in VA and decrease of central macular thickness. But in contrast to their study (six weeks follow-up) our study population was more homogenous and we followed up all the patients for six months. We also monitored for any post injection ocular inflammation in the form of anterior chamber cells and any systemic adverse events caused by bevacizumab. Additionally, our study show the beneficial effect of intravitreal bevacizumab in patients with DME associated with active PDR. The PRP laser requirements were reduced in this subset of patients following the intravitreal injection.

Our preliminary study provides evidence that inhibition of VEGF associated with both pathological ocular neovascularization and increased retinal vascular permeability in diabetic retinopathy may produce a clinically meaningful and statistically significant benefit in the treatment of DME.

CONCLUSION

Intravitreal bevacizumab resulted in a significant improvement in visual acuity and decrease in macular oedema in diabetic patients at three months. Though effect was reduced at 06 months interval but still significant statistically.

REFERENCES


Different Patterns of Retinal Vein Occlusion on Fundus Fluorescein Angiography

Sidrah Riaz., FCPS, FRCS1. Muhammad Tariq Khan FCPS2. Zaheer-ud-Din Aqil Qazi FCPS3, Riaz Qadeer MBBS, DMJ4. Shahroze Shaukat MBBS5

ABSTRACT

Purpose: To study the different patterns of retinal veins occlusion (RVO) on fundus fluorescein angiography (FFA).

Materials & Methods: It is a hospital based descriptive study of 33 patients, conducted in Akhtar Saeed Trust Hospital, Ophthalmology Department from February 2014 to October 2016. These patients were selected from outpatient department (OPD) and diagnosed as cases of vein occlusions clinically. Presenting features were sudden painless visual loss, visual field defects, floaters if neovascularization has occurred, flame shaped retinal hemorrhages, dilated tortuous veins in all four quadrants or segmental depending upon it is central or branch vein occlusion. Patients with cataract, vitreous hemorrhage, proliferative diabetic retinopathy and media opacities which impair fundus view were excluded. After informed consent all selected patients were sent for fundus fluorescein angiography (FFA) with intravenous injections of 3ml of 25% and multiple photographs were taken for 20-25 minutes with Topcon digital fundus camera. The pattern of vein occlusions were observed and noted.

Results: In this hospital based study 33 patients of vein occlusions, 21 males and 11 females, all with unilateral involvement were included. The age range was 50-75 years with mean age 62.50 years. The duration of visual disturbances on presentation was 2 to 4 weeks from onset of visual symptoms. After clearance of hemorrhages fundus fluorescein angiography (FFA) was performed. Most common site for venous occlusion was superotemporal quadrant seen in 39.40% cases and non ischemic variety of vein occlusion was more common than ischemic variety.

Conclusion: Based on FFA findings non ischemic CRVO was more common as compare to ischemic CRVO. Temporal BRVO’s were seen more commonly as compared to nasal BRVO. Macular edema and leakage was seen in all cases of retinal vein occlusion (RVO).

Key Words: Retinal vein occlusions (RVO), Central retinal vein occlusion (CRVO), Branch retinal vein occlusion (BRVO), Neovascularization (NV).

INTRODUCTION

Retinal vein occlusion (RVO) is the second most common retinal vascular disease following diabetic retinopathy1. There are three distinct types of retinal vein occlusion (RVO): branch retinal vein occlusion (BRVO), central retinal vein occlusion (CRVO) and anatomical variant of CRVO, namely, hemi-retinal vein occlusion (HRVO).

Retinal vein occlusion (RVO) affects men and women equally predominantly in persons over 65 years 2,3,4. Central retinal vein occlusion (CRVO) is associated with systemic vascular disease including hypertension and diabetes mellitus5. Histopathological studies demonstrated a thrombus occluding lumen of central retinal vein at or just proximal to lamina cribrosa6. CRVO has two types on basis of FFA, non ischemic (perfused, partial or incomplete) CRVO and ischemic (non perfused, complete or hemorrhagic). In 1904, Coats was the first to describe these two types. Perfused CRVO occurs after occlusion of retinal venous flow while nonperfused CRVO develops after occlusion of venous and arterial flow. The eyes with nonperfused or ischemic CRVO show greater degree of intraretinal hemorrhages, macular and disc edema, and capillary nonperfusion than in perfused CRVO.

Non ischemic CRVO was more common as compare to ischemic CRVO. Temporal BRVO’s were seen more commonly as compared to nasal BRVO. Macular edema and leakage was seen in all cases of retinal vein occlusion (RVO).

BRVO most commonly occurs at arteriovenous crossing 7,8,9. In normal eyes retinal arteries cross over retinal veins in 70-75% of intersections 10,11. Systemic risk factors associated with it are hypertension and arteriosclerosis, diabetes, smoking, hyperlipidemia, glaucoma and ocular inflammatory disease12. Some studies have suggested increased risk of BRVO in eyes with shorter axial length13,14,15,16. Histopathologically, the retinal artery and vein share a common adventitial sheath, and in some case, a common medium. The lumen of vein may be compressed up to 33% at
crossing site\(^{17, 18}\). The resulting venous obstruction leads to elevation of venous pressure that may over load the collateral drainage capacity\(^{19}\) and lead to macular edema and ischemia by mechanisms that are still under investigations. Unrelieved venous pressure can also result in rupture of vein wall with intraretinal hemorrhage \(^{20}\).

Retinal vein occlusion have characteristic, although somewhat variable appearance with intraretinal hemorrhage, cotton wool spots, tortuous and dilated retinal veins, retinal edema and occasionally optic disc swelling. These findings are present segmentally in BRVO, in either the superior or two inferior quadrants in HRVO, and in all quadrants of fundus in CRVO (classic blood and thunder appearance in CRVO). Vision loss can vary from minimal to complete visual blindness depending on extent of involvement of retina by vein occlusion. Causes of vision loss associated with RVO include macular edema, macular non perfusion and ischemia, epiretinal membrane, dense intraretinal hemorrhages, vitreous hemorrhage, neovascular glaucoma or tractional retinal detachment\(^{21, 22, 23, 24, 25}\).

**MATERIALS AND METHODS**

The hospital based descriptive study of 33 patients (21 males and 11 females) was conducted in ophthalmology department in Akhtar Saeed Trust Hospital for 32 months, from February 2014 to October 2016. The patients were selected from OPD. After history and complete ocular examination clinical diagnosis of central or branch retinal vein occlusion was established. Patients with cataract, vitreous hemorrhage or media opacities impairing fundus view are excluded. Demographic data such as patient age and gender are noted. The age range of patients was 50-75 years with mean age 62.50 years. All patients had unilateral involvement were included. Presenting features were sudden painless visual loss, visual field defects, floaters, flame shaped retinal hemorrhages, dilated tortuous veins in all four quadrants or segmental depending upon it is central, branch retinal vein occlusion was. Patients with cataract, vitreous hemorrhage or media opacities impairing fundus view are excluded. Demographic data such as patient age and gender are noted. The age range of patients was 50-75 years with mean age 62.50 years. All patients had unilateral involvement were included. Presenting features were sudden painless visual loss, visual field defects, floaters, flame shaped retinal hemorrhages, dilated tortuous veins in all four quadrants or segmental depending upon it is central, branch retinal vein occlusion. After informed consent, the colored fundus photographs and fluorescein angiography was performed in all 33 patients. Retinal hemorrhages after retinal vein occlusions usually take 6 weeks to clear and FFA was planned 6 weeks after the onset of disease. Pupils were dilated with 1% tropicamide and 10% phenylephrine 3ml of 25% intravenous fluorescein was injected after checking sensitivity and fundus serial photographs are taken using Topcon digital fundus camera. fluorescein was injected over the course of few seconds. Images were taken at approximately one second interval, beginning 5-10 seconds after injection and continuing through the desired phases (pre arterial, arterial, arteriovenous and venous phases) for 20 to 25 minutes. The patterns of vein occlusion on FFA were observed and recorded. The initial pre arterial or choroidal phase which typically occurs 9-15 seconds after dye injection, was noted (it was longer in patients with vascular diseases). In non ischemic vein occlusions delayed arteriovenous transit time, hypo fluorescence by blockage due to hemorrhages and hyper fluorescence leakage at macular area was observed where as in ischemic variety extensive capillary non perfusion (hypo fluorescence) and vessel wall staining.

**RESULTS**

Out of 33 patients of vein occlusion 13 patients (39.40%) were diagnosed as cases of central retinal vein occlusion. Five patients (4 males and 1 female) 24.24% has ischemic CRVO and eight patients (5 males 3 females) 15.15% has non ischemic CRVO. Non ischemic CRVO was more common than ischemic. Total 20 patients (60.61%) had BRVO (11 males 9 females) including 13 (39.50%) temporal BRVO (supero-temporal BRVO 9 (27.27%), 4 (12.12%) infero-temporal BRVO) were more than nasal BRVO that were only 2 (6.06%) in supero-nasal position and 5 (15.15%) cases were suffering from macular BRVO. Supero-temporal BRVO was more common pattern than nasal BRVO.

<table>
<thead>
<tr>
<th>Patient Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Retinal Vein Occlusion</td>
</tr>
<tr>
<td>Vein Occlusion (CRVO)</td>
</tr>
<tr>
<td>----------------------</td>
</tr>
<tr>
<td>Ischemic CRVO</td>
</tr>
<tr>
<td>Non-Ischemic CRVO</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>
**DISCUSSION**

For nearly 50 years FFA is valuable in expanding our knowledge of anatomy, pathology and pathophysiology of retina and choroid\(^{26}\). It is used as an important investigation in establishing diagnosis of retinal vascular diseases\(^{27,28,29,30}\). Fluorescein angiographies have greatly increased our knowledge of retinal and choroidal circulatory physiology and fundus pathology. Ischemia or capillary drop out, seen as areas of hypo fluorescence on FFA, carry a high risk of complications that is neovascularization. Macular edema is typically patellloid hyper fluorescence.

CRVO has two types on basis of FFA, non ischemic (perfused, partial or incomplete) CRVO and ischemic (non perfused, complete or hemorrhagic). A non ischemic variety demonstrates less than 10 disc diameter areas of retinal capillary nonperfusion on angiography. These eyes have lesser degrees of intra-retinal hemorrhages on presentation; generally have better degree of initial and final visual acuity. A non perfused CRVO demonstrates more than 10 disc diameters areas of capillary drop out on FFA seen as areas of hypo fluorescence. These eyes show greater degree of intra-retinal hemorrhages, macular and disc edema, and capillary non-perfusion than in perfused CRVO.

The central retinal vein occlusion study (CVOS)\(^ {31,32,33}\) reported that in first 4 months of follow up 15% of eyes with Perfused CRVO converted into nonperfused variety and after 3 years 34% eyes converted into nonperfused CRVO. In eyes initially diagnosed as Perfused CRVO only 10% developed NV at iris or anterior chamber angle (NVI/NVA) compared to 35% of eyes initially characterized as non-perfused.

BRVO is more than twice as common as CRVO, as also seen in our study and more than 10 times as HRVO\(^ {34,35,36,37}\). The most common location of BRVO is superotemporal quadrant of retina. This may be due to increased symptoms of temporal versus a
nasal occlusion. Of temporal BRVO’s 62% occur superotemporal quadrant and 38% in inferotemporal quadrant. FFA should be obtained to verify diagnosis and evaluate complications. FFA has also prognostic significance as in macular leakage and edema, macular ischemia, areas of capillary non perfusion that may portend eventual neovascularization. The most common site for neovascularization after BRVO is retina and least common site is iris. When disc NV does occur, retinal NV is typically present as well. The incidence of retinal neovascularization increased to 36% in cases with 5 disc diameters or more of retinal non perfusion in BRVO.

FFA is the only technique that accurately defines the capillary abnormalities in BRVO so it is important to get a good angiography in all patients. According to collaborative BRVO study (BVOS) argon laser photocoagulation is applied in grid pattern throughout leaking area demonstrated by FFA so it is also important in planning treatment of BRVO. Dense intraretinal hemorrhages make FFA interpretation challenging due to blockage of fluorescein by hemorrhages in acute vein occlusions so it is advisable to get FFA only after intra-retinal hemorrhages are cleared significantly from macula, usually 6 weeks after onset of disease. The characteristic findings on FFA are delayed filling of occluded retinal vein. Varying amount of capillary non perfusion, blockage from intra-retinal hemorrhages, micro aneurysms, telangiectatic collateral vessels and dye extravagation from macular edema or retinal neovascularization are other features encountered.

CONCLUSION:

Based on FFA findings non ischemic CRVO was more common as compare to ischemic CRVO. Temporal BRVO’s were seen more commonly as compared to nasal BRVO. Macular edema and leakage was seen in all cases of retinal vein occlusion (RVO).

REFERENCES

32. Central vein occlusion study group: Evaluation of grid pattern photocoagulation for macular edema in central vein occlusion.
Different Patterns of Retinal Vein Occlusion on Fundus Fluorescein Angiography


Occlusion Therapy in Older Children with Amblyopia
(Efficacy of part-time occlusion vis-à-vis full time occlusion)

Rafiq M, FCPS¹, Ahmad I, FCPS², Rasool J, FCPS³, Rehman M, FCPS⁴

ABSTRACT
Aim: To compare the effects of full-time to part-time occlusion therapy in management of amblyopia in children of age 7-12 years.

Materials and Methods: It was a prospective interventional case series study. One hundred children seen at ophthalmology outpatient department at Rehman Medical Institute, between 7-12 years of age with anisometropic (57), strabismic (25) and mixed (18) unilateral amblyopia were randomized (simple randomization) into four groups (25 each) to receive two hours, four hours, six hours or full-time occlusion therapy. Children were regularly followed up at six-weekly intervals for a minimum of three visits.

Statistical Analysis: Intra group visual improvement was analyzed using paired t-test while intergroup comparisons were done using ANOVA and unpaired t-test.

Results: All four groups showed significant visual improvement after 18 weeks of occlusion therapy (P<0.001). Seventy-three (73%) of the total 100 eyes responded to amblyopia therapy with 11 eyes (44%), 17 eyes (68%), 22 eyes (88%) and 23 eyes (92%) being amblyopia responders in the four groups respectively, with the least number of responders in the two hours group. In mild to moderate amblyopia (vision 20/30 to 20/80), there was no significant difference in visual outcome among the four groups (P=0.083). However, in severe amblyopia (vision 20/100 or worse), six hours (P=0.048) and full-time occlusion (P=0.027) treatment were significantly effective in more than two hours occlusion.

Conclusion: All grades of part-time occlusion are comparable to full-time occlusion in effectiveness of treatment for mild to moderate amblyopia in children between 7-12 years of age unlike in severe amblyopia, where six hours and full-time occlusion were more effective than two hours occlusion therapy.

INTRODUCTION
Amblyopia is defined as decreased visual acuity caused by visual deprivation or abnormal interaction between the two eyes for which there is no detectable cause and with an appropriate therapeutic measures can be reversed.¹ Amblyopia is one of the most important causes for decreased vision in children.² Occlusion therapy with patching of the better seeing eye has long been the mainstay of amblyopia management.³,⁴ Initially it was a common belief that occlusion therapy should be prescribed for full time, and that removing the patch even for a short period of time would lead to loss of all the benefit of previous patching.

New studies that prescribed occlusion for as less as one to two hours per day to a maximum of 24 h per day have been reported.⁵,⁶,⁷,⁸,⁹ While initial studies were retrospective and their results varied,⁶,⁷,⁸ Pediatric Eye Disease Investigator Group (PEDIG) was set up to address the need for prospective clinical trials in the treatment of amblyopia.⁷,⁸,⁹

Because age of six to seven years is thought to be the end of the "critical period" for visual development in children, that is why it is thought that amblyopia treatment may not be effective in older age group.¹² Various studies have described conflicting results varying from no effect of age to a highly significant effect.¹³,¹⁴,¹⁵,¹⁶ Patwardhan¹⁶ has shown equally good results in anisometropic amblyopia, even beyond 12 years of age. PEDIG¹¹ found that for amblyopia treatment in patients aged 7-12 years, augmenting the optical correction with patching therapy of two to six hours daily doubled the treatment responder rate to 53%. Compared to this, Brar et al.²³ in their study in older children (> six years) have reported a substantial improvement in visual outcome in nearly 90% of the children with full-time occlusion.

All grades of part-time occlusion are comparable to full-time occlusion in effectiveness of treatment for mild to moderate amblyopia in children between 7-12 years of age unlike in severe amblyopia, where six hours and full-time occlusion were more effective than two hours occlusion therapy.

Hence whether part-time occlusion is equally efficacious as full-time occlusion in older children is still not clear. The aim of the study was to determine the efficacy of part-time occlusion vis-à-vis full time occlusion.
occlusion in children 7-12 years of age with amblyopia.

**MATERIALS AND METHODS**

This prospective study was started in August 2015 and enrolled 100 unilateral amblyopic (strabismic, anisometropic or combined type) children in the age group of 7-12 years. An informed written consent was obtained from the parents of the participating children. The sample size was calculated by assuming an acceptable standard error of 0.05 at 95% confidence level. Baseline testing included measurement of visual acuity, cycloplegic refraction using atropine, and a complete orthoptic and ocular examination of both eyes. The children were corrected for refractive error, if any, for at least six weeks prior to inclusion in the study.

Best corrected visual acuity (BCVA) in the amblyopic eye of 20/30 or less subsequent to the refractive correction for six weeks was used as a diagnostic criterion for amblyopia. Only unilateral cases were selected with BCVA of 20/20 in the normal eye. A difference between the spherical equivalents of the two eyes exceeding 1.00 diopter (D) or astigmatism exceeding 1.5 D was considered anisometropia while amblyopes who had constant esotropia or exotropia were classified as strabismic type. They were randomized into four groups of 25 children each using simple randomization (computer-generated random numbers) to receive two hours, four hours, six hours or full-time occlusion therapy.

Inclusion criteria for the study included unilateral amblyopia associated with strabismus, anisometropia, or both in children ranging from 7-12 years of age, having ability to record visual acuity accurately on Snellens’ vision chart. LogMAR conversion was done to facilitate calculation of mean visual acuity and its comparison between different groups.

Exclusion criteria included presence of a known cause of reduced visual acuity, myopia more than a spherical equivalent of -6.00 D, history of previous amblyopia treatment within one year of enrolment, prior intraocular surgery and known skin reaction to patch or bandage adhesive. Dropouts and non-compliant patients were excluded from final analysis. **Patients were prescribed patching as per the following regimes:** Non-amblyopic eye was patched for limited number of hours each day; two hours in Group 1, four hours in Group 2 and six hours in Group 3. Patch was applied continuously during waking hours. In addition to occlusion, the parents were instructed to have the child spend at least one of the hours of patching time each day performing near visual activities. The near visual activity advised was performing their routine homework. Non-amblyopic eye was patched for all waking hours or all but one hour in group 4 children for all seven days a week. Patch could be removed during the night but it was to be applied first thing in the morning. Six-weekly follow-up was done for a minimum period of 18 weeks. During each follow-up visit, visual acuity was recorded on the same visual acuity chart.

The primary outcome was the BCVA in the amblyopic eye at 18 weeks. Amblyopia responders, defined as those who gained at least two lines of vision between the first and the final visit, were calculated for each of the four groups. The children were further subdivided into two subsets of mild-moderate and severe amblyopia to study the independent effect of occlusion therapy in each subset. Mild-moderate amblyopia was defined as a BCVA between 20/30 to 20/80 in the amblyopic eye while severe amblyopia was defined as BCVA of 20/100 or less in the amblyopic eye.

Statistical analysis between pre-treatment and post-treatment change in acuity was done by paired t-test. The difference between the two groups in the variance of the change in amblyopic eye visual acuity produced was analyzed using Analysis of Variance (ANOVA) test and unpaired t-test.

**RESULTS**

Out of 100 cases, there were 57 cases of anisometropic amblyopia, 25 cases of strabismic amblyopia and 18 cases of mixed amblyopia. The mean age was 8.9 ± 1.7 years in Group 1, 9.5 ± 2.1 years in Group 2, 10.0 ± 1.8 years in Group 3 and 9.3 ± 2.1 years in Group 4. The baseline BCVA was 0.67 logMAR units (range 20/40 - 20/400) in Group 1, 0.80 logMAR units (range 20/40 - 20/400) in Group 2, 0.68 logMAR units (range 20/30 - 20/400) in Group 3 and 0.76 logMAR units (range 20/30 - 20/400) in Group 4. The four groups were matched for age (P =0.355), distribution of the three types of amblyopes (P =0.3) and pre-treatment BCVA (P =0.183). Post-treatment visual acuity was measured at completion of 18 weeks and was compared with pre-treatment visual acuity using paired t-test. The results showed significant visual improvement in all four groups at the end of the study period (P <0.001).

Seventy-three (73%) of the total 100 eyes responded to amblyopia therapy with 11 eyes (44%), 17 eyes (68%), 22 eyes (88%) and 23 eyes (92%) being amblyopia responders in each group respectively, with least number of responders in the two hours group. ANOVA test revealed a statistically significant difference (P =0.002) in visual improvement among the four groups. On further analysis with unpaired
t-test, a significantly better outcome was seen when visual improvement in Group 2 (four hours occlusion) was compared with Group 1 (two hours occlusion) \((P=0.026)\). Similarly Group 3 (six hours occlusion) had a better visual outcome compared to Group 1 (two hours occlusion) \((P=0.002)\). Full-time occlusion Group 4 also fared significantly better compared to the two hours occlusion Group 1 \((P=0.001)\). However, the difference was non-significant when visual outcome in six hours occlusion Group 3 \((P=0.486)\) and full-time occlusion Group 4 \((P=0.103)\) was compared with four hours occlusion Group 2 or when six hours occlusion Group 3 was compared with full-time occlusion Group 4 \((P=0.274)\).

Subset A (mild-moderate amblyopia) included 47 children while Subset B (severe amblyopia) included 53 children. The two subsets were matched for age \((P=0.7)\). Comparison of various treatment protocols in mild-moderate amblyopia: Out of the 47 patients in subset A, 15 patients were included in Group 1, 10 patients in Group 2, 12 patients in Group 3 while 10 patients were in Group 4. The four groups were matched for age \((P=0.3)\) and the pretreatment visual acuity \((P=0.5)\). ANOVA test revealed no statistically significant difference \((P=0.083)\) in visual improvement among the four groups. Table No.2

Comparison of various treatment protocols in severe amblyopia: Out of the 53 patients in subset B, 10 patients were included in Group 1, 15 patients in Group 2, 13 patients in Group 3 and 15 patients in Group 4. The four groups were matched for age \((P=0.41)\) and the pretreatment visual acuity \((P=0.57)\). ANOVA test revealed a statistically significant difference \((P=0.036)\) in visual improvement among the four groups. Table No.3

On further analysis with unpaired t-test, a significantly better visual outcome was seen in six hours group \((P=0.031)\) and full-time group \((P=0.015)\) when compared with the two hours group while comparative improvement in the four hours group \((P=0.33)\) was not significantly different from the two hours group. Also, there was no significant difference in visual improvement among the four hours group and the six hours group \((P=0.284)\), four hours group and the full-time group \((P=0.068)\), and among the six hours group and the full-time group \((P=0.341)\).

<table>
<thead>
<tr>
<th>Groups</th>
<th>No of Patients</th>
<th>No. of Aniso/Strabismic/ Mixed amblyopia</th>
<th>Mean age (yrs)</th>
<th>Pre-treatment mean BCVA</th>
<th>Post-treatment mean BCVA</th>
<th>Mean change in BCVA</th>
<th>P value (paired test)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>25</td>
<td>14/6/6</td>
<td>8.9</td>
<td>0.65±0.29</td>
<td>0.48±0.27</td>
<td>0.17±0.11</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Group 2</td>
<td>25</td>
<td>15/6/4</td>
<td>9.5</td>
<td>0.80±0.28</td>
<td>0.54±0.30</td>
<td>0.26±0.17</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Group 3</td>
<td>25</td>
<td>15/7/3</td>
<td>10.0</td>
<td>0.68±0.27</td>
<td>0.38±0.22</td>
<td>0.30±0.16</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Group 4</td>
<td>25</td>
<td>13/7/5</td>
<td>9.3</td>
<td>0.76±0.33</td>
<td>0.41±0.28</td>
<td>0.33±0.22</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

P=0.002 on ANOVA test for inter-group comparison. No. number Anisometropia yrs Year; BCVA- Best corrected visual acuity

<table>
<thead>
<tr>
<th>Groups</th>
<th>No of Patients</th>
<th>Mean age (yrs)</th>
<th>Pre-treatment mean BCVA</th>
<th>Post-treatment mean BCVA</th>
<th>Mean change in BCVA</th>
<th>P value (paired test)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>15</td>
<td>9.3</td>
<td>0.45±0.15</td>
<td>0.31±0.14</td>
<td>0.14±0.11</td>
<td>&lt;0.000</td>
</tr>
<tr>
<td>Group 2</td>
<td>10</td>
<td>8.6</td>
<td>0.50±0.12</td>
<td>0.27±0.11</td>
<td>0.23±0.12</td>
<td>&lt;0.000</td>
</tr>
<tr>
<td>Group 3</td>
<td>12</td>
<td>9.8</td>
<td>0.43±0.12</td>
<td>0.21±0.11</td>
<td>0.23±0.11</td>
<td>&lt;0.000</td>
</tr>
<tr>
<td>Group 4</td>
<td>10</td>
<td>9.0</td>
<td>0.41±0.14</td>
<td>0.18±0.14</td>
<td>0.23±0.08</td>
<td>&lt;0.000</td>
</tr>
</tbody>
</table>

P=0.002 on ANOVA test for inter-group comparison. No. number Anisometropia Year; BCVA- Best corrected visual acuity

<table>
<thead>
<tr>
<th>Groups</th>
<th>No of Patients</th>
<th>Mean age (yrs)</th>
<th>Pre-treatment mean BCVA</th>
<th>Post-treatment mean BCVA</th>
<th>Mean change in BCVA</th>
<th>P value (paired test)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>10</td>
<td>8.6</td>
<td>0.95±0.17</td>
<td>0.73±0.23</td>
<td>0.22±0.11</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Group 2</td>
<td>15</td>
<td>10.1</td>
<td>1.00±0.15</td>
<td>0.71±0.25</td>
<td>0.29±0.19</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Group 3</td>
<td>13</td>
<td>10.2</td>
<td>0.90±0.15</td>
<td>0.54±0.17</td>
<td>0.30±0.17</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Group 4</td>
<td>15</td>
<td>9.6</td>
<td>1.00±0.15</td>
<td>0.56±0.24</td>
<td>0.44±0.25</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

P=0.0036 on ANOVA test for inter-group comparison. No. number yrs-Year; BCVA- Best corrected visual acuity
DISCUSSION

Initial reports on occlusion therapy in older children found that the age of the patient at which the treatment was initiated had a direct bearing on the visual outcome.\textsuperscript{13,14,15} Epelbaum \textit{et al.},\textsuperscript{14} reported in strabismic amblyopia that the recovery of acuity of the amblyopic eye was maximum when the occlusion was initiated before three years of age, the improvement further decreased as a function of age and was about null by the time the patient was 12 years of age. Similarly Rutstein \textit{et al.},\textsuperscript{15} reported that the visual acuity improvement is somewhat lesser in patients older than seven years than in younger patients.

However, in recent years a large number of studies have shown a comparable beneficial effect of occlusion therapy in older children too.\textsuperscript{11,16,17} Brar \textit{et al.},\textsuperscript{17} have reported a substantial improvement in visual acuity with full-time occlusion in nearly 90\% of the children. They showed that visual acuity could be improved uniformly for strabismic, anisometric or a combination of strabismic and anisometric amblyopia in older children. The authors observed improvement in visual acuity in 98.7\% of children younger than 12 years and in 46.2\% children older than 12 years at the time of initiation of occlusion therapy. Patwardhan\textsuperscript{18} has recently shown that there is no statistically significant change in the success rate of treatment of anisometropic amblyopia, even beyond 12 years of age. The present study also included patients of strabismic and mixed amblyopia in addition to children with anisometric amblyopia, who after randomization, were uniformly distributed in the four groups. Table 1.

The distribution of amblyopes is important as it can have a bearing on the final outcome. Most studies report best-to-worst ranking of anisometric, strabismic, and combined amblyopia for visual acuity at initial visit and outcome at the end of treatment.\textsuperscript{5,24,25}

A very important factor determining the outcome of occlusion therapy in these older children could be the patching compliance. It is obvious that lesser the hours of patching in a day better the compliance with the treatment.\textsuperscript{26} Hence the concept of part-time occlusion holds stronger ground in the case of older children. Two studies have recently looked into the role of part-time occlusion in older children. One of these is a multicentric study by PEDIG.\textsuperscript{11} The study found that augmenting the optical correction with part-time patching therapy and atropine penalization doubled the responder rate (53\% vs. 25\%) and the response to treatment was seen regardless of the severity of amblyopia. Hence this study established the role of part-time occlusion in older children. A significant difference from our study is that none of the children in the present study were prescribed atropine in the dominant eye in addition to the occlusion therapy. The PEDIG study\textsuperscript{11} did not compare the effectiveness of varying hours of part-time occlusion among themselves.

Recently Lee \textit{et al.},\textsuperscript{27} have also studied the effect of part-time occlusion in older children (29 eyes) aged 8-12 years. They reported a beneficial effect of part-time occlusion therapy in nearly 96\% of the eyes. Visual improvement and occlusion time showed a significantly positive correlation. However, only two children received less than three hours of daily occlusion therapy for a limited period of one month. Hence this study was also limited by the lack of a proper comparative analysis between full-time occlusion and varying hours of part-time occlusion in addition to involving a very limited number of patients.

We planned and conducted this prospective randomized study comparing the effect of varying hours (two hours, four hours and six hours) of part-time occlusion therapy with full-time occlusion therapy in children aged 7-12 years. We observed that both full-time patching and part-time patching, even as little as two hours a day, led to significant improvement in visual outcome at 18 weeks of treatment. We observed a much higher responder rate (73\%) compared to the PEDIG study (54\%); this could be because in their study a large majority of patients received either two hours patching (50\%) or four hours patching (41\%) while very few (9\%) received six hours patching and none received full-time patching. However, we distributed the patients equally in four groups of 25 each. Among children who received two or four hours of patching, 28 of the 50 children (56\%) responded to the treatment, a figure comparative to the PEDIG study. However, in children who received six hours or full-time occlusion, 45 of the 50 children were treatment responders (90\%). The difference was predominantly due to the fact that, in children with severe amblyopia, full-time patching and six hours/day patching was found to have a significantly better outcome when compared to two hours of patching therapy. While in patients with mild to moderate amblyopia all treatment protocols produced comparatively similar outcome. This is similar to observations of PEDIG in younger children.\textsuperscript{2,9,10}

The limitations of the study include its smaller sample size and shorter follow-up. Moreover, it does not address the issue of maintenance therapy and the recurrence of treated amblyopia in this age group. Still, the present study suggests a beneficial effect of part-time occlusion therapy in older children. Larger studies with longer follow-up are needed to address issues of
recidivism and extent of improvement with part-time occlusion in older children.

Hence it can be concluded that for treatment of mild to moderate amblyopia, as little as two hours/day of patching may be adequate in the 7-12 years age group while in severe amblyopia, six hours and full-time occlusion are more effective than two hours occlusion therapy in this age group.

CONCLUSION

All grades of part-time occlusion are comparable to full-time occlusion in effectiveness of treatment for mild to moderate amblyopia in children between 7-12 years of age unlike in severe amblyopia, where six hours and full-time occlusion were more effective than two hours occlusion therapy.

REFERENCES

INTRODUCTION

Convergence insufficiency is defined as failure to maintain binocular vision at near targets resulting from misalignment of both eyes. Reported incidence is 2.25%-8.3% and is rare below 10 years. This ultimately result in asthenopic symptoms, presenting with headache, blurring of vision, watering eyes, eye-strain as well as inability to read for longer duration. Two phases in convergence insufficiency have been suggested. One in early school age where great demand is put for near work for prolonged period and the second one is at presbyopic age where accommodative effort is increased in order to see clearly. Headache and intermittent diplopia occur forcing to halt study momentarily.

Various causes were propagated from time to time but near work, reading, computer use, lack of sleep and anxiety further aggravate the problem. There is exophoria that is greater at near than at distance. Near point of convergence is fundamental visual measure, defining closest point of fusion. The test is performed when the target is slowly moved towards patient. End point is when diplopia occurs or other eye deviates from target. It is noted as exophoria at least 4 prism diopters or NPC greater than 6 cm. Eye strain is a symptom complex with irritation to eyes, blurring of vision and headache. This is due to fatigue of ciliary and extra ocular muscles due to prolong accommodation for near work. Video display terminals are increasing day by day leading to tremendous problems for the personnel using these devices. So eye strain in emmetropes need to be worked thoroughly. It was initially considered as neurotic manifestation of psychiatric disorder but it is definitely now a binocular dysfunction. Use of computers increasingly in everyday life is resulting in visual symptoms although there are contradictory reports about convergence insufficiency in this regard. Current study tries to co-relate the use of cellular phone for long hours and development of convergence insufficiency.

Use of cellular phones has significant impact on convergence insufficiency in children and young adults. Further studies are required to confirm these investigations.

PATIENTS AND METHODS

The present study was prospective case controlled pilot study conducted in the department of ophthalmology Kuwait Teaching Hospital & Peshawar Medical College during 1st August to 30th November, 2016.

Eligibility criteria included age between 5-25 years with asthenopic symptoms particularly headache after near work or using optical devices specifically cellular phone or touch screen. Patients with convergence insufficiency were selected from eye OPD. Their biodata recorded on prescribed proforma recording age, gender, symptoms, reading difficulties,
use of cellular phone and its duration. Near point convergence, diplopia, visual acuity and findings on slit lamp examination as well as fundoscopy were noted. At the same time ocular motility test were conducted.

Treatment was given in the form of pencil pushup for one month. Follow up was noted. Instructions were given to reduce the duration of use of cellular phone.

RESULTS

Total numbers of patients with convergence insufficiency was 55 the number of control patients with normal convergence was 55. The mean age was 17 yrs, ranging from 10-25 yrs, median 19yrs, male 29(52%) female 26(47%)--NPC range 6-30cm, mean 13cm. The number of patients with asthenopic symptoms and diplopia were 50 (90%), the number of patients using mobile phone for more than 6hrs were 40, 6-10 hrs were 13 and 2-3 hrs were 2. 52(94%). Out of 55 patients using cellular phone for more than 6 hrs had convergence insufficiency as well as related ocular symptoms. 51(92%) out of 55 control patients had normal convergence using cellular for less than 2 hrs., visual acuity was 6/6 in both eyes in 50(90%) patients.

DISCUSSION

Many teenager patients as well as parents of children with convergence insufficiency linger on in the neurology department to seek treatment for headache. Convergence insufficiency leading to asthenopia, headache and diplopia as well as reading difficulties in the present study address the increasing trend of using cellular phones for long hours meaning, more than 4 hours. The current pilot study revealed a significant correlation between asthenopic symptoms and related use of cellular phones. It has been indicated that small screen devices leads to fatigue of extra ocular muscles in convergence when utilized for long durations.

In the study by Borsting E et al, 469 children were initially screened. It revealed a strong association between signs of convergence insufficiency and increasing symptoms of convergence insufficiency.\(^8\) CITIT pilot study carried out by Mitchell Scheiman et al, while focusing on CI treatment in multi-central clinical trial, 47 children with age range 9-18 years had CI, exodeviation of more than 4D was noted.\(^9\)

In the current study mean age was 19 years ranging from 6-25 years. Mean NPC was 13cm (range-6-30 cm). Standard criteria for CI is more than 6cm NPC. Mitchell Scheiman et al in his other article on CI in childhood concluded that office based vision therapy was reported to be successful in 75% of patients with improved symptoms and signs. NPC was also receded to normal. Our current study showed effective improvement of symptoms with pencil pushup exercise.\(^10\)

In the study by Porcar et al, 65 university students were studied for convergence insufficiency and binocular dysfunction, 7.7% had convergence insufficiency. It further revealed an extra burden during reading and near work because of excessive eye strain.\(^11\)

Futyma. E et al in his article while evaluating visual function in employees working with computers reported no change in employee’s visual functions while using computer monitoring. Our current study revealing change in visual functions because of small screens (cellular phones). Rouse MW et al reported 13% 5th and 6th grader children had convergence insufficiency. Total number of student screened was 684.\(^12\) Letourneau JE et al conducted a study on 735 school children between the ages of 7-14years. 9% of the participants had NPC more than 10cm. It also reported no relationship of CI with school achievement.\(^13\)

Matti Westment et al studied the effect of orthoptic exercises on relieving symptoms of convergence insufficiency on 135 patients. 59.5% of children with CI had significant improvement in asthenopic symptoms following treatment. The limitation of this study was lack of control and retrospective design. The current study had 55 patients in control group and also our study was prospective.\(^14\)

D J Bhanderi in a community based study on 419 subjects on association of computer work with asthenopic symptoms found that 46.3% suffered from asthenopic symptoms. There was association between duration and type of screen setting used. Our current study deliberated on duration of use of small screen devices.\(^15\) C Blehm et al on study of computer use related the symptoms to dry eyes and accommodative spasm.\(^16\)

Schieman et al performed a study on 2023 patients between the group of 6 years to 18years aging, it was revealed that accommodative and binocular visual dysfunction were 9.7 times more prevalent than ocular pathologies.\(^17\)

A retrospective study by Daum KM on 114 subjects with accommodative dysfunction revealed asthenopic symptoms including headache and blurred vision in 96 patients. The limitation of this study was its retrospective nature and no control group.\(^18\) Y Cohen et al, correlated asthenopic symptoms to reading comprehension. This study was performed on 66 children between 8-10years. Our study did not address the issue of reading disabilities in the student population.\(^19\) Pearce KL in his study on correlation of sports related concussion to near point of convergence
found 42% of patients had convergence insufficiency. He suggested routine screening for NPC in evaluating patients with concussion due to sport trauma.20

CONCLUSION

Current study supports the view with strong evidence that use of cellular phones has significant impact in emergence of convergence insufficiency. Large scale study will be conducted in the above mentioned age group of children and young adults in order to further investigate the issue.

REFERENCES

5. Carmen, Barnhart et al. Symtome in children with convergence insufficiency before and after treatment. Optom Vis Sci 2012: 89 (10); 1512-1520
19. Cohen Y, Segal O, et al. Correlation between asthenopic symptoms and different measurements of convergence and saccadic fixation eye movements
INTRODUCTION

After cataract surgery, posterior capsular opacity (PCO) is one of the major causes of visual disability all over the World. Blindness and visual impairment due to PCO ranked fourth among the treatable causes of blindness in the Pakistan National Survey. In children, PCO causes amblyopia in addition to decreased vision so it is important to treat PCO in children as soon as possible. PCO can be treated by surgical methods as well as by using Neodymium YAG Laser. In children doing YAG laser is particularly difficult due to poor cooperation of child. To make this possible we developed a counseling technique to train the children for YAG laser capsulotomy. This not only saves time and money but also saves child from general anesthesia, which is necessary for surgical capsulotomy.

Before YAG laser, the treatment of PCO was surgical capsulotomy. Nowadays YAG laser is safe and most effective outpatient method of posterior capsulotomy. YAG laser is photo disruptive laser which along with heat produces acoustic shock waves. This creates opening in the posterior capsule which results in improvement in visual acuity. YAG laser posterior capsulotomy is routinely performed nowadays but in children it becomes very difficult and requires lots of patience and cooperation of the child.

YAG laser capsulotomy in younger children is possible which saves them from undergoing a surgical procedure and its complications. This procedure is not only cost but also time effective as compared to surgical capsulotomy which may run into complications like endophthalmitis.

MATERIAL AND METHODS

This prospective study was carried out from April 2014 to August 2016. A total of 16 eyes of 14 children underwent YAG laser capsulotomy. All the procedures were done by first two authors. All children were treated with same Light Med ND: YAG laser. All YAG laser capsulotomies were done without using contact lens to make it more comfortable and acceptable for children.

We developed and adopted a special regimen to motivate and encourage children for YAG laser capsulotomy. We make child stand on stool to put his chin on slit lamp. First time we only take child’s photo and then give him toffees or tin of juice. We repeat procedure 2-3 times to make child confident that this is not going to hurt him. After gaining child’s confidence, we start capsulotomy. We do it in steps with only few shots at a time and then another treat to child in the form of toffees or juices. We were able to do complete capsulotomy in 14 eyes of 12 patients. In 2 eyes of 2 patients, we could not complete procedure, even after repeated attempts. Both these patients had surgical
capsulotomy with anterior vitrectomy with 20 gauge cutter through corneal approach.

**RESULTS**

This study was carried out in 16 eyes of 14 children who underwent YAG laser capsulotomy with success rate of 87.5%. 12 children were male with only 2 female children. 14 eyes of 12 children had successful laser while in 2 eyes of 2 children (case 4 & 12) laser could not be completed because of poor co-operation (see table). Both these patients had surgical capsulotomy with anterior vitrectomy through corneal approach with 20 gauge cutter and infusion cannula. Average age of 14 children undergoing laser was 3 years and 205.07 days while average age of 12 children having successful laser was 3 years and 198.66 days. Youngest child having successful laser was 3 years and 89 days while the oldest child in study was 3 years and 342 days old.

**DISCUSSION**

Early lens aspiration with intraocular lens (IOL) is recommended for unilateral pediatric cataract and bilateral visually significant cataracts but postoperative visual axis opacification (VAO) remains a big issue. VAO due to posterior capsular opacification (PCO) is very high and VAO occurs in up to 40% of pediatric patients after cataract surgery with IOL implantation even with a primary posterior capsulotomy (PPC)\(^5\). In both children and adult group, opacification does obscure the visual axis. However, in children after PPC, there is no capsule so the terminology VAO is usually used in children rather than PCO. This opacification is caused by a proliferation of epithelial cells on the posterior capsule or anterior vitreous face and can hinder the optical image quality needed for normal visual development. The rate of epithelial mitotic activity is higher in children compared to adult. In our study none of patients had PPC and VAO was due to posterior capsule. Age of cataract patients, surgical technique and type and materials of IOL are most common influencing factor for PCO. Visual rehabilitation of a child with congenital or developmental cataract requires a great degree of commitment and effort from the treating ophthalmologist, optometrist as well as the parents. This is a time consuming, expensive and at times a frustrating exercise.

Control of childhood blindness is one of the priorities identified for achieving the goals of Vision 2020. This is considered a priority because blind-years (number of years that a blind person lives after going blind) due to childhood blindness are second only to cataract and half of childhood blindness is avoidable in a way that it can either be prevented or treated. The needs of children with cataract are different from that of adults. Management of the posterior capsule and aggressive amblyopia therapy are major factors governing the outcome of pediatric cataract surgery. PCO occurs frequently and rapidly following cataract extraction in children\(^6\). In our study 12 out of 14 children had unilateral cataracts. In such patients obstruction of the visual axis occurs at a critical period of visual development and the major concern is amblyopia. Strategies to maintain a clear visual axis coupled with amblyopia therapy are necessary to achieve visual rehabilitation\(^7\). YAG laser capsulotomy is a simple and relatively safe procedure but its use is limited to older and more co-operative children. In younger children, primary posterior capsulotomy and anterior vitrectomy have been advocated but in this study none of patients had PPC and all patients had YAG laser capsulotomy for PCO.

PCO-induced decreased visual acuity occurs in up to 50% of human adults following phacoemulsification surgery\(^8\), with a higher risk in younger patients\(^9\), particularly in traumatic pediatric cataracts\(^10\). The incidence of PCO has been somewhat lowered, but not eradicated, by improvements in IOL design, such as the

<table>
<thead>
<tr>
<th>Patient No</th>
<th>Eye No</th>
<th>Age</th>
<th>Laser outcome</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case 1</td>
<td>Eye 1</td>
<td>3yrs, 121 days</td>
<td>Done</td>
<td></td>
</tr>
<tr>
<td>Case 2</td>
<td>Eye 2</td>
<td>3yrs, 272 days</td>
<td>Done</td>
<td></td>
</tr>
<tr>
<td>Case 3</td>
<td>Eye 3</td>
<td>3yrs, 342 days</td>
<td>Done</td>
<td>Eldest child</td>
</tr>
<tr>
<td>Case 4</td>
<td>Eye 4</td>
<td>3yrs, 301 days</td>
<td>Not done</td>
<td></td>
</tr>
<tr>
<td>Case 5</td>
<td>Eye 5</td>
<td>3yrs, 303 days</td>
<td>Done</td>
<td></td>
</tr>
<tr>
<td>Case 6</td>
<td>Eye 6</td>
<td>3yrs, 89 days</td>
<td>Done</td>
<td>Youngest child</td>
</tr>
<tr>
<td>Case 7</td>
<td>Eye 7</td>
<td>3yrs, 238 days</td>
<td>Done</td>
<td></td>
</tr>
<tr>
<td>Case 8</td>
<td>Eye 8</td>
<td>3yrs, 245 days</td>
<td>Done</td>
<td></td>
</tr>
<tr>
<td>Case 9</td>
<td>Eye 9</td>
<td>3yrs, 119 days</td>
<td>Done</td>
<td></td>
</tr>
<tr>
<td>Case 10</td>
<td>Eye 10</td>
<td>3yrs, 152 days</td>
<td>Done</td>
<td></td>
</tr>
<tr>
<td>Case 11</td>
<td>Eye 11</td>
<td>3yrs, 147 days</td>
<td>Done</td>
<td></td>
</tr>
<tr>
<td>Case 12</td>
<td>Eye 12</td>
<td>3yrs, 186 days</td>
<td>Not done</td>
<td></td>
</tr>
<tr>
<td>Case 13 (R eye)</td>
<td>Eye 13</td>
<td>3yrs, 175 days</td>
<td>Done</td>
<td></td>
</tr>
<tr>
<td>Case 13 (L eye)</td>
<td>Eye 14</td>
<td></td>
<td>Done</td>
<td></td>
</tr>
<tr>
<td>Case 14 (R eye)</td>
<td>Eye 15</td>
<td>3yrs, 181 days</td>
<td>Done</td>
<td></td>
</tr>
<tr>
<td>Case 14 (L eye)</td>
<td>Eye 16</td>
<td></td>
<td>Done</td>
<td></td>
</tr>
</tbody>
</table>
square edge. PCO can be treated effectively with YAG laser capsulotomy. However, the cost is substantial, and there can be significant morbidity due to postoperative complications including damage to the IOL, cystoid macular edema, retinal detachment, IOL sub-luxation, exacerbation of localized endophthalmitis, and retinal detachment11.

There are different techniques of treating pediatric PCO in children12. PCO can be managed during surgery or postoperatively, depending upon surgical skills and facilities available. During surgery PCO in younger children can be managed by approaches like pars-plicata posterior capsulorhexis13, posterior capsulectomy14, sutureless vitrectomy, sealed-capsule irrigation, and bag-in-the-lens IOL but all these approaches are per operative. Postoperatively, PCO can be managed by surgical capsulotomy15 and YAG laser. In younger children YAG laser has been reported under general anesthesia but in our study we managed to do YAG laser in normal clinical office settings. In YAG laser under GA16, anesthesia was induced in the supine position and the patient was then transferred to the sitting position with chin in the slit-lamp laser delivery system. But in our study, we managed to do YAG laser in children in most of patients less than 4 years of age.

CONCLUSION

YAG laser capsulotomy in younger children is possible and it saves child from undergoing a surgical procedure and its complications. This procedure is not only cost and time effective as compared to surgical capsulotomy but also there are surgical complications like endophthalmitis.

REFERENCES

INTRODUCTION

Retinal detachment (RD) refers to a separation of the inner neurosensory retina (NSR) from the outer retinal pigment epithelium (RPE). Rhegmatogenous retinal detachment (RRD) refers to detachment due to holes, tears or breaks in the retina. Incidence is around 10-15 in 100,000 with a prevalence of about 0.3% in the general population and a lifetime risk of 3%. 1

It is roughly estimated that, globally, 90 eyes are blinded by RD every hour. 2 RD per se is an ophthalmic emergency. Urgency is heightened when the macula is involved, as visual prognosis for ‘macula off’ RDs is limited. Untreated RRD results in loss of visual acuity in all patients with more than 50% going totally blind. 3 Management for RRD is primarily surgical; the three principal methods are scleral buckling (SB), pars plana vitrectomy (PPV) and pneumatic retinopexy.

SB results in high rates of successful re-attachment however SB surgery leads to eyeball distortion and change in trans-equatorial diameters. Although many authors have reported an increase in axial length (AL) following SB but limited data is available in Pakistan to establish it. This study gives a recent perspective in our settings where encircling SB is a frequently employed surgical technique in patients with RRD.

The encircling buckle in retinal detachment creates circular indentation of the eyeball causing a clinically noticeable but statistically insignificant increase in axial length. The refractive error induced by elongation of the eyeball does results in myopia, which requires appropriate rectification in the early postoperative period to achieve encouraging vision rehabilitation.

METHODS

Written informed consent was obtained from all patients based on Helsinki protocol. The hospital ethics committee and institutional review boards approved the trial. Baseline readings included anterior segment examination and dilated fundal examination performed with slit lamp βşişçinoşçoro using a 78D indirect lens. This quasi experimental study was done at the retina department of Al-Shifa Trust Eye Hospital Rawalpindi.

Inclusion Criteria: patients included of either gender between the ages of 20 and 70 years with acute non-traumatic RRD with peripheral to equatorial break(s) in phaṭğık eyes. Other criteria’s were RRD without age-related macular degeneration, vitreous hemorrhage, advance proliferative vitreoretinopathy (PVR), choroidal detachment, macular holes, intraocular inflammation, glaucoma or retinal vascular occlusive diseases. Patients fulfilling inclusion criteria were
selected by non-probability consecutive sampling. 

Exclusion criteria included past history of any ocular surgery, corneal disease and uveal coloboma. Patients with systemic diseases, such as diabetes or hypertension, were excluded. If the RRD range was more than half of the retina and obvious traction existed, the eye was excluded. Patients were chosen according to the inclusion criteria and excluded on the basis of history and slit lamp examination.

All patients were treated with 360 degree scleral buckle 12-14mm from the limbus with a silicon explant material sutured with 5-0 non absorbable braided polyethylene (ehibond). In all cases cryopexy and drainage of sub retinal fluid was attempted. Surgeries were performed by an experienced yiğîrçetînal surgeon.

AL was measured on two occasions i.e. a day before the surgery and one month after the surgery. Topical 1% tropicamîde (mydriacyl) were administered before all readings. AL was measured by A-Scan mûaçaşophəzy (Aviso, Quantel Medical) with A-Scan mode by proçe plâçemênç directly onto the cornea with due care not to cause corneal deformity. Cîstança between the top of the cornea and the scleral spike on the A-scan was considered as the AL. A mean of ten readings was taken as the final ocular AL. Pře- pôrə-tațiye, and post operative AL was recorded along with any change. AL measurements by A-Scan were performed by an experienced ophthalmic technician.

Statistical analyses were performed with SPSS software (version 19, SPSS Inc. Chicago, IL). Statistical analyses were done using paired samples t-test to determine the difference in pôrə-tațiye and pôsrə-tațiye AL. The level of statistical significance was p < 0.001.

RESULTS

A total of 62 eyes were studied in patients operated for RRD. All patients went under SB procedure for repair of the detachment in the involved eye. There were 42 male patients (67.7%) and 20 female patients (32.3%). Right eye studied were 56.5% and left were 43.5%. The minimum age of the patient was 20 years and the maximum age was 70 years with a mean age of 51 ± 14.64 years. (Fig. 1,2)

The minimum AL recorded was 20.50 mm and the maximum AL was 29.93 mm with a mean of 23.37 ± 1.79 mm. The minimum AL in the postoperative group was 21.23 mm and the maximum was 30.36 mm with a mean of 24.00 ± 1.78 mm. All eyes showed a change in AL. The minimum change was 0.35 mm and the maximum change noted was 0.88 mm. The mean change in AL in 62 eyes studied was 0.63 ± 0.14 mm. The mean change in male patient was 0.64 ± 0.14 mm and in females was 0.61 ± 0.13 mm. (Table 1)

Paired samples t test was used to calculate the change in AL after encircling SB. Even though we observed a change in AL postoperatively clinically, a p=0.053 indicates that this change was statistically not significant.

Table 1: Minimum, maximum and mean change in axial length.

<table>
<thead>
<tr>
<th>Eye axial length</th>
<th>Minimal length (mm)</th>
<th>Maximal length (mm)</th>
<th>Mean in eyes (mm)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preoperative</td>
<td>20.50</td>
<td>29.93</td>
<td>23.37 ± 1.79</td>
<td></td>
</tr>
<tr>
<td>Postoperative</td>
<td>21.23</td>
<td>30.36</td>
<td>24.00 ± 1.78</td>
<td>0.053</td>
</tr>
<tr>
<td>Change</td>
<td>0.35</td>
<td>0.88</td>
<td>0.63 ± 0.14</td>
<td></td>
</tr>
</tbody>
</table>
DISCUSSION

SB remains the ‘gold standard’ for the repair of RRD despite recent advances in vitreoretinal (VR) surgery. Most reports of large consecutive case series on RDD treated by SB show a success rate of 90% or more. Failure is usually due to inability to recognize breaks during surgery, new break formation, inadequate buckle and PVR. Other complications include macular epiretinal membrane, cystoid macular edema, IOL dislocation, vitreous and choroidal hemorrhage, vitreous loss, diplopia, glaucoma, choroidal detachment and extrusion or infection of the buckle.

AL is an essential man-made parameter generated from ocular biometric components. As the AL increases the eye becomes more prone to pathologies such as RD, glaucoma, cataract, maculopathy including macular holes, choroidal thinning and posterior staphyloma. Normal AL in our population ranges between 21 and 25 mm with a mean of around 22.5 mm. The mean AL in our cases with RRD was 23.37 ± 1.79 mm. Alimanovic found that AL ranging from 24.52 mm to 26.51 mm seemed to be a predictive factor in the occurrence of retinal breaks and RD. Considering Rubin’s report and applying his factor of myopia induction of 2.564 diopters with AL increase by 1 mm to our study, the mean myopia induced in our patients was 1.62 D. Study done Abdullah and colleagues noted a refractive error of -1.478 ± 0.698 DS.

Retinal surgery induces a significant number of refractive errors including spherical changes caused by alterations in AL after SB placement, astigmatic changes and focal alterations in corneal curvature. Furthermore aberrations such as higher-order aberration (HOA’s) and changes in the corneal biomechanical properties such as corneal hysteresis (CH) and corneal resistance factor (CRF) also have been reported. Encircling procedure induces the greatest change in refractive error, usually a spherical error. The change is greater for phakic eyes than aphakic eyes, because of the anterior shift of the lens. The magnitude of refractive error caused by SB is associated to the height of indent caused by the encircling band.

Rubin, found that low - moderate buckle height (band width - 2 mm) resulted in -1.56 D to -2.24 D of change in phakic eyes and -0.74D to -1.14 D change in aphakic eyes. High encircling buckles of 5 mm indentation resulted in hyperopic shift of +0.35 D for phakic eyes and +0.59 D for aphakic eyes. Low-moderate buckles induce an increase in AL while higher buckles shorten the AL. Citirik found that after encircling SB statistically meaningful changes were observed in the vitreous length and AL in the postoperative period. This study revealed statistically insignificant AL changes after SB.

Grimm and others study found no statistically significant difference in AL between patients with encircling and segmental buckles fixed parallel to the limbus. These results resemble ours where we also found statistically insignificant change in AL after the surgery. Shi MG studied the changes in ocular dimensions after encircling SB with MRI scans. They found that the length of the circumference at the site of buckling is shortened and the volume of the vitreous was decreased after the surgery. Our study demonstrates that though statistically insignificant but a clinically appreciable increase in AL may have been due to an increase in trans-equatorial diameter owing to the indentation produced by the 360 degree buckle configuration.

Okada Y stated that after encircling with additional segmental buckling the AL elongated and a myopic shift was detected. We found a myopic shift in all patients as clinically evidenced by a mean increase in AL. Malukiewicz studied 74 patients who underwent SB; they found that AL was significantly increased by surgery (median 0.77 mm one month after surgery). The distribution of AL showed a significant predominance of eyes with a longer AL amongst males. Our study also showed a preponderance of male patients with a median change of 0.66 mm one month after the surgery.

Larsen studied the effect of encircling buckle on 10 phakic eyes. They found a significant increase (P less than 0.001) in AL from 0.62 to 1.24 mm (average: 0.98 mm). They proposed that the elongation of the eye was caused by a corresponding increase in the length of the vitreous cavity. The results of our study are consistent with the above mentioned study where we found an increase ranging from 0.35 to 0.88 mm but a p = 0.053 suggests these changes were not statistically significant.

Vukojević et al results showed the AL to increase by a mean of 0.74 ± 0.44 mm, yielding a statistically significant difference from the preoperative measurement. The mean myopia induced by this eyeball elongation was 1.77 D. They concluded that encircling band with and without segmental buckling used in surgical repair of RD creates circular and segmental indentation of the eyeball thus increasing its AL. The results mentioned above are consistent with ours where we found a mean increase of 0.63 ± 0.14 mm.

This study showed a male preponderance (2.1:1). Various studies have shown that rate of RD surgery for all age groups shows a 1.5 times male preponderance. This may be related to an inherent gender risk. A higher proportion of myopia in young males may partly explain this. Other possible explanations include increased myopia and AL in men, as well as gender differences in the anatomy of the vitreoretinal base.
Furthermore, tertiary care ophthalmic care limited to major cities along with the conservative nature of the Pakistani society may have a part in this gender difference. In our study the highest numbers of patients undergoing surgery were 60-70 years old. Studies also suggest that highest incidence rate of detachment is found in this age group. 19,18 In different studies there is bimodal distribution with a secondary peak in younger ages (20-30 years), reflects the highly myopic group. We found a higher incidence of RD in the right eye. Literature review is suggestive of the fact that right eye seems to be involved more in RD compared to the left.20,19,18 Affluence has been suggested as a factor associated with RD, though our study didn’t consider the socioeconomic status of the patients; general impression was that most patients belonged to a lower-middle socioeconomic class.

The limitations of this study included a relatively short duration of follow-up. Any regression in terms of relative decrease or increase in AL in the late follow up period could not be taken into account. A-mode ultrasound employing the contact method has a higher probability of error however great care was taken not to cause corneal compression during scans. Some authors report on the results comparable to ours, whereas others recorded greater postoperative change in AL of the eye and thus higher myopia. These differences could be explained by a lower rate of buckle tightening being preferred at our hospital. The change in refraction is evident despite this variation and we believe that the existing myopia should be properly corrected in the early postoperative period to allow for early binocular visual rehabilitation.

SB also produces refractive errors such as astigmatism, corneal curvature changes and HOAs. All these refractive errors result in substantial visual reduction after surgery. Further studies needs to be undertaken to evaluate the effect of these parameters on vision and how they progress in the postoperative period. Correcting these specific errors once the functional anatomy of the eye is restored should result in improved vision in the detached eye.

CONCLUSION:
The encircling buckle used in surgical repair of retinal detachment creates circular indentation of the eyeball causing a clinically noticeable but statistically insignificant increase in axial length. The refractive error induced by elongation of the eyeball does results in myopia, which requires appropriate rectification in the early postoperative period to achieve encouraging vision rehabilitation.

REFERENCES
Association of ABO Blood Group with Glaucoma

Muhammad Kashif,1 BVS, FAAO, FIACLE, MPH. Shua AzamBVS, MPH2
Humaira Ramzan BVS3 Afshan Hassan B.sc optometry MPH 4

Purpose: The purpose of this study was to determine any association of glaucoma (primary open-angle glaucoma (POAG), and Pseudo-exfoliative glaucoma (PEXG) with ABO blood groups.

Aims and Objectives: i) To determine association between blood groups and glaucoma.

ii) To identify ABO blood group as risk factor for POAG and PEXG.

Material and Methods: In this case control study Hema-glutination patterns were used to determine the prevalence of the ABO blood groups in all the subjects. Odds ratio was calculated for each blood group. Patients having POAG and PEXG in age group 40 and above were included. Controls were selected from the relatives of the patients with the same age.

Results: In the present study, the percentage of blood groups A, B, AB, and O in patients was found to be 17.85%, 46.42%, 21.42% and 14.28%, and in the control group, the values were 39.28%, 21.42%, 10.71%, and 28.57%, respectively. Odds ratio for blood group B was 4.5 in PEXG and for POAG it was 2.66. Similarly odds ratio for blood group AB was 2.9 in POAG and 1 in PEXG.

Conclusions: In the present study group B was associated with both type of glaucoma and AB blood group was only associated with POAG.

Keys words: POAG, PEXG, ABO blood group, risk factor

INTRODUCTION

Glaucoma is a potentially blinding disorder. Since the patho-physiology, presentation and treatment of the different types of glaucoma are so varied, there is hardly any single definition that adequately encompasses all forms. Globally, it is the third cause of blindness next to cataract and trachoma. Blindness due to glaucoma is about 7.1% in Pakistan.

The ABO group system consists of four main groups AB, A, B and O which are determined by the presence or absence on the red cell of two antigens A and B. The antigens are under the control of three allelic genes A, B and O situated on the long arm of chromosome 9. The A and B genes are co-dominant and the O gene is an amorph, i.e. it has no effect on antigenic structure. Group AB red cells possess both antigens, group A cells possess the A-antigen, group B cells possess the B-antigen, and group O cells possess neither A nor B. The serum of an individual contains antibodies against the antigens lacking in the person’s red cells. Thus, as a group A person lacks the B antigen, the serum contains anti-B agglutinins.

Similarly, a group B person lacks the A antigen and the serum contains anti-A, while the serum of a group O person, who lacks both A and B antigens, contains, anti-A and anti-B. Group AB persons have neither antibody in their serum1.

Blood group B is a risk factor for both glaucoma and blood group AB is only associated with POAG.

MATERIAL & METHODS

In the present study, 28 glaucoma patients and 28 normal controls were analyzed to study the association of the ABO blood group with glaucoma in the people coming to eye department Hayatabad Medical Complex, Peshawar. Patients were categorized into two types: POAG consisting of 20 patients with a mean age of 65 years (75% male and 25% female); and PEXG, consisting of 8 patients with a mean age of 64.25 years (87.5% male and 12.5% female). In controls, 82.143% were male and 17.85% were female and mean age was 45.5%. Odds ratio for POAG in blood group A, B, AB and O was 0.39, 2.66, 2.9 and 0.46, respectively.

Odds ratio for PEXG in blood group A, B, AB and O was 0.59, 4.5, 1 and 0.31 respectively. Blood group B was a risk factor for both types of glaucoma but blood group AB was risk factor for POAG only.
RESULTS

Figure 1: This graph shows that patients with POAG having blood group A, B, AB and O were 3, 9, 5 and 3 respectively. And patients with PEXG having blood group A, B, AB and O were 2, 4, 1 and 1 respectively.

DISCUSSION

In our studies odds ratio for A blood group was 0.397 in POAG which shows that A blood group was not the risk factor for POAG. This result correlates with the study “Association of ABO blood groups with glaucoma in the Pakistani population”\(^2\) in which odds ratio for blood group A was 0.70 . Similarly blood group A was not the risk factor for PEXG in our studies.

In our study OR for blood group B was 2.66 and 4.5 in POAG and PEXG, respectively. Which shows B blood group is risk factor for POAG and PEXG. Similarly above study shows correlation with my study. While study done in Iran (Association between glaucoma and blood groups)\(^2\) contradict my results. In Iran study blood group B was more prevalent in PCG and no association was found between blood groups and POAG and PEXG. Also no association was found between POAG and blood groups (ABO and Rh) by Leske and coworkers\(^3\). Also our studies show that AB blood group is risk factor for POAG with OR 3.9 while it is not the risk factor for PEXG, having OR 1.

In our study sample size was small as compared to other studies. There were 25% females with mean age of 46.2 years and 75% males with mean age of 70 years in POAG while in PEXG the percentage was 12.5% in females and 87.5% in males with mean age of 46 years and 65.5 years respectively. While in other studies which were carried out in different countries sample size was large time duration was up to a year.

Limitation of the study: In this research, we have tried our best to cover maximum patients but still this research study has following limitations:
1. The time duration was less for the collection of data.
2. Some patients were not co-operative during the study.

CONCLUSION

Blood group B was risk factor for both glaucoma and blood group AB was only associated with POAG.
**Recommendation:** As blood group B and AB people are at risk of glaucoma according to our studies, their thorough eye checkup in a year is needed. Further detail study is needed to determine the association of ABO blood group with glaucoma.

**REFERENCES**

5. Gordon J Johnson, Darwin C Minassian, Robert A Weale, Sheila K West. The Epidemiology Of Eye Disease. 2003; 222
17. Linden S, Mahdavi I, Semino-Mora CS et al. Role of ABO secretor status in mucosal innate immunity and H. pylori infection. PLOSPathog 2008; 4; 42.
Incidence of Raised of Intra Ocular Pressure amongst Non Glaucomatous Patients after Yag Capsulotomy

(Zahir Gul, MD1, Muhammad Adnan MBBS2, Adnan Liaqat MBBS3)

ABSTRACT:

Background: Raised IOP is most common and transient complication following Nd:YAG laser capsulotomy. An incidence of high IOP level more than 10mmHg was observed among 15-67% of eyes.

Aim: To compare IOP elevation in non glaucomatous patients after YAG capsulotomy using NSAIDS (Non Steroid Anti Inflammatory Drugs) plus pressure lowering drugs versus NSAIDS alone.

Methods: The study was a randomized controlled trial (RCT) and conducted in Department of Ophthalmology, Pakistan Institute of Medical Sciences (PIMS), Islamabad. The study duration was 6 months (August 2014-January 2015). A sample size of 80 was studied using WHO formula. One group (interventional group) is given NSAIDS plus pressure lowering drugs while the other group (placebo) is given NSAIDS alone. Chi square test was applied to observe the association between different variables.

Results: The study includes 80 participants with 1:1 in both groups. There were 25 (62%) females and 15(38%) males in interventional group and in placebo group there were 20(50%) females and 20(50%) males in placebo group. There was no significant difference in mean visual acuity of two groups (P=0.209, P= 0.887 respectively). There was no statistically significant difference in IOP level of interventional and placebo group (P=0.456, P=0.559 respectively).

Conclusion: There is no statistically significant difference in IOP reduction after YAG capsulotomy in non glaucomatous patients who were given NSAIDS plus pressure lowering drugs versus NSAIDS alone. No significant glaucomatous change was found among patients following YAG capsulotomy. Therefore in the absence of glaucomatous risk factors, NSAIDS can be prescribed, with close follow up after YAG capsulotomy.

Key words: Intra ocular pressure, Nd: YAG capsulotomy, NSAIDS, Glaucoma

INTRODUCTION

The neodymium: yttrium-aluminum-garnet (Nd:YAG) is solid state laser that has 1064 nm wavelength. This laser is associated with ocular tissue disruption by achieving optical breakdown with short and high power impulse(1). Posterior capsule opacification is a common delayed complication of cataract surgery associated with incidence 20.7% at 2 years and 28.5% at 5 years(2). Evidence exist that Nd: YAG is an effective alternative of surgical decisions to prevent endophthalmitis and vitreous lost related complications(3). Different studies had reported an improvement in visual acuity among patients with significant posterior capsular opacification (PCO) treated with Nd: YAG(4). PCO treated with Nd:YAG is also associated with improvement in contrast and glare sensitivity(5). Nd: YAG is a safe, effective and standard treatment for PCO and prevent sight threatening complication like retinal edema and detachment(6).

Intra ocular pressure is an important risk factor for glaucoma(6). Nd:YAG related complications include raised IOP, damage to intraocular lens, glaucoma, corneal injury, hyphema and retinal detachment(7). Raised IOP is most common and transient complication following Nd:YAG laser capsulotomy. An incidence of high IOP level more than 10mmHg was observed among 15-67% of eyes. After capsulotomy, the IOP level begins to increase at 3-4 hours, remained elevated at 24 hours, then decreases and returns to baseline at 1 week. Some times IOP remains constantly elevated leading to visual field loss. While acute IOP raise may contributes to visual loss to the level of light perception(8).

There is no statistically significant difference in IOP reduction after YAG capsulotomy in non glaucomatous patients who were given NSAIDS plus pressure lowering drugs versus NSAIDS alone. No significant glaucomatous change was found amongst the patients following YAG capsulotomy. Therefore in the absence of glaucomatous risk factors, NSAIDS can be prescribed, with close follow up after YAG capsulotomy.

Elevated IOP is associated with capsulotomy size, lack of posterior chamber IOL, myopia and pre-existing vitreo retinal disease. Increase in IOP after
YAG capsulotomy is the result of facility for aqueous humor outflow. Apraclonidine, brimonidine, timolol, levobunolol and pilocarpine reduce the magnitude and frequency of IOP raise (9).

There is limited data available on comparative IOP elevation after YAG capsulotomy among non glaucomatous patients in Pakistan. The study aims to compare IOP elevation among non glaucomatous patients after YAG capsulotomy using NSAIDS (non steroid anti inflammatory drugs) plus pressure lowering drugs versus NSAIDS alone.

**MATERIAL & METHODS**

The study was a randomized controlled trial (RCT) and conducted in Department of Ophthalmology, Pakistan Institute of Medical Sciences (PIMS), Islamabad. The study duration was 6 months (August 2014-January 2015). A sample size of 80 was achieved using WHO formula with 80% power, SD 1.09, anticipated population 7.55 and 5% significance level. All the patients underwent through Nd:YAG capsulotomy and then were randomly assigned to two groups using lottery method. One group (interventional group) was given NSAIDS (Nepafenac 0.1%) plus pressure lowering drugs (Levobunolol hydrochloride 0.5%) while the other group (placebo) was given NSAIDS (Nepafenac 0.1%) alone. Both groups had two follow-ups, first at 3 hours after YAG capsulotomy and second was done after 1 week. All the patients above 15 years and both genders were included in the study. Patients with diabetic retinopathy, glaucoma, retinal detachment, congenital abnormalities, mentally retarded were excluded from the study. Ethical approval was taken from ethical review board of Pakistan Institute of Medical Sciences Islamabad and consent form was taken from all participants. Data was collected through pre tested questionnaire. Reliability of questionnaire was assessed after a pretest exercise of 10 questionnaires.

**Statistical analysis:** Data was analyzed using SPSS software version 20.0. Descriptive statistics (percentages, mean, SD) was used to describe the data. Results were reported in percentages, tables and charts for different variables according to nature of variable. Chi- square test was applied to see the association between two groups.

**RESULTS**

The study includes 80 participants with 1:1 in both groups. Among all the patients included in study, there were 25 (62%) females and 15 (38%) males in interventional group while in placebo group there were 20 (50%) females and 20 (50%) males in placebo group. Intervventional group had 5 (12%) patients in 15-30 years age group, 15 (38%) in 31-45 years age group, 15 (38%) in 46-60 years age group and 5 (12%) >60 years age group. The placebo group had 2 (5%) patients in 15-30 age group, 10 (25%) in 31-45 age group, 20 (50%) in 46-60 years age group and 8 (20%) >60 years age group. Mean age and gender were not significantly different between interventional and placebo groups (P=0.479, P=0.243 respectively). Mean capsulotomy size was 3.33±0.33mm (range 2.6-3.9) in interventional group while 4.51±0.48mm (range 4.2-5.5) in placebo group. Mean capsulotomy size was significantly larger in placebo group (p=0.001).

The mean best corrected visual acuity (LogMAR) pretreatment was 0.61±0.15 in interventional group while 0.66±0.18 in placebo group. The mean best corrected visual acuity after one week was 0.18±0.10 in interventional group and 0.17±0.14 in placebo group. There was no significant difference in mean visual acuity of two groups (P=0.209, P= 0.887 respectively). There was no statistically significant difference in IOP level of interventional and placebo group (P=0.456, P=0.559 respectively). Change in intra ocular pressure after 1 hour and 1 week following YAG capsulotomy among non glaucomatous patients is shown in figure 1.

**Figure 1:** Intra Ocular Pressure after YAG capsulotomy

Pre-treatment spherical equivalent (diopters) was -1.12±1.24 in interventional group while -1.26±1.22 in placebo group. After 1 week, it was -0.95±1.08 in interventional group and -0.88±1.02 in placebo group. There was no statistically significant difference of spherical equivalent between interventional and placebo group (P=0.660, P=0.851 respectively). The study did not found any serious anterior chamber reaction and cystoids macular edema.

**DISCUSSION:**

The study type was randomized controlled trial, comprised of 25 (62%) females and 15 (38%) males in interventional group and in placebo group there were...
Incidence of Raised of Intra Ocular Pressure amongst Non Glaucomatous Patients after Yag Capsulotomy

Leys et al. (14) studied 67 eyes of 65 patients dislocation may be significantly less, especially with capsulotomy size was 4.8 mm in the patients (7).

In our study there was no significant difference in mean visual acuity of two groups (P=0.209, P= 0.887 respectively). Similar study reported that best corrected visual acuity (BCVA) improvement at 1 week, 4 weeks, and 12 weeks was statistically significant in both small and large capsulotomy groups (P = 0.000) (8). Another parameter that is believed to be important is laser energy level. Ari et al. reported that numbers of laser pulses and energy delivered, not a risk factor for the development of cystoid macular edema (20). The study had a limitation that sample size was very small and represent single centre results.

In our study there was no statistically significant difference of spherical equivalent between interventional and placebo group (P=0.660, P=0.851 respectively). Mean capsulotomy size was significantly larger in placebo group (p=0.001). Similar study reported that the SE was −3.25 diopters, Nd:YAG laser capsulotomy was administered 6 months after phacoemulsification, and capsulotomy size was 4.8 mm in the patients (7).

In our study there was no significant difference in mean visual acuity of two groups (P=0.209, P= 0.887 respectively). Similar study reported that best corrected visual acuity (BCVA) improvement at 1 week, 4 weeks, and 12 weeks was statistically significant in both small and large capsulotomy groups (P = 0.000) (8). The study had a limitation that sample size was very small and represent single centre results.

CONCLUSION

There is no statistically significant difference in IOP reduction after YAG capsulotomy in non glaucomatous patients who were given NSAIDS plus pressure lowering drugs versus NSAIDS alone. No significant glaucomatous change was found among patients following YAG capsulotomy. Therefore in the absence of glaucomatous risk factors, NSAIDS can be prescribed, with close follow up after YAG capsulotomy.

REFERENCES

5. Magno BV, Dallies MB, Lasa MS, Fajardo MR, Caruso RC, Kaiser-Kupfer MI. Evaluation of visual function following...
An Eye to Hand Dominance  
(a study based on health Professionals)  

Imran Khalid B.Sc (Hons) Vision Sciences, CRCP\textsuperscript{1}, Saqib Siddiq FCPS\textsuperscript{2},  
Khawaja Mohsin Ihsan FCPS\textsuperscript{2}

ABSTRACT  
Background: Determination of eye dominance for accurate aimed target is significantly important in monocular viewing conditions, sports vision and ophthalmic practice. It is not always associated with the same eye to hand dominant pattern.  
Objective: To determine which pattern of eye to hand dominance existed more frequently in medical students and eye care professionals.  
Method: A hospital based cross sectional study was conducted in November 2016 at Eye Department of Services Hospital Lahore. This study included medical students (post graduate residents, house officers), eye care professionals (ophthalmologist, optometrist, orthoptist) and ophthalmic technicians. Subjects with normal sight, normal convergence range and had no extra ocular motility disorder were examined. Three tests were performed to determine the ocular dominance.  
For the Porta test, subjects were asked to vertically align an index finger with both eyes open on corner of Snellen’s chart then alternatively closed each eye, the eye that maintained the alignment was considered a dominant eye. For convergence tests, an accommodative target mid of nose brings closer to the eyes and determined that which eye drift firstly. For distance hole in the card test, the subject held a card with both hands at 3 cm diameter hole in the center of card and instructed to look a target placed at 2 meter distance with both eyes then alternatively occluded each eye, the eye that maintained the target was recorded as a dominant eye. Hand dominance was evaluated to ask which hand is used more frequently to write down the message and firmly hold the things.  
Results: 40 subjects were in the age range 23-57 years and median age was 28 years. Male were 20 (50%) and female were 20 (50%). 21 (52.5%) were medical students, 15 (37.5%) were eye care professionals, 4(10%) were ophthalmic technicians, 38 (95%) had right hand and 2(5%) had left hand dominant. 35(87.5%) were uncrossed and5(12.5%)were crossed. Of 35 uncrossed dominant, 34 (97%) were RH and RE, one uncrossed dominant (3%) had LH and LE dominant. Of 5 crossed dominant, 4 (80%) were RH and LE dominant, 1(20%) had LH and RE dominant. Of crossed dominant 3 were female and 2 were male.  
Conclusion: The eye to hand dominance existed predominately in uncrossed form right hand and right eye whereas crossed dominance in the form of right hand and left eye. Application of near point of convergence does not help in determining the dominance in the subjects with normal extra ocular motility and convergence value within normal range.  
Key words: Eye care professionals, uncrossed dominance, crossed dominance, hole in the card test  
Abbreviations: Right eye (RE), left eye (LE), Right hand (RH), Left hand (LH), Hole in the card test(HICT), Near point of convergence (NPC).

INTRODUCTION  
Ocular dominance is defined as tendency to prefer visual input from one eye to another for precise localization and stable fixation preference. In 1593, ocular dominance first described by Giovanni Battista Porta. Miles (1928) established hole based test to determine the eye dominance. Ocular dominance sometimes called eyedness and hand dominance is defined as handedness. In uncrossed dominance, the individual has same side eye and hand dominance and in crossed dominant the individual has the opposite eye to hand dominance.  
Every individual has one eye dominant. It is significantly accountable in monocular viewing aimed to peek through a hole and crossed dominant has an advantage in sports vision (cricket, baseball and golf)\textsuperscript{3}. However, crossed dominant pattern (eye and hand opposite side) not recommended for novice archers\textsuperscript{3}. The phenomenon of dominance existed with paired organs like hands, eyes, feet and cerebral hemispheres. The information received by the dominant eye is analyzed about 14 milliseconds than the non dominant eye\textsuperscript{4}. Two third of population had right eye dominant. 93% were right handed dominant and 2% ambidextrous. 7.5 % children were had left hand dominance\textsuperscript{4}.

The eyeto hand dominance existed predominately in uncrossed form right hand and right eye whereas crossed dominance in the form of right hand and left eye. Application of near point of convergence does not help in determining the dominance in the subjects with normal extra ocular motility and convergence value within normal range.

Ocular dominance is independent of refractive error\textsuperscript{5}. The dominant eye was more myopic in myopic...
An Eye to Hand Dominance

Anisometropia. The basis of Rosenbach test is Porta test and the basis of hole in the card test is Miles test. The most common method is the hole in the card test is (HICT), near convergence test, sensorial (+1.50D lens induced blur) test, variable angle mirror angle test and visual evoked potential test. To the best of our knowledge, no study carried out in Pakistan to find the pattern of handedness and eyedness in eye care professionals, medical students and ophthalmic technicians. So, apart from its significance in sports vision, it is clinical useful in ophthalmic practice to prescribe the mono vision lens for the correction of presbyopia, binocular balancing of refraction and to select the non dominant eye for surgical correction of squint in certain cases. Sighting or directional dominant subjects without any ocular motility disorder were included and sensory dominant were excluded.

The pattern of eye to hand dominance was evaluated, primarily to determine how frequently a specific type of ocular dominance is existing and secondary to aware the subjects that which eye must be opened to get accurate aimed target in monocular viewing condition.

**METHODOLOGY**

Non probability, consecutive sampling technique applied to determine the ocular dominance by using three tests hole in the card test, sighting test and near point of convergence were done to evaluate the ocular dominance in healthy subjects had normal visual acuity with or without spectacles. In (HICT), the subject held a card with both hands at 3 cm diameter hole in the center of card. The participants were instructed to look a target placed at 2 meter distance with both eyes opened. Once the target seen with both eyes, then do not move hand and neck. After that covered each eye alternatively with occluder to observe the eye that will see the target, considered as dominant eye and the open eye through which target was displaced or disappeared is considered non dominant eye. Ocular dominance was assessed by near point of convergence, an accommodative target brings closer to the eye to observe which eye drift out (objectively) or the subject will report diplopia (subjectively). The test was repeated twice to confirm the subjective response. The hand dominance determined to ask which hand is used more frequently for writing purpose.

**RESULTS**

**Distribution of Study’s Participants**

<table>
<thead>
<tr>
<th>Professionals</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>House officers</td>
<td>11</td>
<td>27.5%</td>
</tr>
<tr>
<td>Post graduate residents</td>
<td>10</td>
<td>25%</td>
</tr>
<tr>
<td>Ophthalmologists</td>
<td>8</td>
<td>20%</td>
</tr>
<tr>
<td>Optometrists</td>
<td>6</td>
<td>15%</td>
</tr>
<tr>
<td>Ophthalmic technicians</td>
<td>4</td>
<td>10%</td>
</tr>
<tr>
<td>Orthoptist</td>
<td>1</td>
<td>2.5%</td>
</tr>
</tbody>
</table>

The pie graph 1, showed that RH and RE subjects were predominantly more prevalent (85%), crossed eye hand dominant pattern RH and LE (10%) were more common. 2 left handed dominant, one had RE and other had LE dominant.

**DISCUSSION**

There were 21(52.5%) medical students, 11(27.5%) were house officers and 10 (25%) post graduate residents, 15(37.5%) were eye care professionals, 8 (20%) were ophthalmologists, 6 (15%) were optometrists and 1 (2.5%) orthoptist and 4(10%) were ophthalmic technicians. While to perform the HICT, the potential bias was restricted to instruct the subjects that do not move the card from the center of both eyes and do not move the head to get a viewing angle. All the participants reported to have one dominant eye (right or left). No subject was ambidextrous and no one had distance and near ocular dominance difference as
stated by Rice et al (2008) 15. Right hand and right eye dominant were 34(85%), right hand and left eye 4(10%), left hand and left eye 1(2.5%), left hand and right eye 1(2.5%). 35 (87.5%) were uncrossed and 5 (12.5%) were crossed. Of 35 uncrossed dominant, 34 (97%) were RH and RE, one uncrossed dominant (3%) had LH and LE dominant. Of crossed dominant 3 were female and 2 were male. Among five crossed dominant, four had right hand and left eye dominant. One crossed dominant had left hand and right eye dominant. Among crossed dominant subjects, three were aware and two were unaware about the dominant eye before this test. One female crossed dominant (right hand and left eye dominant) told that she got second position in marksmanship among 70 competitors. One male subject used left hand for routine work and right eye dominant but on investigation, it revealed that historically his right hand was dominant that become non functional due to an accident. So, he was not recorded as a crossed dominant. Two subjects, one habitually reported to use left eye for single task but two tests confirmed that right eye was dominant. One male subject, had uncrossed dominant (left eye and left hand) habitually used to close his left dominant eye for single shooting target but he reported that always he missed the target. The present study guided those participants who were unaware to use the dominant eye in monocular conditions and aimed target for accurate and stable fixation. Eye to hand dominance pattern may determine genetically and no way must be supported to change it16. However, a study with small sample size and one month follow up of cataract surgery reported that ocular dominance changes in seven subjects17. Aswathappa et al (2011) studied 100 healthy subjects had normal sight by questionnaire and miles test. 75 % were RE and 25 % were LE dominant. 76% were uncrossed dominance and 24% were crossed dominance18. Johansson et al (2015) studied 32 healthy subjects had normal sight. 65.6 % were RE dominant and 34.4 % were LE dominant19. Waheed and Laidlaw studied eye dominance in visual handicap with full thickness macular hole (FTMH) and found that historical dominant eye were two times more symptomatic and elected to undergo surgery than patients had (FTMH) in their non dominant eye19. The results of this study is closer to Vinodha et al (2014) in which 23 medical students participated, among them 5 (21.7%) were crossed dominant and 18 (78.2%) were uncrossed4. The pattern of dominance was same except that one individual of present study has crossed dominant pattern (left hand and right eye). To find the characteristics of dominant eye study had been extended to the ganglion cell inner plexiform layer thickness and Choi et al (2016) determined that dominant eye were more thicker than the non dominant eye 20. The subjective response of Porta test and HICT were highly consistent as all the subjects reported single dominant eye (right or left). Highly consistent results may due to potential control that all the subjects were professionals, well-educated and potential bias was controlled. Near point of convergence remained sustained among all the subjects, no drifting of any eye observed objectively and no one reported diplopia subjectively within normal convergence range. So, it may be concluded that application of near point of convergence does not help in determining the dominance in the subjects with normal extra ocular motility and convergence value within normal range.

CONCLUSION

The eye to hand dominance predominately existed in uncrossed form right hand and right eye whereas crossed dominance in the form of right hand and left eye. The limitation of present study that it was a single centered study with small sample size and the defined population was well educated. Further qualitative research may be conducted in common public to see that how would they respond in confirmation of ocular dominance through scientific tests.

Acknowledgment: we thank all the authors and the participants of this study for their valuable time, cooperation and patience.

Conflict of interest: None

Financial disclosure: None

REFERENCES
10. Ferreira DL, Neves H, Queros A, Ribeiro MF, Matos SCP, Meijome JMG. Ocular dominance and visual function testing.
A 37-year-old woman presented with symptoms of allergic conjunctivitis: Differential diagnosis are: Aniridia, Prominent iris collarette, Coloboma of the iris, Granulomatous iritis, and Persistent pupillary membranes.

It is a protruding and prominent iris collarette. The finding was detected on slit lamp exam. The iris collarette is a landmark that separates the central pupillary zone from the peripheral ciliary zone. It is typically flat but can be prominent, as seen here. This finding is a normal variant and is benign which requires no treatment. Curtesy: Nejam. UK
Effect of Incision Site on Central Corneal Thickness after Pediatric Cataract Surgery

Mariya Nazish Memon FCPS1, Sajjad Ali Surhio MS (Ophth)2 Azfar Ahmed MirzaFCPS3

Department of Ophthalmology, Institute of Ophthalmology, Liaquat University of Medical and Health Sciences (LUMHS)
Jamshoro, Hyderabad (Sindh)

ABSTRACT
Purpose: To evaluate the effects of two different incision sites on central corneal thickness after pediatric cataract surgery with foldable intraocular lens implantation.

Material and Method: This prospective, cohort study was conducted in the Department of Ophthalmology, Liaquat University Eye Hospital, Hyderabad from January to June 2016. A total number of 104 eyes of 84 children with pediatric cataract and age range of 4-16 were randomized into 2 groups according to the incision site: clear corneal incision group (52 eyes) and scleral tunnel incision group (52 eyes). Surgery was performed under general anesthesia. Only the incision site is different and all other steps of surgery were same. After cataract removal, acrylic intra ocular lens (IOL) was implanted with the help of injector. Ultrasound Pachymetry was done to record central corneal thickness (CCT) pre operatively and 1 month and 3months post operatively. The mean of 3 readings was calculated for CCT.

Results: Preoperative CCT was 518.5 ±29.4 μm in group -1 and 514 ±25.3 μm in group-2. (P value = 0.8). First month postoperative mean CCT was 527.2 ±28.7μm in group-1 and in group-2 mean CCT was 524.1 ±25 μm. The mean increase in CCT was 8.7 μm in Group 1 and 10.1 μm in Group 2 (p-value = 0.6). At 3rd postoperative month the mean CCT was 533.6 ±27.7 μm in group-1 and 527.3 ±24.6 μm in group-2. The mean increase in CCT was 15.1 μm in Group 1 and 13.3 μm in Group 2 (p-value = 0.2). Difference between two means was statistically insignificant at 1 month and 3 months post op. In group-1 the mean percent increase in CCT at first postoperative month was 1.68% and 1.96% in group-2. At 3rd postoperative month the mean percent increase in CCT was 2.91% in group-1 and 2.59% in group 2.

Conclusion: Clear corneal and scleral tunnel incisions seem to result in no significant increase in central corneal thickness up to 3 months post-operatively if foldable intraocular lens is implanted after cataract surgery in children. Clear corneal incision should be preferred to avoid conjunctival scarring.

Key Words: Central Corneal Thickness, Pediatric Cataract, Scleral Tunnel Incision, Clear Corneal Incision

INTRODUCTION
Congenital cataracts are responsible for about 10% of all visual deprivation in children worldwide. Early surgical intervention and visual rehabilitation is necessary to prevent cataract induced childhood blindness. Although several techniques of adult cataract surgery are adopted during surgery of pediatric cataract, pediatric eye is different from adult eye. Thin and elastic sclera and high vitreous pressure predisposes to repeated shallow anterior chamber intra operatively. Highly elastic and thin capsule and soft, gummy lens matter makes the capsulorhexis and cataract removal more difficult and time consuming.

In pediatric cataract when foldable intra ocular lens (IOL) is being implanted, a corneal tunnel incision is preferred to leave the conjunctiva undisturbed and should be sutured with absorbable sutures as corneal incision do not usually self seal in children as in adults. In infants scleral tunnel incision is used when rigid IOL is implanted in sulcus after large posterior capsulotomy and anterior vitrectomy.

Clear corneal and scleral tunnel incisions seem to result in no significant increase in central corneal thickness up to 3 months post-operatively, if foldable intraocular lens is implanted after cataract surgery in children. Clear corneal incision should be preferred to avoid risk of conjunctival scarring.

During cataract surgery, corneal endothelium is under the influence of many factors. These include surgical technique, site and size of tunnel incision, visco-elastic substance, type of intra ocular lens, duration of surgery, post op inflammation and secondary glaucoma. Corneal endothelium is a single layer of cells, devoid of mitotic activity. The normal average rate of endothelial cell loss throughout the life is about 0.6% per year. The operated eyes continue to lose endothelial cells for several years after cataract surgery at a high rate of about 2.5% per year. Endothelium
Effect of Incision Site on Central Corneal Thickness after Pediatric Cataract Surgery

Cell loss is compensated by changes in size and shape of corneal endothelium and increase in central corneal thickness (CCT). Several studies have reported the effect of incision site on corneal endothelium in adults, literature on such loss in children is not available to our knowledge so we are the first to reporting the effect of incision site on central corneal thickness in children after pediatric cataract surgery with foldable IOL implantation.

MATERIAL AND METHOD

This prospective, cohort study was conducted in the Department of Ophthalmology Liaquat University Eye Hospital, Hyderabad from January to June 2016. Approval was obtained from ethical review committee of Liaquat University of Medical and Health Sciences (LUMHS). A total number of 104 eyes of 84 children with pediatric cataract were randomized into 2 groups according to the incision site: clear corneal incision group (52 eyes) and scleral tunnel incision group (52 eyes). Patient with history of trauma, previous intraocular surgery, glaucoma, uveitis and with other anterior segment abnormalities such as anterior segment dysgenesis, aniridia and subluxated lenses were excluded from the study. After written informed consent from the parents or guardian, all patients underwent detailed ophthalmic examination including visual acuity, intraocular pressure, slit lamp examination for the anterior segment and dilated fundus examination. Ocular ultrasound was performed in children with no fundus view to rule out posterior segment pathology. Ultrasound Pachymetry (SpA 2000, Optikon, Rome, Italy) was used to record CCT preoperatively and 1 month and 3 months postoperatively. The mean of 3 readings was calculated for CCT.

Surgery was performed under general anesthesia. In scleral tunnel incision group, after standard aseptic measures, conjunctiva peritomy was performed at 12‘o clock. The scleral tunnel was constructed using crescent knife and entry into the anterior chamber was made with 3.2 keratome. Two corneal side ports were made at 2 and 10‘O clock with 20 gauge micro vitreo retinal (MVR) blade to introduce automated vitrector-aspirator probe and anterior chamber maintainer (ACM) for irrigation. Viscoelastic substance was injected to maintain anterior chamber and to protect endothelium. Continuous curvilinear anterior capsulorhexis (CCC) achieved with cystotome bent needle, utrata forceps and lens matter was aspirated with vitrectomy probe. Anterior chamber was refilled with viscoelastic substance and the acrylic intra ocular lens (IOL) was implanted with the help of injector. Scleral and conjunctiva wound were closed with 10/0 vicryl. Viscoelastic substance were aspirated from anterior chamber with the help of vitrector probe and corneal side ports were closed with 10/0 vicryl as well.

In clear corneal incision group, two corneal side ports were made at 2 and 10‘O clock similarly as in scleral tunnel incision group. After CCC and lens matter aspiration, one of the corneal incision usually supero-temporal in right eyes and supero-nasal in the left eyes was enlarged to 3.5 mm and the acrylic IOL was implanted with the help of injector. Corneal incision and side port were closed with 10/0 vicryl. Intracameral 1.0ml moxifloxacin hydrochloride 0.5% and dexamethasone 0.4 mg were given at the end of the procedure. Topical antibiotic and steroid combination was given post-operatively.

Data Analysis: Data was analyzed by using SPSS.16. Frequencies and percentages were calculated for all qualitative/categorical variables including gender and eye laterality. Mean and standard deviation was calculated for all quantitative variables including age and central corneal thickness. Independent sample t-test was used to compare the mean central corneal thickness pre and post operatively and between two groups at 5% level of significance. Percentages of CCT increase were calculated by difference in pre and post operative values divided by preoperative value multiplied by 100.

RESULTS

Eighty four children (104 eyes) including 48 male (57.1%) and 36 female (42.9%) with mean age of 8.5 ±2.5 (range, 4 to 15) years were equally allocated to two groups according to the incision site: corneal incision (52 eyes), scleral incision (52 eyes). The mean age of Group-1 (corneal incision) was 8.4 ±2.7 years and 8.8 ±2.7 years for Group-2 (scleral incision). There were 22 (56.4%) males and 17 (43.6%) females (M: F ratio = 1.3: 1) in group-1 and in group-2, 26 (57.8%) were males and 19 (42.2%) females (M: F ratio=1.4: 1). There was no statistically significant difference in demographic variables (e.g., age, sex) between groups. While in group-1, 26 (68.4%) children were unilateral cases and 13 (31.6%) were bilateral cases and in group-2, 38 (84.4%) children were unilateral cases and 7 (15.5%) were bilateral cases. Table-I

Table-II illustrates central corneal thickness (CCT) values both before and up to 3 months after surgery between two groups. In group-1 mean preoperative CCT was 518.5 ±29.4 µm and 514 ±25.3 µm in group-2. There was no statistically significant difference in two groups, p value = 0.8. First month postoperative mean CCT was 527.2 ±28.7µm in group-1 and in group-2 mean
CCT was 524.1 ±25 µm. The mean increase in CCT was 8.7 µm in Group 1 and 10.1 µm in Group 2. Difference between two means was statistically insignificant, p-value = 0.6. At 3rd postoperative month the mean CCT was 533.6 ±27.7 µm in group-1 and 527.3 ±24.6 µm in group-2. The mean increase in CCT was 15.1 µm in Group 1 and 13.3 µm in Group 2. Difference between two means was statistically insignificant, p-value = 0.2.

In group-1 the mean percent increase in CCT at first postoperative month was 1.68% and 1.96% in group-2. At 3rd postoperative month the mean percent increase in CCT was 2.91% in group-1 and 2.59% in group 2. Figure-1

Table 1: Demographic data  n = 84

<table>
<thead>
<tr>
<th>Demographics</th>
<th>Corneal Incision n = 39</th>
<th>Scleral Incision n = 45</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean±SD</td>
<td>8.4 ±2.7</td>
<td>8.8 ±2.7</td>
</tr>
<tr>
<td>Min - Max</td>
<td>4 – 15</td>
<td>4 – 15</td>
</tr>
<tr>
<td>Gender(M: F = 1.3: 1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>22(56.4%)</td>
<td>26(57.8%)</td>
</tr>
<tr>
<td>Female</td>
<td>17 (43.6%)</td>
<td>19 (42.2%)</td>
</tr>
<tr>
<td>M: F</td>
<td>1.3: 1</td>
<td>1.4: 1</td>
</tr>
<tr>
<td>Eyes involved</td>
<td></td>
<td></td>
</tr>
<tr>
<td>One Eye</td>
<td>26(68.4%)</td>
<td>38(84.4%)</td>
</tr>
<tr>
<td>Both eyes</td>
<td>13 (31.6%)</td>
<td>7 (15.6%)</td>
</tr>
</tbody>
</table>

DISCUSSION

Corneal transparency and integrity is entirely based on healthy and functioning endothelium. Active fluid pump and barrier function of corneal endothelium maintain normal thickness and transparency of cornea. Corneal endothelium is under stress by various factors during surgery and corneal characteristics are essential to measure the safety and efficacy of surgical technique.

Several authors observed significantly thicker corneas of aphakic and pseudophakic pediatric population when compared with reported normal values of pediatric eyes. But it is unknown that either increased CCT was present before cataract surgery or develops postoperatively. It has been suggested that surgical trauma to cornea during the first few months of life might interrupt the normal corneal development and impair the regulatory mechanisms. Furthermore congenital cataract may affect the development of the cornea, resulting in increased CCT or increased susceptibility to subclinical edema.

In our study we observed the effect of two different incision sites i.e., clear corneal vs scleral tunnel incision on central corneal thickness while all the other step of surgery were same in both groups and revealed that CCT increases in both the group. The mean increase in CCT was 8.7µm(1.68%) and 10.1µm(1.96%) at 1 month post op where as 15.1µm(2.91%) and 13.3µm(2.59%) at 3 months post op in group 1 and group 2 respectively. These changes are insignificant as compare to pre operative values and in between groups. It could be because of close chamber microsurgical technique and foldable IOL through small 3.2 incision.

Limited literature available regarding the CCT changes after pediatric cataract surgery in terms of incision site. Porwik and coauthors observed statistically insignificant change in CCT after phaco aspiration with in bag acrylic IOL implantation through clear cornea. Kim and coworkers found significantly thicker corneas in treated eyes (600 µm) as compared to

Table 2: Comparison of central corneal thickness (µM) in pediatric underwent cataract surgery between groups  N = 104 (eyes)

<table>
<thead>
<tr>
<th>Follow ups</th>
<th>CCT (µM) Mean ±SD</th>
<th>P-values</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Corneal</td>
<td>Scleral</td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>518.5 ±29.4</td>
<td>514 ±25.3</td>
<td>0.8</td>
</tr>
<tr>
<td>1 month postoperative</td>
<td>527.2 ±28.7</td>
<td>524.1 ±25</td>
<td>0.6</td>
</tr>
<tr>
<td>P Value**</td>
<td>&lt; 0.0001</td>
<td>0.084</td>
<td></td>
</tr>
<tr>
<td>3 months postoperative</td>
<td>533.6 ±27.7</td>
<td>527.3 ±24.6</td>
<td>0.2</td>
</tr>
<tr>
<td>P Value**</td>
<td>&lt; 0.0001</td>
<td>0.024</td>
<td></td>
</tr>
</tbody>
</table>

*By Independent Sample t-test, ** By Paired t test, CCT = central corneal thickness, CI = Confidence Interval, SD= Standard Deviation
the control group (569 μm), after lens matter aspiration and foldable IOL implantation through scleral tunnel incision. There was 31um (5.4%) increase in CCT after surgery18 where as Vasavada and coworkers observed 2.3% decrease in mean CCT from pre-operative period (535.8 μm) to 3 months (521.6 μm) after lens matter aspiration and acrylic IOL implantation through clear cornea and 2.8% increase in the mean CCT from pre-operative period (519.5 μm) to 3 months (531.9 μm) after surgery, in eyes underwent posterior capsulotomy and anterior vitrectomy along with IOL implantation19.

Baltrame and coauthors compared the post phacoemulsification endothelial changes induced by different cataract incision sites, i.e.3.5 mm clear corneal incision (CCI) with silicon IOL;5.5 mm sutured CCI with PMMA IOL and 5.5 mm scleral tunnel incision with PMMA IOL and observed that corneal thickness significantly increased in all groups 1 week postoperatively but returned to pre operative values during the follow up period and no differences among the groups were found7. Few similar type of studies conducted in the adult age group. Our study concluded that the both type of incisions are safe, have minimal and acceptable changes in CCT. Corneal tunnel incision is the better option when foldable intraocular lens is implanted to leave the sclera and conjunctiva undisturbed.

This study has the limitation of short follow-up. Further studies with larger sample size and long-term follow-up are required to evaluate the long-term effects of incision on central corneal thickness after pediatric cataract surgery.

CONCLUSION

Clear corneal and scleral tunnel incisions seem to result in no significant increase in central corneal thickness up to 3 months post-operatively if foldable intraocular lens is implanted after cataract surgery in children. Clear corneal incision should be preferred to avoid conjunctival scarring.

REFERENCES


Complications and Outcomes of Phacoemulsification in Cataract Surgery

(A different experience in Saudi Arabia)

Suhail Mushtaq FCPS,FRCS1. Naeem Munir FCPS,FRCS.2

Department of Ophthalmology, King Saud Hospital Unaizah, Al-Qassima, Kingdom of Saudi Arabia

ABSTRACT

Purpose: To assess the complications and outcomes of phacoemulsification cataract surgery in Saudi Arabia.

Materials and Methods: This was a prospective hospital-based study conducted from August 2015 to August 2016 in King Saud Hospital Unaizah, Al-Qassim, Kingdom of Saudi Arabia. There were total 50 patients, including 34(68%) males and 16(32%) females. The patients of cataract with mild to moderate lens density, without ocular adnexa disease and quiet eyes without uveitis were included. After taking the informed consent, complete ocular examination was performed. Trypan blue dye was used to stain the lens capsule. Basic salt solution (BSS) 500ml with ½ injection of adrenaline 1:1000 was used during surgery. The stop and chop phaco technique was adopted. An acrylic single piece foldable monofocal lens was implanted into the capsular bag. Intra-operative and postoperative complications were recorded. Follow-up period was scheduled for 2 months and final visual acuity was assessed.

Results: The male to female ratio was 34(68%):16(32%) and the average was 58 years. The most common intraoperative complication was posterior capsule rupture, seen in 3(6%) patients. The most common postoperative complication was mild striate keratopathy, seen in 20(40%) cases. There was mild uveitis in 6(12%) cases. Posterior capsular opacification (PCO) was noticed in 5(10%) patients. 25(50%) patients achieved uncorrected vision 6/6 and in 19(35%) patients best corrected visual acuity (BCVA) was 6/6. There was only 1(2%) patient with BCVA 6/24.

Conclusion: Phacoemulsification with foldable intraocular lens (IOL) implant is a modern and preferred cataract surgery technique.

INTRODUCTION

Cataract is one of the most common causes of treatable blindness and cataract surgery is the commonest procedure performed in ophthalmology.1 It is also cost-effective surgical intervention in terms of the quality of life restored. It is fast, relatively risk free, usually does not need admission or general anesthesia and gives dramatic visual recovery as compared to the preoperative condition. The techniques of cataract surgery have changed a lot in the past three decades. Sir Stewart Duke Elder mentioned intra-capsular cataract extraction (ICCE) as the surgery of choice in 1967 and he was not impressed by phacoemulsification technique that was introduced by Charles Kelman in 1967. The Madurai intraocular lens implant study, revealed the superiority of extra-capsular cataract extraction (ECCE) with posterior chamber intraocular lens implantation (PCIOL) over ICCE. Phacoemulsification soon replaced ECCE and now phacoemulsification with foldable IOL implant is the gold standard to restore the vision in cataract patients.

Aligning outcome measures for cataract surgery may facilitate international comparisons that can drive improvements in the outcomes and that is also meaningful to the patients.2 Preoperative, intra-operative and postoperative assessment with attention to BCVA has a pivotal role to establish the complications and outcomes of phacoemulsification cataract extraction with IOL implantation.3 While we appreciate the many technical advances that have happened up till now but we should not forget the surgeon, who is still the most crucial factor in the success of cataract surgery.

Undoubtedly, the state of the art surgery for visual rehabilitation in cataract patients is phacoemulsification. The most common intra-operative complication we encountered in Saudi Arabia, are ruptured posterior capsule and the most common postoperative complication is striate keratopathy.

MATERIALS AND METHODS

This was a prospective hospital-based study conducted from August 2015 to August 2016 at King Saud Hospital Unaizah, Al-Qassim, Kingdom of Saudi Arabia.
Arabia. The research was approved ethically by the hospital. There were total 50 patients including 34 males and 16 females.

**Inclusion Criteria:** Cataract with mild to moderate density. Eyes without ocular adnexa disease or uveitis were included.

**Exclusion criteria:** Combined ocular surgical procedures, planned manual ECCE, history of previous intraocular surgery and only eye were excluded.

Informed consent was obtained from all patients. Complete ocular examination including determination of BCVA, measurement of intraocular pressure (IOP), slit lamp examination, fundoscopy, ultrasonography and biometry was undertaken prior to surgery. The cataract was graded by considering LOCS III (lens opacification classification system III): nuclear opalescence (NO), nuclear color (NC), cortical cataract (C) and posterior sub capsular cataract (P).

The outcome measures were intraoperative complications, incidence of postoperative complications and visual outcomes. Postoperatively, topical corticosteroid (prednisolone acetate 1%) drops 2 hourly per day for one week, antibiotic steroid combination (tobramycin 0.3%, dexamethasone 0.1%) drops 4 times per day for one month and antibiotic (moxifloxacin 0.5%) drops 3 times a day for 5 weeks were used by patients. Systemic oral antibiotic (ciprofloxacin 500mg) was prescribed twice a day for five days after surgery and systemic oral analgesic (paracetamol 500 mg) was advised for the first 2 postoperative days if patient experiences ocular pain.

**RESULTS**

Between August 2015 to August 2016, 50 phacoemulsification surgeries were performed. The male: female ratio was 34(68%):16(32%) with an average age of 58 years.

The incomplete CCC was noticed in 1(2%) patient and most common serious complication was intraoperative posterior capsule rupture which was seen in 3(6%) patients. **Table 1**

**Table 1:**

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Intraoperative Complications</th>
<th>No of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Incomplete Continuous Curvilinear Capsulorhexis</td>
<td>1</td>
<td>2%</td>
</tr>
<tr>
<td>2</td>
<td>Posterior capsular rent</td>
<td>3</td>
<td>6%</td>
</tr>
<tr>
<td>3</td>
<td>Nuclear lens material drop</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>4</td>
<td>Intraocular lens drop</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>4</td>
<td>8%</td>
</tr>
</tbody>
</table>

Follow-up examination was scheduled on day 1, week 1, month 1 and months 2 after surgery. The most common post operative complication, mild striate keratopathy, was seen in 20(40%) patients that was managed successfully by topical treatment. There was mild anterior uveitis in 6(12%) cases that was very well treated by topical medication. We noticed PCO in 5(10%) cases. There was no case of post operative endophthalmitis in our series. **Table 2**

**Table 2:**

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Postoperative complications</th>
<th>No of Cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Striate Keratopathy</td>
<td>29</td>
<td>58%</td>
</tr>
<tr>
<td></td>
<td>Mild</td>
<td>20</td>
<td>40%</td>
</tr>
<tr>
<td></td>
<td>Moderate</td>
<td>7</td>
<td>14%</td>
</tr>
<tr>
<td></td>
<td>Severe</td>
<td>2</td>
<td>4%</td>
</tr>
<tr>
<td>2</td>
<td>Anterior Uveitis</td>
<td>8</td>
<td>16%</td>
</tr>
<tr>
<td></td>
<td>Mild</td>
<td>6</td>
<td>12%</td>
</tr>
<tr>
<td></td>
<td>Moderate</td>
<td>2</td>
<td>4%</td>
</tr>
<tr>
<td>3</td>
<td>Intraocular pressure rise</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>4</td>
<td>Endophthalmitis</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>5</td>
<td>Posterior capsular opacification</td>
<td>5</td>
<td>10%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>42</td>
<td>84%</td>
</tr>
</tbody>
</table>

In 46 (92%) patients we noticed complications and in 4(8%) patients there was no complication. **Table 3**

**Table 3:**

<table>
<thead>
<tr>
<th>No of patients without complications</th>
<th>No of patients with complication</th>
</tr>
</thead>
<tbody>
<tr>
<td>4(8%)</td>
<td>46 (92%)</td>
</tr>
</tbody>
</table>

Phacoemulsification cataract surgery with IOL implant yields significantly improved snellen’s visual acuity. In our post operative follow up after 2
months, 25(50%) patients achieved uncorrected visual acuity 6/6. In 19(38%) patients, BCVA was 6/6. 5(10%) have BCVA ranging from 6/9-6/12. There was only 1(2%) patient having vision 6/24.

Table 4:

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Visual acuity</th>
<th>No of Cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6/6 Uncorrected</td>
<td>25</td>
<td>50%</td>
</tr>
<tr>
<td>2</td>
<td>6/6 Best corrected</td>
<td>19</td>
<td>38%</td>
</tr>
<tr>
<td>3</td>
<td>6/9 – 6/12 Best corrected</td>
<td>5</td>
<td>10%</td>
</tr>
<tr>
<td>4</td>
<td>6/18 – 6/24 Best corrected</td>
<td>1</td>
<td>2%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>50</td>
<td>100%</td>
</tr>
</tbody>
</table>

DISCUSSION

The current cataract surgery technique of choice is phacoemulsification, unlike with previous methods, its wide spread use and the increasing surgical experience of its practitioners have also reduced the indication time for cataract surgery.

Phacoemulsification requires capsulorrhexis to be completed and its failure has shown negative impact on surgical success. The anterior capsular tear may lead to posterior capsular rupture with a nucleus lens material drop in the posterior segment and refractive outcomes remain poor in certain cases.4 The chances of pseudophakic retinal detachment (PRD) after posterior capsular rupture during phacoemulsification, were more and prophylactic circumferential retinal cryopexy (CRC) will be useful treatment option to reduce the chances of PRD development.5 The results of phacoemulsification are very impressive and the most common intra operative complication is ruptured posterior capsule.6 In our cases we faced this drastic complication in 3(6%) patients. This was the most common intra-operative complication in our study. In all these cases we did anterior vitrectomy and PMMA lenses were implanted in the sulcus. In our study (Table 1) we could not complete capsulorhexis in 1(2%) patient and that case was converted to ECCE with extended corneal incision. Delaying surgery in patients with cataract creates a high risk for capsule related surgical complications.7 We faced this capsule related problem less because of immature cataract in all cases of our series.

In stop and chop phaco technique, one of the challenging steps is determining adequate groove depth during sculpting to produce a thin enough posterior plate for effective splitting of the nucleus.8 The literature differs in the estimates of how many phaco tips should fit vertically inside groove, ranging from 2-4. The other visual clues include observing the bright red reflex suggesting thinning posterior plate. We followed the appearance of the red reflex of the groove during sculpting of nucleus, then the nucleus was easily divided into two parts and ultimately it was chopped.

The risk of high endothelial cell loss should also be considered when phacoemulsification is performed on high density nuclear cataract. Newly emerging cataract techniques, like femtosecond laser assistance causes less endothelial cell loss than conventional phacoemulsification.9,10 The implementation of other new surgical techniques such as torsional ultrasound, viscoelastic devices and pre-existing medical problems of the patient may lead to varying degree of endothelial cell loss after cataract surgery.11 The percentage of endothelial cell loss is significantly lower in phaco-chop technique.12,13 Appropriately addressing these issues may improve the rate of endothelial cell loss and thus further enhance the visual outcome of patients undergoing cataract surgery.

By considering the 4 preoperative LOCS III characteristics and 3 intra-operative observations: phacoemulsification time, mean power expenditure and BSS volume used, can help to create a more organized, integrated customized operative plan to achieve good outcome of cataract surgery.14

There is a recent advance in creation of aspheric lens technology that corrects the patient’s focal length and some optical aberrations that naturally occur in the cornea due to aging.15 There are also other lenses available like: accommodating lenses and multifocal lenses but there are limitations for their use. Adverse subjective visual problems particularly haloes, rings around light and reduced contrast sensitivity are more prevalent and troublesome in individuals with multifocal IOL.16 Patients having accommodative IOL’s has small gain in near vision after six months and there is also evidence of worsening of distance vision after 12 months which may be due to more chances of development of PCO in these patients.17

In our cases, we have seen there was not a single case showing raised IOP postoperatively. The study conducted by Zetterstrom C, Behndig A, Kugelberg M and et al also observed that cataract surgery was found to even reduce the IOP by a mean of 1.46 mm of Hg.18 We have also done cataract surgery in eyes with the history of anterior uveitis in the past but at the time of surgery the eyes were quiet and we got the good visual results. So, normal range levels of visual acuity can be achieved in most of the cases undergoing cataract surgery in eyes with uveitis when there is preoperative control of uveitis and use of acrylic IOL.19
We have observed mild to moderate striate keratopathy and anterior uveitis in our few cases but it settled down with appropriate treatment. There was no case of endophthalmitis and 5(10%) patients developed PCO but it was too early to do Yag capsulotomy. In our series, we could achieve 6/6 vision in 44(88%) , 6/9 - 6/12 in 5(10%) and only in 1 (2%) we could achieve BCVA 6/24. Table 4 That was a case of traumatic cataract with macular scar but there was no zonular dehiscence and that is why we did not implant capsular tension ring (CTR). To improve the clinical outcome, CTR can be implanted in patients having zonular dehiscence or weakness associated with mature cataract, trauma, pseudoexfoliation syndrome, retinitis pigmentosa, degenerative myopia and lens coloboma.

The visual outcomes of cataract surgery are excellent. Removing cataract by phacoemulsification may result in a better visual acuity compared to conventional ECCE, with lower complication rate. But the phacoemulsification through a microincision with implantation of latest generation IOLs is an important step in the evaluation of cataract surgery.

CONCLUSION

Undoubtedly the state of the art surgery for visual rehabilitation in cataract patients is phacoemulsification. The most common intra-operative complication is ruptured posterior capsule and the most common postoperative complication is striate keratopathy.

REFERENCES

INTRODUCTION
Primary congenital glaucoma is a serious ocular disorder throughout the world as it is very difficult to manage this condition. Gravity of the condition is clear from the fact that 50% of eyes with primary congenital glaucoma become legally blind sometime later in life. Although advancements in surgical techniques and treatment options have improved the prognosis but there is still room for betterment. Medical therapy plays a subordinate role but the mainstay in the treatment of primary congenital glaucoma is surgical. Goniotomy and trabeculotomy, depending on the circumstances and severity of the condition, are nowadays considered to be the procedures of first choice. Goniotomy is less invasive and less mutilating than trabeculotomy as it preserves the conjunctiva, but it cannot be performed in a cloudy cornea and the results are unpredictable in comparison to trabeculotomy which is technically easier and can be performed in opaque cornea with better results. Trabeculotomy can either be conventional, which is also called as filament or suture assisted trabeculotomy, or modified, which is also known as rigid probe trabeculotomy. Conventional trabeculotomy opens all the 360° of anterior chamber angle after treatment while modified trabeculotomy treats around 120° of angle with lesser complications than the conventional trabeculotomy, but both have comparable results. This study was done to assess the surgical outcome of modified trabeculotomy in primary congenital glaucoma patients at the department of pediatric ophthalmology, Chandka Medical College and Hospital, Larkana.
MATERIAL AND METHODS

This was a prospective interventional case series study which was conducted from June 2014 to June 2016 at the department of pediatric ophthalmology, Chandka Medical College and Hospital, Larkana, Pakistan. Patients presenting with primary congenital glaucoma, from birth to 14 years of age were included in the study after taking the informed written consent from the guardian. Patients with glaucoma due to secondary causes, history of prior surgery and those who were lost to follow up before six months postoperatively were excluded from the study. Slit lamp examination and examination under general anesthesia was done in every case. Fundoscopy, retinoscopy and autorefractometry were performed wherever possible. Preoperative and postoperative corneal clarity, average corneal diameter, axial length and intra ocular pressure of patients were compared. Corneas were divided on the basis of haziness into following grades:

Grade I: Mild corneal haziness
Grade II: Moderate corneal haziness
Grade III: Severe corneal haziness or scarring

Surgery was labeled successful if improvement was observed in any two of the four aforementioned variables (i.e. corneal clarity, average corneal diameter, axial length and intra ocular pressure). Patients were followed up at 1st day, two weeks, and one month postoperatively and monthly thereafter; minimum follow up period was 10 months and maximum follow up period was 12 months. SPSS version 20 was used for data entry and analysis. Frequency with percentage was calculated for gender and categories of congenital glaucoma. Mean ± standard deviation were calculated for numerical variables like age, average corneal diameter, axial length and intra ocular pressure. Paired-t test was used for comparing preoperative and postoperative corneal clarity, average corneal diameter, axial length and intra ocular pressure. P-value ≤ 0.05 was considered significant.

Surgical Technique: All surgeries were performed by the first author to avoid the inter-surgeon variability in surgical technique to gauge the results. After inducing general anesthesia and cleaning the field, a superior rectus bridal suture was applied. Peritomy was performed and a fornix based conjunctival flap was raised and cautery was done to secure hemostasis. A 4×3 mm rectangular partial thickness scleral flap was reflected up to about 1mm of clear cornea. Then a radial incision was given in the center of the scleral bed in between the clear corneal stroma and the opaque scleral stroma, about 1-2 mm away from the limbus. Keeping the field dry, the Schlemm’s canal was identified by gush of aqueous, debris or blood. 6/0 prolene or nylon suture was then inserted to confirm the position of Schlemm’s canal and to avoid false passage. No resistance offered to the passage of suture confirmed the proper position of Schlemm’s canal. Then the Harm’s rigid probe or trabeculotome was gently passed both nasally and temporally to cover about 120° of the circumference. The partial thickness scleral flap was closed with two 10/0 nylon sutures and the conjunctiva closed with two 8/0 silk sutures. Surgery was ended by giving subconjunctival injection of antibiotic steroid combination.

RESULTS

A total of 45 eyes of 29 patients of primary congenital glaucoma underwent modified trabeculotomy, out of which 15 (51.72%) were males and 14 (48.28%) were females. Mean age ± standard deviation was 2.29 ± 3.70 years and age range was 1 month to 12 years. Follow up period of patients were 10 months. Preoperative average corneal diameter was 13.90 ± 1.18 mm and postoperative average corneal diameter was 13.63 ± 1.15 mm (P < 0.000454).
Preoperative intra ocular pressure was 14.58 ± 5.27 mm Hg and postoperative intra ocular pressure was 9.00 ± 3.76 mm Hg (P < 0.000001). Preoperative axial length was 23.45 ± 3.29 mm and postoperative axial length was 23.34 ± 3.31 mm (P < 0.0658). On the basis of clarity, corneas which cleared postoperatively were 14 (31.11%), corneas which remained in Grade I were 19 (42.2%), in Grade II were 9 (20.0%) and in Grade III were 3 (6.7%). Follow up showed that a total of 39 (86.67%) eyes fulfilled the criteria of successful surgery. A few complications were encountered like hyphema, false passage, iris prolapse, shallow anterior chamber, oval pupil and iridodialysis which were treated conservatively except iris prolapse which was treated with iridectomy.

DISCUSSION

After being reported for the first time in 1960, trabeculotomy has become the surgical option of first choice for the treatment of primary congenital glaucoma. Trabeculotomy is superior to goniotomy not only in terms of results but also because of the fact that it is easier to perform and is more feasible for cases of cloudy and opaque corneas. Comparing goniotomy with trabeculotomy, for the treatment of primary congenital glaucoma of varying severity, shows that goniotomy controls IOP in 64-77% of eyes and trabeculotomy in over 90% of eyes. Zhang X et al have reported a success rate of up to 87% for trabeculotomy after 3 years of follow up which is similar to our results of 86.67% and also to some other previous studies which have reported success rates of 75-90%. Filouset al have also reported a success rate of 87% for modified trabeculotomy using rigid probes, which were tailored for three different corneal diameters. Local data about trabeculotomy in primary congenital glaucoma also suggests similar results, as a study from Pakistan has reported successful surgery in 80% cases. On the other hand some researchers have debated about the limitations of trabeculotomy as well. As trabeculotomy is invasive and mutilating to the conjunctiva and sclera it makes future surgeries, if needed, more difficult and vulnerable to failure. Many complications like, hyphema, false passage, iris prolapse, shallow anterior chamber, iridodialysis, descemet’s membrane stripping, cataract, hypotony, choroidal detachment and exudative retinal detachment have been reported in the literature, but we came across hyphema, false passage, iris prolapse, shallow anterior chamber, iridodialysis and oval pupil during our study, which were treated accordingly.

CONCLUSION

Modified trabeculotomy has proved to be a safe and effective procedure for treating primary congenital glaucoma in our setting with a success rate of 86.67%.

REFERENCES

Efficacy of Nepafenac 0.1% VS Topical Ketorolac 0.5% in Phacoemulsification Surgery in terms of Maintaining Pupil Dilatation

Maria Sultan, FCPS, FRCS1. Syed Amir Hamza FCPS, 2 Umer Khan FCPS3

Department of Ophthalmology Hayatabad Medical Complex, Peshawar

ABSTRACT:
Objective: To compare topical ketorolac (0.5%) versus nepafenac (0.1%) in phacoemulsification surgery in terms of maintaining pupil dilation.
Materials and Methods: In this study sample size was 250 eyes in each group. All patients in age range of 45-75 years including both genders, having age related cataract with round, regular and reactive pupil. A detailed history and complete examination was done including slit lamp examination, fundoscopy and checking for pupillary reaction. Patients in group A received topical nepafenac 0.1% while patients in group B received topical ketorolac 0.5%. Pupil diameter of each patient was measured with a caliper in the pre-operative and post-operative time.
Results: In this study mean age in nepafenac group was 60 years with standard deviation ± 12.73, while mean age in ketorolac group was 62 years with standard deviation ± 11.92. In nepafenac group 150 (60%) patients were male and 100 (40%) patients were female while in ketorolac group 155 (62%) patients were male and 95 (38%) patients were female. Our study shows that nepafenac 0.1% was effective in 200 (80%) patients while ketorolac 0.5% was effective in 165 (66%) patients.
Conclusion: Our study concludes that nepafenac 0.1% is more effective than ketorolac 0.5% in maintenance of dilated pupil during phacoemulsification surgery.
Key Words: Dilatation of pupil, phacoemulsification.

INTRODUCTION
The most common surgical technique for cataract surgery is phacoemulsification with intraocular lens (IOL) implantation that provides good visual outcomes. Constant and sufficient pupillary dilatation is necessary during phacoemulsification.1 Intraoperative pupil constriction is related with more risk of intraoperative complications especially in cases which are complicated and consume more surgical time.2 Proper mydriasis and control of inflammation during intraocular lens implantation surgery is one of the basic requirement for best post-operative results.3,4 Appropriate pupil dilatation is attained by topical and or intracameral use of anticholinergic agents, sympathomimetic agents, or both like cyclopentolate, tropicamide, and phenylephrine.

Nowadays, topical NSAIDs are routinely used in cataract surgery for avoidance of intraoperative pupil constriction, for reduction of post-operative inflammation and for inhibition and treatment of cystoid macular edema (CME).5,6 Topical nepafenac is frequently used NSAID for maintenance of mydriasis in phacoemulsification. We used topical nepafenac and ketorolac in our study. Cervantes-coste et al from Mexico stated that, the use of nepafenac 0.1% before surgery was useful in maintaining pupillary dilatation throughout phacoemulsification. The decrease in pupil diameter from start to the end of surgery was 1.59 ± 0.94 in control group V/s 0.78 ± 0.51 in nepafenac group.7 Pupil constriction during cataract surgery is due to surgical trauma to the anterior segment which leads to compromise of blood aqueous barrier and this causes meiosis due to release of prostaglandins.8 When release of prostaglandins (PGs) is reduced by using topical NSAIDs, sufficient pupillary dilatation is sustained during surgery thus decreasing intraoperative complications such as posterior capsule rupture.9 Nepafenac is a prodrug, which is hydrolyzed within ocular tissues to amfenac, a strong inhibitor of COX-1 (cyclo-oxygenase-1) and COX-2 (cyclo-oxygenase-2) enzymes. The ocular bioavailability and penetrability of nepafenac, along with its fast bio-activation by ocular tissues, make it a target specific NSAID for reduction of PG production in the both...
anterior and posterior segments of eye.\textsuperscript{12} Its pro-drug structure reduces the risk of toxicity on the corneal surface and improves its infiltration to definite ocular tissues.\textsuperscript{11}

Aim of the current study is to compare the effectiveness of Nepafenac 0.1% versus ketorolac 0.5% in maintaining pupillary dilatation during phacoemulsification surgery. This study will highlight the efficacy of nepafenac 0.1% and ketorolac 0.5% in our patients. The results of this study will help us to devise future strategies in maintaining pupillary dilatation during phacoemulsification.

**Objective:** To compare nepafenac 0.1% versus topical ketorolac 0.5% in phacoemulsification surgery in terms of maintaining of pupil dilatation.

**MATERIAL AND METHODS:**

This study was conducted at Ophthalmology Department, Hayatabad Medical Complex, Peshawar. Study design was comparative study and duration of the study was 1 ½ year (1\textsuperscript{st} January 2015 to 1\textsuperscript{st} July 2016). The total sample size was 250 eyes in each group, using efficacy of nepafenac 17.32% and efficacy of ketorolac 27.89%, in terms of maintenance of pupil dilatation in phacoemulsification. Power of test 80% and level of significance 5%. All patients in age range 45-75 years, including both genders, having age related cataract with round, regular and reactive pupil were included while all those patients with irregular and unresponsive pupil, patients with pseudo-exfoliation, patients with diabetes mellitus and those having anterior or posterior synechiae were excluded. After the approval from hospital ethical and research committee all patients meeting the inclusion criteria were included in the study via OPD. The purpose and benefits of the study was explained to all patients and a written informed consent was obtained.

A detailed history and complete examination was done including slit lamp examination, fundoscopy and checking for pupillary reaction. Patients were randomly allocated in two groups by lottery method. Patients in group A received topical nepafenac 0.1% while patients in group B received topical ketorolac 0.5%. Pupil diameter of each patient was measured with a caliper. All the above mentioned information was recorded in a pre-designed proforma. The data was analyzed by SPSS 10. Mean and standard deviation was computed for numerical variables like age, pre and per-operative pupil size while frequency and percentage was computed for categorical variables like gender and efficacy.

**RESULTS:**

In this study mean age in nepafenac group was 60 years with standard deviation \( \pm 12.73 \) while mean age in ketorolac group was 62 years with standard deviation \( \pm 11.92 \). In nepafenac group 150(60%) patients were male and 100(40%) patients were female while in ketorolac group 155(62%) patients were male and 95(38%) patients were female.

Pre-operative pupil size among two groups was analyzed. In nepafenac 0.1% group 45(18%) patients had pupil size 4-5 mm while 205(82%) patients had pupil size 5-7 mm. Mean pupil size was 6 mm with standard deviation \( \pm 3.54 \). Where as in ketorolac 0.5% group 50(20%) patients had pupil size 4-5 mm and 200(80%) patients had pupil size 5-7 mm. Mean pupil size was 6 mm with standard deviation \( \pm 3.11 \) (Table No 1). Pupil size during the surgery among two groups was analyzed. In nepafenac 0.1% group, 50(20%) patients had pupil size 4-5 mm and 200(80%) patients had pupil size 5-7 mm. Mean pupil size was 6 mm with standard deviation \( \pm 3.38 \). Where as in ketorolac 0.5% group, 85(34%) patients had pupil size 4-5 mm and 165(66%) patients had pupil size 5-7 mm. Mean pupil size was 5 mm with standard deviation \( \pm 2.37 \) (Table No 2). Our study shows that nepafenac 0.1% was effective in 200(80%) patients while ketorolac 0.5% was effective in 165(66%) patients (Table No 3).

<table>
<thead>
<tr>
<th>Table 1: Pre-operative pupil size</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PUPIL SIZE</strong></td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>4-5 mm</td>
</tr>
<tr>
<td>5-7 mm</td>
</tr>
<tr>
<td>Total</td>
</tr>
<tr>
<td>Mean and SD</td>
</tr>
</tbody>
</table>

T test was applied in which \( P \) value was 1.0000

<table>
<thead>
<tr>
<th>Table 2: Pupil size during the surgery</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PUPIL SIZE</strong></td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>4-5 mm</td>
</tr>
<tr>
<td>5-7 mm</td>
</tr>
<tr>
<td>Total</td>
</tr>
<tr>
<td>Mean and SD</td>
</tr>
</tbody>
</table>

T test was applied in which \( P \) value was 0.0001

<table>
<thead>
<tr>
<th>Table 3. Efficacy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EFFICACY</strong></td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>Effective</td>
</tr>
<tr>
<td>Not effective</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

Chi Square test was applied in which \( P \) value was 0.0005
DISCUSSION:

Phacoemulsification is a standard surgical procedure for cataract surgery with intraocular lens (IOL) implantation that gives excellent visual results. For this procedure stable and adequate pupillary dilatation is required. Intraoperative pupil constriction is associated with an increased risk of intraoperative complications especially in difficult cases and it can result in prolonged surgical time.

Current study shows that mean age in nepafenac group was 60 years with standard deviation ± 12.73 while mean age in ketorolac group was 62 years with standard deviation ± 11.92. In nepafenac group 150(60%) patients were male and 100(40%) patients were female while in ketorolac group 155(62%) patients were male and 95(38%) patients were female. Our study shows that nepafenac 0.1% was effective in 200(80%) patients while ketorolac 0.5% was effective in 165(66%) patients. Similar results were observed in another study conducted by Solomon K et al in which the effects of topical 0.5% ketorolac ophthalmic solution was compared with topical 0.03% flurbiprofen sodium on the inhibition of surgically induced miosis during phacoemulsification. Ketorolac provided a more stable mydriatic effect throughout the surgical procedure.

Similar results were observed in another study conducted by Verzosa L et al in which a total of 47 cases. Br J Ophthalmol 2004;88:1242-6.


Solomon K, Turkalji JW, Whiteside SB. Topical 0.5% ketorolac vs 0.03% flurbiprofen for inhibition of miosis during cataract surgery. Arch Ophthalmol 1997;115:1119-22.


REFERENCES


Post Mortem Artifacts
(An autopsy based study)

Riaz Qadeer MBBS.,DMJ. 1 Anwar ul Haq MBBS,MPH,DMJ. 2

ABSTRACT:
Background: An artifact is a change in the natural state of the dead body which is likely to be misinterpreted at autopsy and these artifacts pose problems in finding out the cause of death, mode of death, manner of death, time since death and whether death occurred at that spot or body thrown at that place after killing.

Study design: This descriptive study is based on autopsy record and provides information regarding problems which are likely to create confusion during autopsy of a dead body.

Duration of study: From 1st January 2013 to 23rd May 2013.

Methodology: This study was conducted in the department of Forensic Medicine & Toxicology of Khyber Medical College, Peshawar. Data was collected from the record of autopsies performed from January 2013 to May 2013. It include all cases referred from urban as well as from rural area police stations of Peshawar district.

Results: Out of total 400 autopsies 19 postmortem (5%) were done on dead bodies which created confusion due to therapeutic, agonal or post mortem artifacts.

Conclusion: Post mortem artifacts cause confusion in finding out the cause of death, whether the wound is ante mortem or post mortem or a fracture especially of skull is cause of death or is iatrogenic i.e. produced during autopsy by the person doing post mortem while opening the cranial cavity.

Keywords: Post mortem, artifacts, Autopsy.

INTRODUCTION:
An artifact is a change in the natural state of the dead body which is likely to be misinterpreted at autopsy. These artifacts pose confusions in finding out the cause of death, mode of death, manner of death, time since dead, any associated crime with the death & whether death occurred at that spot or body thrown at that place after killing. Artifacts may be produced during treatment and are called therapeutic artifacts and artifacts produced during agonal period are called agonal artifacts whereas post mortem artifacts are produced after death and are due to (a) improper handling of the dead body (b) improper autopsy procedures (c) embalming (d) anthropophagy or (e) due to natural process of putrefaction. Most of the artifacts are postmortem artifacts and mostly putrefaction is the cause of these artifacts.

Putrefaction or decomposition is the last stage in the resolution of the dead body from organic to inorganic state. Putrefaction is caused by two process (i) Autolysis which is self digestion of the dead body by its own enzymes and it starts within 3 to 4 hours (ii) Bacterial action which produce a lot of enzymes which act on muscle proteins as well as on body fats and cause their break down. The micro organisms responsible for decomposition are both anaerobic and aerobic. Chief bacteria responsible for putrefaction are Clostridium welchi, Strepto cocci, E.coli and B Proteus. The worst offender is Clostridium welchi as it produces lecithinase

A doctor conducting autopsy may be mislead by post mortem artifacts, he should keep in mind that if the dead body is shifted from the ward he should study all record of ante mortem treatment, consult the treating physician regarding state of body before death, effect of surgical treatment like blood in the pericardium, fracture of ribs. Never use chisel in opening the cranial cavity if there is possibility that skull injury is the cause of death, existing rigor mortis may be absent while shifting the dead body from the scene of crime to the mortuary etc etc., In all difficult cases the autopsy findings, laboratory report and circumstantial evidence as mentioned in police documents must be reviewed.

which hydrolyse the lecithin which is present in the cell membranes of almost all cells of body including blood cells. The process of embalming consist of making incision in the axillary or supra clavicular area through which arteries are entered. Trocars are then inserted and embalming fluid is pumped under pressure. The aim of
embalming is to preserve the dead body and in such cases Trocar wounds may be mistaken for stab wounds or bullet injuries. Anthropophagy mean eating away by the ants and insects and by lower animals like rats, cats, dogs or by marine animals. In such cases only exposed and moist areas of body are affected and there will be no vital reaction.

**MATERIAL AND METHOD**

It is a retrospective descriptive study conducted in the Department of Forensic Medicine & Toxicology of Khyber Medical College, Peshawar where all autopsies are carried out for the district Peshawar. A total of 400 autopsies were performed from 1st January 2013 to 23rd May 2013. All these cases were referred by the police from urban as well as from rural police stations to find out the cause of death and time since dead. Mode and manner of death or any other crime associated with the death was also mentioned in the autopsy report which was issued to the police and a record of each case was maintained. From this record in a performa information like age, sex, from rural or urban area and difficulties/problems faced were noted and the results were analyzed as under.

**RESULTS**

Out of total 400 autopsies performed 19 were having artifacts and it accounts 5% of the total postmortems done. Most of the dead bodies referred by police for postmortem were of male, were from rural areas and were in the age group 12 to 40 years. The results are tabulated as under;

<table>
<thead>
<tr>
<th>S/no</th>
<th>Post mortem findings on dead body</th>
<th>Age</th>
<th>Sex</th>
<th>No. of cases</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Dead bodies with incomplete ligature mark around the neck. Fracture of 3rd and 4th ribs at the costo chondral junction was noted. Bodies were swollen and foul smelling with loosening of nails, teeth and hair and all other features of putrefaction were present. No chemical was detected and tardu spots were present on peritoneum and pleura. (cause of death was asphyxia)</td>
<td>8 to 11</td>
<td>Male</td>
<td>5</td>
<td>The rib fracture at costo chondral junction was due to blunt trauma</td>
</tr>
<tr>
<td>2</td>
<td>Blood was present in the pericardial sac and organo phosphorus compounds were detected in stomach contents (cause of death was poisoning due to organo phosphorus)</td>
<td>28 to 30</td>
<td>2 Male &amp; 1 Female</td>
<td>3</td>
<td>Blood present in the pericardium was due to intracardiac injections given during resuscitation</td>
</tr>
<tr>
<td>3</td>
<td>Dead bodies of two males already admitted in the surgical ward where both were operated and a bullet removed from the abdominal cavity of both the patients and on autopsy fracture of 3rd rib near costochondral junction was found broken in both the patients (cause of death was fire arm injury)</td>
<td>38 to 43</td>
<td>Male</td>
<td>2</td>
<td>Ribs were fractured due to vigorous resuscitation</td>
</tr>
<tr>
<td>4</td>
<td>A lacerated wound with friable margin was present on the temporal region of both the dead bodies, both were of age about 20 to 22 years, both bodies were swollen and foul smelling with loosening of nails, teeth and hair and all other features of putrefaction were noted. No chemical was detected in the contents of stomach. (Cause of death was fracture of skull)</td>
<td>21 to 22</td>
<td>One male &amp; one female</td>
<td>2</td>
<td>Alcohol was detected and it was produced due to putrefaction</td>
</tr>
<tr>
<td>5</td>
<td>Emaciated dead body of a male with syringe marks on both the forearms (fracture base of skull was the cause of death)</td>
<td>47</td>
<td>Male</td>
<td>1</td>
<td>Hair line fracture was noted in the posterior cranial fossa on stripping off the dura -mater</td>
</tr>
<tr>
<td>6</td>
<td>Putrefied partially disfigured burnt dead bodies of two females with blackening of the respiratory tract and upper part of esophagus. No chemical was detected in the stomach contents. (cause of death was ante mortem burns)</td>
<td>30 to 32</td>
<td>Female</td>
<td>2</td>
<td>Alcohol was detected &amp; it was produced due to putrefaction</td>
</tr>
<tr>
<td>7</td>
<td>Dead bodies received from Khyber Teaching Hospital where they were operated and bullets recovered from abdomen (cause of death was firearm injuries)</td>
<td>17 to 51</td>
<td>Male</td>
<td>4</td>
<td>Bruise present on precordial region was produced by defibrillator during resuscitation</td>
</tr>
</tbody>
</table>

**Total**

<table>
<thead>
<tr>
<th>Condition of body</th>
<th>Total</th>
<th>Sex</th>
<th>Total</th>
<th>Area</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fresh</td>
<td>387</td>
<td>13</td>
<td>400</td>
<td>357</td>
<td>43</td>
</tr>
<tr>
<td>Putrefied</td>
<td>13</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>387</td>
<td>13</td>
<td>357</td>
<td>134</td>
<td>400</td>
</tr>
<tr>
<td>Female</td>
<td>37</td>
<td>37</td>
<td>43</td>
<td>268</td>
<td>400</td>
</tr>
<tr>
<td>Urban</td>
<td>387</td>
<td>13</td>
<td>357</td>
<td>134</td>
<td>400</td>
</tr>
<tr>
<td>Rural</td>
<td>13</td>
<td>13</td>
<td>43</td>
<td>268</td>
<td>400</td>
</tr>
</tbody>
</table>

Ophthalmology Update Vol. 15. No. 2, April-June 2017
DISCUSSION

In our study the five cases mentioned in serial No.1 were presumed as asphyxia deaths but it was difficult to comment as cases of throttling because process of putrefaction itself causes loosening of the junction between greater and lesser cornue of the hyoid bone. It was also difficult to comment that garroting was the cause of asphyxia simply on the biases of presence of ligature mark around the neck as this mark around the neck may be produced due to tightening of collar of the shirt under the effect of pressure produced by the accumulation of gases of putrefaction. More over due to prolapsed rectum it was not possible to say whether any sexual act like sodomy was done or not. The asphyxia was presumed as the cause of death keeping in view the age of victim and no poison was detected in the viscera. It is in the knowledge of almost everyone that no weapon is required to mechanically interrupt the process of respiration and it is easy to put pressure on neck to kill someone who is weaker in physique or is shouting for help.

Three cases mentioned in serial No.2 are cases of therapeutic / agonal artifacts as cause of death was poisoning due to organo phosphorus compounds and the blood present in the pericardial sac was due to treatment given by intra cardiac injections causing injury to myocardium leading to accumulation of blood in the pericardial sac. Two cases mentioned in serial No.3 the cause of death was fire arm injury and fracture of ribs is agonal artifact. Two cases mentioned in serial No.4 death was caused due to fracture of skull as it was confirmed from radiology but it was difficult to say whether any or both of them were under the effect of alcohol or not because the process of putrefaction itself produce alcohol in the human body.

In the case mentioned in serial No.5 the cause of death was a hair line fracture of base of skull which was seen on stripping off the dura mater of posterior cranial fossa of the skull bone.

Ante mortem burns were the cause of death in the two females mentioned in the serial No.6 as both were breathing when fire was on so inhaled and swallowed some carbon particles which caused blackening of the respiratory tract. Moreover level of carboxy haemoglobin in the viscera/muscles confirmed that it was case of ante mortem burns. Carbon mono oxide is a chemical which resist the process of putrefaction. Blister are produced by burns and also by putrefaction but ante mortem blistres contain more serum and electrolytes where as post mortem blisters mainly contain putrefactive gases and there will be no vital reaction. The bruise present externally on the left side of chest was due to defibrillator and cause of death was firearm injuries in all the four males mentioned in the serial No.7.

Autopsy performed on fresh body can help in finding out the cause of death, mode of death, manner of death, time since dead, any associated crime with the death, whether born alive or dead and it also help in personal identification of the dead. Such questions are not easy to answer if autopsy is performed on a putrefied body. Ante mortem injuries can be differentiated from post mortem injuries by vital reaction which is the reaction of the living tissues to any trauma. Radiologist may help in estimating the age of the person, age of fracture, any radio opaque material like bullet or coin present in the pharynx or in the body. Pathologist can help in finding out whether injuries are ante mortem or post mortem and personal identification by study of DNA / precipitin test / chromosomes.

Autopsy or postmortem is the scientific study of the dead according to the laws of the state. It is not a simple procedure and sometimes some unusual lesions are found which are difficult to explain. In such cases autopsy findings, forensic science laboratory report and circumstantial evidence as mentioned in police documents must be reviewed. As court decisions are evidence based and according to laws of the state benefit of doubt is given to the accused so autopsy performed by God fearing/expert doctor can help the court in furthering justice. Measures taken by the Government to improve social justice, better training of police and all those who are handling the dead body while shifting from the site of crime to the mortuary. Gentle handling of the dead before & during autopsy and quick recovery of the dead body by police can minimize the problems.

CONCLUSION

Doctors having less experience of autopsy may be mislead by post mortem artifacts so following points must be kept in mind:

1. If dead body is shifted from the ward of the hospital then study all record of ante mortem treatment given & consult the treating physician to know about what was the state of body before death.
2. The effect of surgical treatment /stitching of wounds & effects of resuscitation as blood may collect in the pericardium / fracture of ribs.
3. Do not be mislead by putrefactive artifacts as all post mortem injuries are without a vital reaction.
4. Never use chisel in opening the cranial cavity if there is possibility that skull injury is the cause of death.
5. Existing rigor mortis may be broken down at least partially while shifting the dead body from the
scene of crime to the mortuary and may mislead in calculating the post mortem interval.
(6) Post mortem stains may simulate ante mortem bruises.
(7) In all difficult cases autopsy findings, forensic science laboratory report and circumstantial evidence as mentioned in police documents must be reviewed and discussed with the senior colleague.

REFERENCES
1. Post mortem artifacts made by ants and the effects of ant activity on decompositional rates; by Campobasso, Carlo P., Ph.D, MD, Marchetti, Daniela MD, Introna, Francesco MD; Colonna, Massimo F.M.D; American Journal of Forensic Medicine & Pathology, March 2009, vol 30, issue 1 pp 84-87
2. Interpreting Results of ethanol analysis in post mortem specimens by Fredrik C. Kugelberg, Alan Wayne Jones; Forensic sciences International 165 (2007)10-29
5. Post mortem changes mistaken for traumatic lesions; A highly prevalent reason for coroner’s Autopsy Request; Anny Sauvageau, MD and Stephanie Racettee B.Sc; The American journal of Forensic Medicine & Pathology vol. 29 No.2, June 2008
7. Factors and process causing accelerated decomposition in human cadaver – An over view; journal of forensic and legal medicine; vol 18, issue 1, January 2011, page 6-9
8. Computed tomography as routine in connection with medicolegal autopsies; forensic science international vol 171, issue 2 – 3, pages 190-197, 13 sep 2007
9. Diagnostic yield and characteristics of features in a series of decomposed bodies subject to coronial autopsy; forensic science medicine and pathology; March 2008, vol.4, issue 1 pp 9 – 14
12. Khan, MY, Jan A, Munawar A Z, frequency of Negative Autopsy and their Demographic Evaluation at Khyber Medical College, Peshawar, JPMI 2007;(21);132-5
13. Ali SMA, Bashir MZ, Hussain Z, Kheri GQ, Khalil IR; Unnatural female deaths in Peshawar, JCPSP, 2003;13(4);198-200
14. Roberts IS, Benamore RE, Benbow EW, Lee SH, Haris JN, Jackson A, Mallet S, Patankar T, Peebles C, Roobottom C, Trailiz C; Post mortem imaging as alternative to autopsy in the diagnosis of adult deaths; a validation study; The Lancet 2012; 379(9811);136–42
16. Profile of negative autopsy cases at Punjab medical college, Faisalabad by Altaf, Perveen Qasim, Saeed Akbar Tariq, Pervez Ahmed Makhdoom, Muhammad Naeem, Mubeen inam Pal, Kishwar Naheed, Muhammad Aslam; JUMDC, vol.6, issue 1, January – Mar 2015
17. Profile of Unnatural Deaths In Bhuj (Gujarat): A Retrospective Study Dr.Pirthvirajsinh Vaghelia, NJIRM 2012, vol .3 (2) April – June
20. Analysis of homicidal deaths in Peshawar, Pakistan, J Ayyub Medical College Abbottabad 2006;18(4); 30-3, Murrni MZ, Bashir MZ, Munawar AZ, Khalil ZH, Khalil I R
Diagnostic Accuracy of Color Doppler Ultrasonography in Evaluation of Breast Lumps for Malignancy
(A diagnostic comparative study)

Maira Khan MBBS, FCPS (Trainee) 1, Rumman Khan FCPS (Gen. Surg) 2, Dr. Misbah Durrani FCPS (Diag. Rad) 3, Ghazala Wahid FCPS (Diag. Rad) 4

ABSTRACT

Background: Carcinoma breast is the most common cancer among women, second only to lung cancer overall. The objective of this study is to determine the diagnostic accuracy of Doppler ultrasonography in the evaluation of breast lump for malignancy, keeping histopathology as a gold standard.

Methods: This study was conducted at the Department of Radiology, Hayatabad Medical Complex Peshawar & Department of Radiology, Mardan Medical Complex, Mardan from November 2013 to May 2014. Patients presenting with breast lump were subjected to colour Doppler ultrasound and then surgical excision of the breast lump for histopathological study was done to confirm the findings on colour Doppler ultrasonography. The data was analysed with SPSS version 10. Sensitivity, Specificity, positive predictive value, negative predictive value were determined by taking histopathology report of breast lump as gold standard.

Results: One hundred and fourteen (114) patients were included with age range from 18 to 65 years. Mean age was 43.6 years ± 11.23 SD. On colour Doppler ultrasonography, true positive and true negative patients for breast malignancy were 20 (17.54%) and 72 (63.16%) respectively while false positive and false negative patients were 19 (16.67%) and 3 (2.63%) respectively. The sensitivity and specificity colour Doppler ultrasonography were 86.95% and 79.12% respectively while positive and negative predictive values were 51.28% and 96% respectively. The diagnostic accuracy was 80.70%.

Conclusion: Color doppler ultrasonography has better sensitivity than specificity and high negative predictive value. Its accuracy in detecting breast malignancy is 89.70%.

Key words: Breast lump; Color Doppler Ultrasonography; Histopathology, Diagnostic Accuracy.

INTRODUCTION

Carcinoma breast is one of the most common amongst women. In situ carcinoma is characteristically contained within the epithelium, with the basement membrane intact, and without any signs of invasion. In general, the incidence is greater than 100 per 100,000 in developed world, intermediate 30–70 per 100,000 in several Asian populations and most eastern European populations while incidence rates are less than 40 per 100,000 women in most of the less developed countries.

The most common presentation of carcinoma breast is painless breast lump, divided into invasive ductal carcinomas (75%), invasive lobular carcinomas (10–15%) and several rare types including invasive tubular, mucinous, or cribriform carcinomas. Diagnosis is suggested by history, clinical examination, findings of mammography and ultrasound while definitive diagnosis is done by histopathology. Treatment options for carcinoma breast include surgery, chemotherapy, radiotherapy and endocrine therapy. There are highest survival rates for localized disease (97%) and lowest for distant disease (23%).

In our set up, the sensitivity and specificity of color Doppler ultrasonography are 86.95% and 79.12% respectively while positive and negative predictive values are 51.28% and 96.00% respectively. The diagnostic accuracy is 80.70%. High negative predictive value indicates that color Doppler ultrasonography is more accurate in ruling out malignancy in breast lump.

Diagnostic modalities are mammography, ultrasonography and fine needle aspiration cytology. Ultrasonography has evolved as the diagnostic modality over the previous decade. Sensitivity of ultrasound range from 57.1% to as high as 98.4% in classifying breast masses as malignant while the specificity ranges from 80.5% to 100%. To improve the accuracy of USG, Doppler imaging is used. Open surgical biopsy remains the gold standard for establishing the histopathological nature of any breast abnormality with reported sensitivity and specificity of 100%.
The aim of our study was to investigate the accuracy of Doppler ultrasonography in the diagnosis of breast malignancy in patients with breast lumps because various authors have reported different values of sensitivity and specificity.

**MATERIAL AND METHODS**

**Setting:** This study was carried out at Department of Radiology and those referred from OPD of Surgical Units of Hayatabad Medical Complex Peshawar.

**Study design:** Cross sectional (validation) study

**Duration:** 6 months from November 2013 to May 2014.

**Sampling technique:** The technique was consecutive (non-probability sampling)

**Sample selection:**

**Inclusion criteria:** The following patients were included in the study:
- Female patients with breast lump (both solitary and multi-nodular) of any age group

**Exclusion criteria:** The exclusion criteria adopted was as under;
- Patients with known Breast Malignancy (confirmed by previous record) and patients with breast abscess.

**Data collection procedure:** Approval of this research study from ethical committee of the hospital was obtained. Patients having breast lump and fulfilling the inclusion criteria were selected. The selection of patients having breast lump was on physical examination, selected from outpatient department (OPD) of radiology, and those referred from OPD of surgical units of Hayatabad Medical Complex Peshawar and Mardan Medical Complex. All the included patients were explained the purpose of procedure, use of data and publication of the study. Informed written consent was taken from the patients.

The demographic information like name, age, sex and address was recorded. Thorough history was taken and detailed physical examination was performed. All the sonographic examinations were performed by an experienced radiologist using either an ATL HDI 3500 unit (Philips Medical Systems) with a 5-12-MHz linear transducer or a Sonoline Elegra unit (Siemens AG Medical Solutions) with a 5-13-MHz linear transducer, both of which were equipped to perform color Doppler sonography. The lesions were imaged with grayscale sonography to locate the lesion and evaluate its sonographic characteristics and to ascertain its diameters. Next, Doppler sonography was performed. The color box was adjusted to include the lesion and a small margin of normal breast tissue. The color sensitivity was adjusted so that only the background color was suppressed and small vessels could be detected.

During the examination, care was taken to apply as little pressure as possible with the probe on the lesion to prevent vessels from collapsing. Its characteristics having solid echo structure, hypo-echogenicity, Width-AP ratio = or < 1.4, fine or micro calcifications and ill-defined margin, posterior acoustic shadowing and presence of more than 3 vessels showing an arterial flow pattern was recorded as the breast malignancy. For histo-pathological diagnosis of breast lump, surgical excision of the breast lump by an expert General Surgeon was done under general anaesthesia and the specimen was sent in formalin to a histo-pathologist in Hayatabad Medical Complex having more than seven years' experience. The exclusion criteria was strictly followed to control confounders and exclude bias in study result. All the results were followed and all the above mentioned information were recorded in a pre-diagnosed pro forma.

**Data analysis:** The collected data was entered in SPSS version 10 and analyzed through it, study variables were age, sex and ultrasound report. Mean ± standard deviation of age of the patients and frequency and percentage of gender were calculated. Sensitivity, Specificity, positive predictive value (PPV), negative predictive value (NPV) were determined by taking histopathology as gold standard from 2x2 table. Stratification were done with respect to age.

**RESULTS**

The total number of patients presenting with breast lump were 114. The most commonly involved side was right breast in 77 (67.54%) patients while left breast was having lumps in 37 (32.46%) patients. (Figure 1) The age range was from 18 to 65 years. The mean age of patients was 43.6316 years ± 11.2386SD (Table No. 1). Maximum number of patients presenting with breast lumps were 38 (33.33%) from the age group of 51-60 years followed by 36 (31.58%) patients from 31-40 years age group. Patients from the age group of 18-30 and 41-50 years were 13 (11.40%) and 25 (21.93%) patients respectively. Patients with the age of 60 years and above were only 2 (1.76%). (Table No. 2).

On Color Doppler ultrasonography, true positive and true negative patients for breast malignancy were 20 (17.54%) and 72 (63.16%) respectively while false positive and false negative patients were 19 (16.67%) and 3 (2.63%) respectively. The sensitivity and specificity Color Doppler ultrasonography were 86.95% and 79.12% respectively while Positive and Negative predictive values were 51.28% and 96% respectively. The diagnostic accuracy of Color Doppler ultrasonography was 80.70%. (Table No. 3)
Among the age groups, diagnostic accuracy of color Doppler ultrasound was higher in the age group 31-40 years i.e. 83.33% while it was lower in the age group of 41-50 years i.e. 72.00%. The age groups of 18 to 30 years and 51 and above showed 76.92% and 80.00 diagnostic accuracy respectively. Stratification of diagnostic accuracy according to age is shown in full detail in Table no. 4.

![Figure 1: Laterality of Breast Lumps N=114](image)

N= Total number of patients, n= number of observed patients, %=Percentage

### Table 1: Age groups and their respective frequencies N=114

<table>
<thead>
<tr>
<th>Age Groups (years)</th>
<th>Frequency n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-30</td>
<td>13 (11.40%)</td>
</tr>
<tr>
<td>31-40</td>
<td>36 (31.58%)</td>
</tr>
<tr>
<td>41-50</td>
<td>25 (21.93%)</td>
</tr>
<tr>
<td>51-60</td>
<td>38 (33.33%)</td>
</tr>
<tr>
<td>61 and above</td>
<td>2 (1.76%)</td>
</tr>
</tbody>
</table>

### Table 2: Contingency table; Doppler vs Histopathological diagnosis

<table>
<thead>
<tr>
<th>Doppler Ultrasound</th>
<th>Histopathology</th>
<th>Breast Malignancy (+ ve)</th>
<th>Breast Malignancy (- ve)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast Malignancy</td>
<td></td>
<td>20 (17.54%)</td>
<td>19 (16.67%)</td>
</tr>
<tr>
<td>(+ ve)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breast Malignancy</td>
<td></td>
<td>3 (2.63%)</td>
<td>72 (63.16%)</td>
</tr>
<tr>
<td>(- ve)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

n= number of observed patients, %=Percentage Sensitivity = 86.95%, Specificity = 79.12%, Positive Predictive Value = 51.28%, Negative Predictive Value = 96%, Diagnostic Accuracy 80.70

**DISCUSSION**

Breast cancer is the most common type and the leading cause of mortality in women today, accounting for 1 of every 3 cancers diagnosed. A woman’s chance of developing invasive breast cancer at some time in her life is approximately 12%. The prevalence of breast lumps has been reported up to 70% in women seeking advice. A breast lump either self-detected, screen detected or clinician detected, it is the scare of breast cancer which most of the times makes women consult a doctor. Although, majority of breast lumps are benign but this does not rule out the need for evaluation of any palpable breast lesion. Among the female patients presenting with breast lumps, incidence of malignancy has been reported up to 58%.

The standard investigation for distinguishing benign from malignant masses of the breast is excisional biopsy. However, it is an invasive procedure and to reduce the unnecessary biopsies, allays anxiety of the patient, and control costs alternative, less invasive methods of diagnosis are required. In this study, we evaluated breast masses in a series of patients using color Doppler sonography. In all cases, the pathologic diagnosis of the breast mass was subsequently established by excisional biopsy.

A number of previous studies have examined the accuracy of color Doppler ultrasonographic diagnosis in breast lumps. In our study, on color Doppler ultrasonography, 34.21% patients have breast malignancy but only 20.18% were conformed on histopathology. On color Doppler ultrasonography, true positive and true negative patients for breast malignancy were 17.54% and 63.16% respectively while false positive and false negative patients for breast malignancy were 16.67% and 2.63% respectively. According to Tsai et al the statistical conception of test accuracy is a summation of its true-positive and true-negative rates. Thus a test with high true-negative and fair true-positive rates may still be very accurate. However, a high true-positive rate is critical for tests upon which a decision to surgically intervene is made. In our study we noted a high true negative rate 63.16% and relatively a fair true positive rate of 17.54%.

It is important to know the diagnostic accuracy of tests used to establish a diagnosis in patients who present with possible malignancy in breast lump. Our results compare favorably with those from the published literature, suggesting that breast malignancy is a condition which can be diagnosed with a high level of accuracy with a color Doppler ultrasonography for assessing the number of vessels in breast lump. In our study, color Doppler ultrasound was found to be the most effective method of diagnosing breast malignancy, with a diagnostic accuracy, sensitivity and specificity of 80.70%, 86.95% and 79.12% respectively while positive
and negative predictive values were 51.28% and 96.00% respectively.

Sensitivity and specificity values may be more useful than predictive values. The sensitivity of a test represents the number of the total group of patients with the condition who had a positive test result. This measure of true positive results indicates the degree to which a positive clinical test truly represents the presence of the condition. Expressed as a percentage, the higher the sensitivity, the better the chance that a positive test confirms the presence of the condition. According to Fritz and Wainner that a negative test finding for a test with high sensitivity provides a strong indication that the condition is indeed absent, whereas a positive test finding for a test with high specificity rules in the condition. Specificity represents the number of patients without the condition who had a negative test result. This measure of true-negative results indicates the degree to which a negative clinical test truly represents the absence of the condition. Again expressed as a percentage, the higher the specificity, the better the chance that a negative test result reflects the absence of the condition.¹⁰

Kalmanitis et al¹¹ studied 125 women with clinically or mammographically suspicious findings were by Doppler ultrasound prior to surgery. Histological diagnosis was conducted after surgery and compared with ultrasound findings. Sonographic criteria used for breast cancer diagnosis were based on a system that included morphological characteristics and criteria of the vascular pattern of a breast mass by Doppler imaging. Seventy two lesions were histopathologically diagnosed as benign and 53 tumors by Doppler imaging. Seventy two lesions were by Doppler ultrasound prior to surgery. Sonographic criteria used for breast cancer diagnosis were based on a system that included morphological characteristics and criteria of the vascular pattern of a breast mass by Doppler imaging. Seventy two lesions were histopathologically diagnosed as benign and 53 tumors as malignant. Doppler ultrasound identified 49 out of 53 histologically confirmed breast cancers resulting in a sensitivity of 92.4% and a specificity of 86.1% in diagnosing breast malignancy (PPV: 0.83, NPV:0.94). Willkens et al¹² studied breast lumps with color Doppler ultrasound and found that of the 55 masses, 40% proved to be malignant on histologic examination. Color Doppler ultrasound showed sensitivity, specificity of 73% and 78% respectively while diagnostic accuracy was 76%.

Chatterjee et al¹³ presented a technique for segmenting blood vessels in ultrasound color Doppler images based on image processing techniques. The technique decomposes a complex object representing either two or more vessels artificially linked together or a main vessel with its branches. They segment the blood vessels in ultrasound color Doppler images and count the number of vessels to detect breast malignancy. The result represents distinct vessels that can be used in further object recognition and quantification applications. Number of vessels of the malignant nodule was always greater than 3 and that of the benign nodule was always less than three. They tested their technique on 77 images. The sensitivity [TP / (TP+FP)], the specificity [TN / (TN+FP)] and the classification accuracy [(TP + TN) / (TP+FN + TN+FP)] of the system was 90.5% (19/21), 89.28% (50/56) and 90% (69/77) respectively. The positive predictive value is 76% (19/25) and the negative predictive value is 96.15% (50/52).

We performed the study in a community setting with patients of various socioeconomic classes. Participants’ compliance was high and our radiologist was expert in performing color Doppler ultrasound. In our study, statistical analyses were straightforward, and missing data analysis was not required.

This technique of color Doppler ultrasonography is not without limitations. As with any USG technique, Color Doppler USG results may vary depending on the operator. It is also subject to motion artifact from the transducer, which can simulate blood flow. This was a pilot study and further research is required to elaborate this technique of USG for detecting malignant lesions in breast lumps.

CONCLUSION

Form the results of our study, it is concluded that in our set up, the sensitivity and specificity of color Doppler ultrasonography are 86.95% and 79.12% respectively while Positive and Negative predictive values are 51.28% and 96.00% respectively. The diagnostic accuracy is 80.70%. High negative predictive value indicates that color Doppler ultrasonography is more accurate in ruling out malignancy in breast lump.

REFERENCES

Study of Anaemia which turns out to be Cases of Leukemia at D.H.Q Hospital, Mardan (KPK)

ABSTRACT:
Purpose of the study: To study children presenting with anaemia having underlying serious blood disorder like leukemia. These children are usually referred late to tertiary hospital with many complications and thus with low level of chances of survival. The purpose of this study is to know that how many cases of anaemia are actually sign of another blood disorder like leukemia, so that these cases are properly investigated and referred to tertiary hospital in time.

Background: Anaemia is defined as a reduction of the hemoglobin concentration or red blood cell (RBC) volume below the range of values occurring in healthy persons. "Normal" hemoglobin and hematocrit (packed red cell volume) vary substantially with age and sex. There are also racial differences, with significantly lower hemoglobin levels in African American children than in white non-Hispanic children of comparable age. Anaemia is the most common form of clinical presentation of blood disorder. Anaemia is a significant global health problem affecting children and reproductive age women. The global prevalence of anaemia in preschool children (0-5year) is mild (5-19.9%) moderate (20-39.9%) and severe (>40%).

Study Design: Descriptive.

Material and Method: This study was conducted in paediatric department of D.H.Q Hospital Mardan over a period of 3 Years from 2013 to 2016. During the study period 50 cases of anaemia were examined. The diagnosis was suspected clinically and supported by peripheral smear and bone marrow aspiration done where needed. Tests were done at private clinical laboratory Peshawar. Cyto chemical studies (PAS and Peroxidase) were used for the identification of the type of leukemia. During the study period 10 cases of leukemia were diagnosed. These were from both sexes, different age group and mixed socio economic status. Socio economic status was evaluated on history. After the diagnosis and supportive treatment, cases were referred to teaching hospitals at Peshawar (LRH and HMC)

Results: Patients with anaemia were clinically suspected in OPD randomly. They were advised peripheral smear. Cases suspected as leukemia were referred to private clinical laboratory at Peshawar. During the study period ten cases of leukemia (ALL) were diagnosed in 1-10 years children. After diagnosis the patients were referred to Peshawar for management.

CONCLUSION:
During the study period 50 cases of anaemia were examined ten cases of leukemia (ALL) were detected. They were more common in 1-5 years and in poor socio economic status (70%).

Key Words: Anaemia, Leukemia (ALL)

INTRODUCTION:
Anemia is a relatively common finding, and identifying the cause is important. Even though anemia in childhood has many causes, the correct diagnosis can usually be established with relatively little laboratory cost. Frequently the cause is identified with a careful history. Nutritional causes should be sought by inquiry about dietary intake; growth and development; and symptoms of chronic disease, mal-absorption, or blood loss. Hemolytic disease may be associated with a history of jaundice (including neonatal jaundice) or by a family history of anemia, jaundice, gallbladder disease, splenomegaly, or splenectomy. The child’s ethnicity may suggest the possibility of certain hemoglobinopathies or deficiencies of red cell enzymes. Such as glucose-6-phosphate dehydrogenase (G6PD). The review of systems may reveal clues of anemia are age related. For example, patients with iron-deficiency anemia (IDA) and B-globin disorders present more commonly at ages 6-36 months than at other times in life. The physical examination, may also reveal clues to the cause of anemia. Poor growth may suggest chronic disease or hypothyroidism. Congenital anomalies may be associated with constitutional aplastic anemia (Fanconi anemia) or with congenital hypoplastic anemia (Diamond-Blackfan anemia). Other disorders may be suggested by the findings of petechiae or purpura (leukemia, aplastic anemia, hemolytic uremic syndrome), jaundice (Hemolysis or liver disease), generalized lymphadenopathy (leukemia, juvenile, sickle hemoglobinopathy syndromes, hereditary spherocytosis, liver disease, hypersplenism) or evidence of chronic or recurrent infections.

Children with acute leukemia, sometimes, presents only as paler appearance, one should be alert to diagnose these cases as anaemia in time.

MATERIAL & METHODS
This study was conducted in paediatric department of D.H.Q Hospital Mardan over a period of 3 Years from 2013 to 2016. During the study period 50
cases of a anaemia were examined, The diagnosis was suspected clinically and supported by peripheral smear and bone marrow aspiration done where needed. Tests were done at private clinical laboratory Peshawar. Cyto chemical studies (PAS and Peroxidase) were used for the identification of the type of leukemia. During the study period 10 cases of leukemia were diagnosed. These were from both sexes, different age group and mixed socio economic status. Socio economic status was evaluated on history. After the diagnosis and supportive treatment, cases were referred to teaching hospitals at Peshawar (LRH and HMC).

The initial laboratory evaluation of the anemic child consists of a complete blood count (CBC) with differential and platelet count, review of the peripheral blood smear, and a reticulocyte count is needed limited laboratory information, together with the history and physical examination to reach a specific diagnosis or to focus additional laboratory investigations on a limited diagnostic category (e.g., microcytic anemia, bone marrow failure, pure red cell aplasia, or hemolytic disease). This diagnostic scheme depends principally on the MCV to determine whether the anemia is microcytic, normocytic, or macrocytic. Although the incidence of iron deficiency (ID) in the United States has decreased significantly with important cause of microcytic anemia, especially at ages 6-24 moths. Atrial of therapeutic iron is appropriate in such children, provided the dietary history is compatible with ID and the physical examination or CBC does not suggest an alternative cause for the anemia. If a trial of therapeutic airon fails to correct the anemia and microcytosis, further evaluation is warranted. Another key element is the use of both the reticulocyte count and the peripheral blood smear to determine whether a normocytic or macrocytic anemia is due to hemolysis. Typically hemolytic disease is associated with an elevated reticulocyte count, but some children with chronic hemolysis initially present during a period of a virus-induced aplasia when the reticulocyte count is not elevated. Thus, review of the peripheral blood smear for evidence of hemolysis (e.g., spherocytes, red cell fragmentation, sickle forms) is important in the evaluation of children with normocytic anemia and low reticulocyte counts. When hemolysis is suggested, the correct diagnosis may be suspected by specific abnormalities of red cell morphology or by clues from the history or physical examination. Autoimmune hemolysis is usually excluded by a negative direct antiglobulin test (DAT). Review of blood counts and he peripheral blood smears of the mother and father may suggest genetic disorders such as hereditary spherocytosis.

Children with normocytic or macrocytic anemias, with relatively low reticulocyte counts and no evidence of hemolysis on the blood smear, usually have anemias caused by inadequate erythropoiesis in the bone marrow. The presence of neutropenia or thrombocytopenia in such children suggests the possibility of aplastic anemia, malignancy, or severe folate or vitamin B12 deficiency, and usually dictates examination of the bone marrow.

Pure red cell aplasia may be congenital (Diamond-Blackfan anemia), acquired, and transient (Transient erythroblastoepenia of childhood); a manifestation of a systemic disease such as renal disease or hypothyroidism; or associated with malnutrition or mild deficiencies of folate or vitamin B12.


RESULTS

There is no authority except facts. These are obtained by accurate observation. Deductions are to be made only from facts. (Hippocrates, 5th country B.C., Cited by John Macleod, 1983)

Fifty (50) cases of Anemia were examined Ten (10) Children both male and female were diagnosed to have acute lymphoblastic leukemia (ALL). Patients with acute myeloid leukemia were not found. There were 6 male children and 4 female children. The age ranged from 1 to 10 years. They were divided into three groups. One to five years, 6-10 years and more than 10 years. Six cases were in age group 1-5 years, 3 cases were in age group 6-10 years and 1 case were in age group more than 10 years. Seven (7) Cases belonged to lower socioeconomic class, 02 cases to middle class and 01 case to high socioeconomic class. The geographical distribution showed that 8 cases were from Mardan division and 2 cases from various parts of KPK. The common clinical signs noted were anemia (n=9) splenomegaly (n=6) hepatomegaly (n=6) petechiae (n=4) lymphadenopathy (n=7) bone tenderness (n=5) retinal hemorrhages (n=2) joint swelling (n=2) wide mediastinum on X-ray chest (n=1).

<table>
<thead>
<tr>
<th>Sex distribution of all</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Female</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age-wise distribution of all in 10 cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age in years</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>1-5 years</td>
</tr>
<tr>
<td>6-10 years</td>
</tr>
<tr>
<td>More than 10 years</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Socioeconomic status of patients in my study with all</th>
</tr>
</thead>
<tbody>
<tr>
<td>Socioeconomic status</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>Poor</td>
</tr>
<tr>
<td>Middle class</td>
</tr>
<tr>
<td>High class</td>
</tr>
</tbody>
</table>
In this study 50 Cases of Anaemia were examined. Ten(10) cases turned out to be cases leukemia (ALL). Although the number of cases is small but never the less certain important finding clinical and hematological features have been brought out. According to Abelson HYT1, 1994 leukemia accounts for 34% of all childhood malignancies in white children and 25% in black children. The incidence is still on the rise and about 2000-2500 new cases of childhood leukemia develop in the United States each year. One of the main reasons for this increase may be environmental exposure associated modernization.

In my study the age distribution showed that 60% occurred in 1-5 years, 30% in 6-10 years and 10% in more than 10 years of age. The peak age of ALL was 1-5 years which was confirming with Jandl Jh, 1987 9; Khan M.A, et al, 1955 10 The socioeconomic status wise distribution has revealed that 70% cases belonged to the lower class. This is similar to Neglia J.P, and Robinson L.L, 1988 14. The majority of cases (71.4%) belonged to agricultural families; the higher incidence of leukemia in them might be due to the increasing use of agricultural herbicides, pesticides or zoonotic transmission of some infection agent, which need further studies. Type of leukemia on F.A.B classification was L1 in L2 in cases Type L3 was not found. This is in accordance with Jandl J.H 1987 9.

My study suggested that anemia, fever, hepatosplenomegaly, aches and pains with skin or mucosal bleeding are the common clinical presentation of ALL and a patient with such complaints should be thoroughly investigated. It is very important to diagnose ALL in early stages because of high rates of complete remission and cure when diagnosed at an early stage.

The geographical distribution of ALL has demonstrated that most of the patients belonged to Mardan division and the rest to various parts of the KPK. Among the atypical symptoms recorded in my study, was ulceration of mucosa, abdominal pain, dyspnea, exophthalmus, meningitis, testicular swelling, AFP. The findings were almost consistent with Wintrobe M.M., et al, 1975, 17 (fever 71%); Khan M.A et al , 1995, 10(50% at the time of diagnosis ) and Bloomfield C.D, 1984 3. Among the different signs found in my patients, anemia was found in 90% cases. Splenomegaly was found in 60% cases.
This was consistent with wintrobe M.M et al, 1974 17, Cristie W.M 5, and Pui C.H, 1996 13 and Bloomfield C.D 3. Lymphadenopathy was recorded in 70% of cases. This was consistent with Hull D and Johnston D.J 1987 7, Cristie W.M 5 and Pui C.H, 1996. 15 Bone tenderness and joint swellings were recorded in 20% and 20% cases respectively. This was consistent with cristie W.M 5 and Pui C.H, 1996. 15 and Jandl J.H 1987 9.

In (n=1) of my patients had a wide mediastinum which was found on X-ray chest, while Bloomfield C.D 3, has reported it in 7 % cases.

On Ophthalmoscopy, fundus changes in the form of retinal hemorrhages were seen in 20% cases. This is similar to Wintrobe M.M et al, 1974 18. The Hb level of patients in my study was 2-6 gm% in 50% cases. 7-10gm 30% cases, 10-12gms in 20% cases. The total leucocytic count (TLC) was < 4000/dl in 10% cases, 4000-11000/dl in 30% cases and > 11000/dl in 30% cases. These figures are comparable with those of Cristie W.M 5 and Pui C.H 1996 15 and Jandl J.H 1987. The platelet count was decreased in 90% of my patients and normal in 10% cases. These figures are consistent with Chessells J.M 1983, 4(15% cases have normal platelets). Blasts cells were detected in 100% cases on peripheral smear. It is in accordance with Wintrobe M.M et al, 1974 18.

Bone marrow aspiration of my patients showed hypercellularity in 90% cases and normal cellularity in 10% cases. These figures are comparable with Lanzkowsky P. 1980 12.

CONCLUSION

Children with acute leukemia, sometimes, presents only as paler (anemia) one should be alert to differential diagnosis of these cases well in time.

Acknowledgement: I am thankful to Mr. Akhtar Naeem laboratory technician for helping data collection and doing peripheral smear. I am also extremely thankful to Mr. Zahoor Ali Khan from Jamal Garhi Mardan for typing this study.

REFERENCES


3. Bloomfield Clara D; Acute lymphoblastic leukemia; Clinical and biological features in Goldman JM preisler HD eds Haematology I Leukemias , Butterworks, 1984; 163-182.
Outcome of Open Reduction & Internal Fixation of Fracture Shaft of Humerus with Dynamic Compression Plate in early Post Operative Wound Infection & Radial Nerve Injury

Umar Hayat FCPS¹, Muhammad Siraj FCPS² Abdus Samad Khan,FCPS³

ABSTRACT
Objectives: To determine the frequency of complications of open reduction and internal fixation of fracture shaft of humerus with Dynamic Compression Plate in terms of early post-operative wound infection and radial nerve injury.

Material & Methods: This study was conducted in orthopedic and trauma department of Khyber teaching hospital Peshawar from July 2012 to January 2015. Patients with closed fracture shaft of humerus were admitted to the unit and prospectively studied. Data collection was done on a prescribed proforma.

Results: 117 patients with mean age of 38.7 including 87 (74.3 %) males and 30 (25.7%) females fulfilling inclusion criteria were operated. At 1st postoperative day, 110 patients (94%) had no neurological deficit while 7 patients (5.98%) had neurological deficit of radial nerve. At 12th postoperative day only 9 patients (7.7%) had superficial wound infection while 108 patients (92.3%) had no wound infection.

Conclusion: In our study there were few cases of radial nerve injury and wound infections which can be further minimized by observing strict operation theatre protocol and proper soft tissue and nerve handling.

INTRODUCTION
Fracture shaft of humerus is a common orthopedic problem and represents about 3% of all cases. Non-operative methods include skeletal traction, abduction casting and splinting, hanging arm cast and functional bracing¹. The usual operative modalities used for fixation of humerus fractures are the Cerclage wires, Kuntscher nails, dynamic compression plate (DCP), external fixator and intra-medullary nail (IMN)².

Postoperative complications rates for open reduction and internal fixation of humeral shaft fractures with dynamic compression plate are highly variable in literature. Frequency of wound infection varies from 12.5 % to 20.8% to 20.8% and radial nerve injury 13.33% to 31.3 % ³⁻⁵. In spite of the fact that open reduction internal fixation of humeral shaft fracture with dynamic compression plate is the most commonly performed procedure in our setup. Local statistics available are deficient and literature shows variable data regarding complications of fixation of shaft of humerus fractures with dynamic compression plate suggesting need for further research.

MATERIALS AND METHODS
This study was conducted in orthopedic and trauma department of Khyber Teaching Hospital Peshawar from July 2012 till Dec 2014.Patients of both genders and age group >18 and <70 yrs with fresh closed humerus fracture and those after failure of conservative treatment presenting in KTH Peshawar were included in the study. Patients with open, pathological or comminuted fractures, pre-op radial nerve palsy, head injury and co-morbid conditions i.e Diabetes Mellitus and HIV were excluded from the study.

Mostly, there are few cases of radial nerve injury and wound infections which can be further minimized by observing strict operation theatre protocol and proper soft tissue and nerve handling.

RESULTS
There were a total of 117 cases falling in the inclusion criteria. These were operated and fixed with same implant i.e. DCP. Mean age was 38.7. Youngest patient was 23 years old while oldest one was 57 years of age (Table 2). There were 87 (74.3%) males and 30 (25.7%) females. The mode of injury is shown in Table 4. In most of the cases patients with fractures due to low-energy trauma belonged of older age group and those with high-energy fractures were young.

Outcome of the patients was based upon post-operative radial nerve injury on 1st postoperative day...
and wound infection on 12th postoperative day. Results obtained were as follows;

**Radial nerve injury on 1st postoperative day**
- 110 patients (94%) had no neurological deficit.
- 7 patients (6%) had neurological deficit.

**Wound infection on 12th postoperative day**
- 108 patients (92.3%) had no wound infection.
- 9 patients (7.7%) had superficial wound infection.

No patients died during follow up. So mortality up to 12th postoperative day was 0%.

### Table 1: Age distribution

<table>
<thead>
<tr>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>117</td>
<td>23</td>
<td>57</td>
<td>38.7</td>
</tr>
</tbody>
</table>

**DISCUSSION**

In this particular study the most important complications of radial nerve injury and postoperative wound infection were evaluated after fixing fracture shaft of humerus with Dynamic Compression Plate. In my study 110 patients (94%) had no neurological deficit while 7 patients (6%) had neurological deficit on 1st postoperative day. On 12th postoperative day only 9 patients (7.7%) had superficial wound infection while 108 patients (92.3%) had no wound infection.

Vander Griend et al reported union in 35 out of 36 plated humeral shaft fractures with no shoulder or elbow morbidity and one temporary radial nerve palsy. Bell et al (union in 37 of 39 fractures) and Tingstad et al (union in 78 of 83 fractures) had excellent union rates with fewer complications. Various studies were carried out to establish the efficacy of locking humeral nails but could not parallel the clinical success seen with similar devices used for femoral and tibial fractures.

In the study of Aizaz Saleem Khan et al, transient radial nerve palsy was observed in 3 patients (10%) and mild wound infection in 2 (6%). Winker et al operated 98 patients with broad AO/ASIF-4.5-mm-DCP, 4 temporary palsies of the radial nerve (4%), three cases of infection (3%) and one non-union (1%) were observed. Mohammad Shoaib Khan et al in study operated 15 patients with bone grafting and DCP. Out of 15 patients the age range was 20-80 years, 12 (80%) were male and 03 (20%) female. Two patients (13.33%) got neuropraxia of radial nerve which resolved within 3 months. 02 patients (13.33%) developed shoulder stiffness which resolved after exercise. Fang-Yao Chiu et al operated 105 patients with DCP, which included 66 males and 39 females. Complications included 4 patients (3.81%) with temporary radial-nerve palsies, and 3 patients (2.85%) with wound infections.

There have been three RCTs that have compared locked intra-medullary nailing to compression plating. Although they are small in numbers, their design is solid and represents the best information on this topic. A recent meta-analysis conducted on these studies revealed that patients in the plated group had a lower rate of reoperation (6% vs. 18%, p=0.03), and a lower rate of shoulder pain (1% vs. 21%, p<0.002). There were also more non-union in the nail group (8/73, 11%) than in the plate group (5/83, 6%), although this difference did not reach statistical significance with the numbers available. There were few limitations in our study i.e. small sample size, short duration of study and non-availability of local data on the subject. Further local studies of longer duration and comparison may be needed to confirm our results and the long term efficacy of ORIF of shaft of humerus with DCP including bony union, ultimate fate of iatrogenic radial nerve injury and wound infection.

**CONCLUSION**

In our study there were few cases of radial nerve injury and wound infections which can be further minimized by observing strict operation theatre protocol and proper soft tissue and nerve handling.

**REFERENCE**

weight-bearing on plated fractures of the humeral shaft. J
nailing of humeral shaft fractures with a locking, flexible nail. J
10. Robinson CM, Bell KM, Court-Brown CM, et al. Locked nailing of
11. Crolla KMP, de Varis LS, Clevers GJ. Locked intramedullary
12. Kuntscher G. Practice of intramedullary nailing. Springfield, IL:
Charles C Thomas; 1967.
13. Khan AS, Afzal W and Anwar A. Comparison of shoulder
function, radial nerve palsy and infection after nailing versus
plating in humeral shaft fractures. J Coll Physicians Surg Pak
2010; 20: 253-7.
Suppl:36-41.
15. Hsu TL, Chiu FY, Chen CM, Chen TH. Treatment of nonunion
of humeral shaft fracture with dynamic compression plate and
al: Fixation of fractures of the shaft of the humerus by dynamic
compression plate or intramedullary nail : A PROSPECTIVE,
17. Bmedolano LE, Iaquinto JA, Vasicek V. Operative treatment
of humerus shaft fractures: a prospective randomized study
comparing intramedullary nailing with dynamic compression
plating. Presented at the 62nd Annual Meeting of the American
Academy of Orthopaedic Surgeons. Orlando, FL; February
1995.
18. Reimer BL, Foglesong ME, Burke CJ, et al. Complications of
Seidel nailing of narrow diameter humeral diaphyseal fractures.
67:857-64.
ABSTRACT:

Background: Trauma is the most common cause of unnatural death and among regional injuries, fractures of skull are the most common injuries causing unnatural death. Most of these fractures are visible on x ray of skull but a fatal hair line fracture of skull involving only inner table of skull especially in the region of posterior cranial fossa may be missed and careful autopsy will help in finding out the cause of death.

Study design: This descriptive study is based on autopsy record and provides information regarding fractures of skull. Some fractures are not visible on x ray but careful autopsy will help in finding out the cause of death.

Duration of study: From 1st January 2013 to 23rd May 2013.

Methodology: This study was conducted in the department of Forensic Medicine & Toxicology of Khyber Medical College, Peshawar. Data was collected from the record of autopsies performed from January 2013 to May 2013. It included all cases referred from urban as well as rural area police stations of Peshawar district.

Results: Out of total 400 autopsies done 297 postmortem (74 %) were done on dead bodies having head injuries with brain damage as the cause of death.

Conclusion: Post mortem done carefully can help in finding out a hair line fracture of base of skull by stripping off the duramater of the posterior cranial fossa. Such fractures are usually missed on x ray of the skull, so autopsy is helpful in finding out the cause of death. It also helps to rule out whether fracture of skull is the cause of death or fracture is iatrogenic ie. produced by the person during autopsy while opening the cranial cavity.

Keywords: skull fractures, Autopsy.

INTRODUCTION

Injuries and death are inescapable in the modern way of life and their correct interpretation is vital in the reconstruction of story. Injuries to the head are very frequent as a result of traffic accidents, homicidal attacks or due to falls from height. Human brain is a very delicate structure and nature has been very kind to place it in a very hard bony cage called skull which mainly consist of frontal, parietal, temporal and occipital bones. The skull has a base and vault. The base of skull is mainly formed by occipital, sphenoid and ethmoid bones. The base of skull by virtue of its irregular shape and several formina passing through it is relatively weak and is therefore the most common site of fractures. In all medico legal autopsies the dura should be stripped thoroughly from the vault and the base so the presence of fractures may be verified or excluded. Unless this is done even fatal fractures involving only the inner table of skull may be missed.

The occipital bone has the biggest central aperture called foramen magnum to admit the spinal cord. Ring fracture around foramen magnum indicate a fall from height on feet or on buttocks. The strength of skull bone depends upon the age and sex of the individual and fracture of skull depends upon the nature of trauma, nature of weapon causing it and whether force is applied to the skull directly or indirectly. If the brain is affected the injury is serious and if brain is not affected then injury is likely to be non fatal. If the dura remains intact then it is called close head injury irrespective of whether the skull is fractured or not and if the dura is torn or lacerated then it is called open head injury as it is open to possible infection .The skull is having an outer and inner table . The outer table being more strong, the fracture may sometime involve inner table only. Such a fracture cannot be detected on x-ray. It can only be detected at autopsy.
Fractures of skull may be:
1. fissured fracture
2. depressed fracture
3. comminuted fracture
4. pond or indented fracture
5. gutter fracture
6. penetrated fracture
7. elevated fracture
8. ring fracture.

**MATERIAL AND METHOD**

It is a retrospective descriptive study conducted in the Department of Forensic Medicine & Toxicology of Khyber Medical College, Peshawar where all autopsies are carried out for the district Peshawar. A total of 400 autopsies were performed from 1st January 2013 to 23rd May 2013. All these cases were referred by the police from urban as well as from rural police stations to find out the cause of death and time since dead. Mode and manner of death or any other crime associated with the death was also mentioned in the autopsy report which was issued to the police and a record of each case was maintained. From this record in a performa information like age, sex, from rural or urban area and injuries / fractures were noted and the results were analyzed as under.

**RESULTS**

Out of total 400 autopsies done, 297 postmortem (74 %) were done on dead bodies having head injuries and cause of death was brain damage. Most of the dead bodies referred by police for postmortem were of male, from rural areas and were in the age group 21 to 39 years. The results are tabulated as under;

**DISCUSSION**

The 253 cases of fractures of skull mentioned in serial A were due to firearm injuries from various distances. All these firearm injuries were due to rifled weapon as: (1) collar of abrasion was present (2) bullets were recovered in most of the cases and (3) beveling out was noted in some cases.

Collar of abrasion indicate the angle at which the bullet entered thus helping in determining the relevant position of the victim and assailant. It also differentiate the wound of entry from the wound of exit. Beveling out was indicating the direction of exit of the bullet. The blackening, tattooing and scorching of tissues were not only helping to differentiate the wound of entry from wound of exit but also indicating the distance of fire hence reconstruction of story was possible. The skull fracture produced was mostly a fissured fracture.

In 27 cases mentioned in serial B the injuries

<table>
<thead>
<tr>
<th>S/No</th>
<th>Post mortem findings on dead body</th>
<th>No. of cases</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Multiple firearm injuries on head and neck region. Flame effect, blackening, collar of abrasion and tattooing was seen depending upon the distance of fire</td>
<td>253</td>
<td>Bullets were seen in x-ray of skull, Fracture of skull was visible in radio graph of skull, corona and beveling out was seen showing the direction of fire and wound of entry</td>
</tr>
<tr>
<td>B</td>
<td>Multiple abrasions, bruises and lacerated wounds on body and on head were seen</td>
<td>27</td>
<td>Injuries were consistent with road traffic accidents</td>
</tr>
<tr>
<td>C</td>
<td>4</td>
<td>Hair line fracture in the posterior cranial fossa was noted on stripping off the dura matter. These fractures were not visible on x ray. In one case external injury was on fore head but posterior lobe of cerebrum was more bruised than anterior lobe</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>Multiple lacerated wounds on head</td>
<td>13</td>
<td>In four cases blood stained axe was recovered by police and it was confirmed in the laboratory that it was blood of the victim</td>
</tr>
<tr>
<td>Total</td>
<td>No fracture of skull noted</td>
<td>103</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>297</td>
<td>103</td>
<td></td>
</tr>
</tbody>
</table>

Ligature mark around neck was seen in 13 cases, Multiple bruises and abrasions on front of neck were present in 03 cases, cut throat wound of neck was seen in 08 cases. No visible injury on body seen but various chemicals like alcohol, carbon mono oxide, organo phosphorus compounds were detected in the forensic science laboratory in 18 cases. In the other 61 autopsies performed the cause of death was either blast injuries, drug addiction, drowning, anaphylactic reaction, burns, gagging, laceration of liver or rupture of spleen.

<table>
<thead>
<tr>
<th>Condition of body</th>
<th>Sex</th>
<th>Area</th>
<th>Cause of death due to skull fracture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fresh</td>
<td>Male</td>
<td>Urban</td>
<td>Fire arm injuries</td>
</tr>
<tr>
<td></td>
<td>387</td>
<td>357</td>
<td>134</td>
</tr>
<tr>
<td>Putrefied</td>
<td>Female</td>
<td>Rural</td>
<td>266</td>
</tr>
<tr>
<td>Total</td>
<td>400</td>
<td>400</td>
<td>400</td>
</tr>
</tbody>
</table>
were consistent with road traffic accidents as in 3 out of 27, the skull was badly smashed and brain tissue was coming out. In four cases mentioned in serial C radio graph of skull was not showing any fracture but during autopsy on stripping off the dura matter of posterior cranial fossa a fatal hairline fracture involving only the inner table of skull was noted. In one out of these four cases the external injury was on forehead but on opening the skull the posterior lobe of cerebrum was more bruised than the anterior lobe of the respective cerebrum. It was a counter coup injury helping in reconstructing the story that the person got it when his moving head was suddenly halted by the hard surface of the ground. It was a case of fall from height. In one case in an adult, a ring fracture was noted around the foramen magnum favoring it was a case of fall from height on his buttocks.

In 13 cases mentioned in serial D the skull fractures were comminuted, depressed as well as elevated. These were caused by the axe and in 4 out of 13 cases blood stained axe was recovered by the police. The blood stain matched with the blood of the victim in the forensic science laboratory. In one case out of these 13 cases the fatal skull fracture was penetrating and age of the victim was 12 years only.

It is in the knowledge of a common man that injury or wound on head is a serious injury and may prove fatal so homicidal wounds are more common on head than any other parts of body. Homicidal gunshot wounds mainly affect economically productive age group as in this study the most common age of victims was 19 to 43 and all types of skull fractures were seen. Police is the in charge of dead body so investigate all unnatural and suspicious deaths on behalf of the state and can ask for autopsy as and when required. Dead body is property of the state hence no consent of any one is required for autopsy. Autopsy or postmortem is the scientific study of the dead according to the laws of the state. This examination is external as well as internal and it also includes the help of radiologist and forensic science laboratory as and when required.

CONCLUSION:

Fire arm injuries and road traffic accidents seek attention of policy makers. The number of unnatural deaths can be decreased by taking measures to improve social justice and education of people. The correct interpretation of injuries is vital to the reconstruction of events in forensic medicine.

A fatal fracture of skull especially involving the inner table of skull only which can be missed by radiologist can be diagnosed on autopsy if it is performed by an expert by properly stripping off the dura matter from skull. Vital reaction is important to differentiate ante mortem injury from post mortem injury. It is recommended that never use a chisel in opening the cranial cavity if there is possibility that skull injury is the cause of death.

REFERENCES

2. Sinnott ID, Morris G, Mediland PJ, Porter K; High velocity facial gunshot wounds; Multi disciplinary care from pre hospital to discharge; BMJ case reports 2016;doi:10.1136/bcr-2015-213268
3. Gunshot injuries in Maiduguri north eastern Nigeria by Dr. S Aliyu, Dr.AG Ibrahim, Dr BS Muhammad & Dr J Jatau; International Journal of Applied Research 2016:2(3):539-541
4. Pattern of Head Injuries in fatal road traffic accidents in a rural district of Maharashtra; by Ranjit M, Tandle, A.N. Keoliya; autopsies based study; JIAFM, Jul-Sep 2011, Vol.33(3)
7. Ali SMA, Bashir MZ, Hussain Z, Kheri GO, Khailil IR; Unnatural female deaths in Peshawar, JCPSP, 2003;13(4);198-200
8. Profile of negative autopsy cases at Punjab medical college, Faisalabad by Altaf, Pervez Qasim, Saeed Akbar Tariq, Pervez Ahmed Makdoo, Muhammad Naeem, Mubeen inam Pal, Kishwar Naheed, Muhammad Aslam; JUMDC, vol.6, issue 1, January - Mar 2015
10. Diagnostic yield and characteristics of features in a series of decomposed bodies subject to coronial autopsy; forensic science medicine and pathology; March 2008, vol.4, issue 1 pp 9 – 14
11. Computed tomography as routine in connection with medicolegal autopsies; forensic science international vol 171, issue 2 – 3, pages 190-197, 13 sep 2007
13. Roberts IS, Benamore RE, Benbow EW, Lee SH, Haris JN, Jackson A, Mallet S, Patel T, Peebles C, Roobottom C, Traill ZC; Post mortem imaging as alternative to autopsy in the diagnosis of adult deaths; a validation study; The Lancet 2012 Jan 20;379(9811); 136–42
15. Khan MY, Jan A, Munawar A Z, Frequency of Negative Autopsy and their Demographic Evaluation at Khyber Medical College, Peshawar, JPMI 2007;(21)2;132-5
16. Profile of Unnatural Deaths in Bhu (Gujarat); A Retrospective Study Dr.Pritivirajsinj Vaghela, NJIRM 2012; vol .3 (2) April – June
Management of Complicated Circumcision in Children

M. Younas Khan FCPS.1 Muhammad Ayub Khan FCPS.2 Prof. Kifayat Khan.,FCPS3

Department of Paediatric Surgery Medical Teaching Institute, Lady Reading Hospital, Peshawar.

ABSTRACT
Objective: Approximately one in three men are circumcised globally, but there are relatively few data on the safety of the procedure. In this study we evaluated cases referred to our pediatric surgical unit with complications of circumcision which may or may not be needed secondary surgical intervention.

Materials and Methods: This study was conducted on male neonates, infants and children with complicated circumcision done in the periphery, referred to the department of paediatric surgery MTI LRH Peshawar for proper management from January 2014 to December 2016. 38 complicated circumcision cases were evaluated. The circumcisions were done at various paramedical clinics, home are communal circumcision ceremonies held in villages. Various methods of circumcisions are commonly used in the KPK today. The choice of circumcision method depends on the physician’s level of comfort and training. The time between the complications of circumcision and the admission of the patient to the hospital from the age of one day to 9 years. The most commonly utilized techniques are Qalam blade method, bone cutter, different type clamps and open surgical procedures. Each instrument and technique carries its own benefits and complication risks.

Results: Circumcision like any surgical procedure does carry the risk of complications, which depends on multiple factors, including anatomic abnormalities, medical comorbidities, surgical techniques and patient’s age. Age range was from one day to 13 years. Death, bleeding, loss of skin/wound dehiscence, trapped/concealed penis, redundant foreskin, preputial adhesions/skin bridges, meatal stenosis, Ureteral injury, UC fistula + hypospadias and glans amputation were present in 1, 14, 2, 8, 4, 1, 4 and 2 cases respectively. Bleeding was controlled by simple pressure bandage/ligation with chromic or vicryl 4/0 in most of cases. Bleeding due to hemophilia treated accordingly either with fresh blood transfusion or by factor 8 injection. Trapped on concealed penis was treated by repeated circumcision. Urethral fistulae treated by simple closure. Hypospadias repair was performed with tubular incised plate urethroplasty technique. Glanular necrosis was put on hyperbaric oxygen treatment. Adhesions freeing and revision were performed to all the cases with prefallo- glanular fusion. The patient with partial are total glans amputation were admitted to our ward late and since glanular anastomosis was not possible for these patients, a cosmetic improvement was achieved by covering the glans with surrounding tissue.

Conclusion: Risk reduction strategies including improved training of providers and provisions of appropriate sterile equipment, are urgently needed.

Keywords: circumcision, circumcision complications, penile imputation.

INTRODUCTION
Circumcision is the oldest and is the most frequently performed surgical procedure in the history of mankind. Mostly it is performed as a ritual for religious reason. The technique and personnel performing the procedure vary from the one carried out in tertiary care hospital by properly trained personnel to quakes in an ill equipped setting. All of the techniques have their strengths and their limitation together with their protagonists and critics. It is estimated that 25 % of all the men around the globe are circumcised (1). Considering this fact, it is clear that circumcision is the most common surgical operation. While most circumcisions are performed for religious reasons, few are performed for medical reasons (2). Complication rates ranging from

1 to 15 % are reported for circumcision procedures (3). Most of these complications are in the form of minor complications such as bleeding, infection and the reopening of wounds. In addition, major complications such as glanular necrosis, glans and penis amputations, urethral openings, and preputial fusion defects can also occur (4). Although it is a common surgical procedure in our country, only 5-10% of circumcisions are performed in hospitals. All techniques of circumcision aim to provide the best cosmetic result together with the lowest possible morbidity rate. All the procedures it is generally accepted that one performed with
plastibell (Hollister) technique is the safest with complication rate from 2% to 2.4% of minor nature have been reported (5-7). More often than not, however, complications arise as a result of operator inexperienced rather than the method employed (8). Circumcisions are more commonly performed in health centres, at home and in villages during communal circumcisions that are usually sponsored by charity organizations. During communal events, hundreds of children are circumcised in a short period of time. Circumcisions performed by unqualified individuals and at ceremonial events can also be an open invitation to major complications. In this study, we evaluated such cases that were referred to us for surgical repair.

METHODS & MATERIAL

This study was conducted on neonates, infants and children with complicated circumcision done in periphery, referred to the department of paediatric surgery MTI LRH Peshawar for proper management from January 2014 to December 2016. 38 complicated circumcision cases were evaluated. The circumcisions were done at various paramedical clinics, homes, communal centers and ceremonies held in villages. Various methods of circumcisions are commonly used in the KPK today. The choice of circumcision method depends on the physicians level of comfort and training. The most commonly utilized technique in the new born and the infant is done by a homemade wooden clamp locally named “Qalam blade”, and bone cutter method used by trained villager quake/paramedical /medical staff. Among the gomco clamp, the mogen clamp and the plastibell, the plastibell technique has started by some doctor now a days here in this province of KPK. The most commonly utilized technique in the operating room, the “free hand circumcision” using either the sleave technique or the dorso-ventral slit technique which is most commonly used. Each instrument and technique carries its own benefits and complications risks. Proper selection of patients based on the age and anatomic consideration as well as proper sterile surgical techniques are critical to prevent future circumcision – related adverse events. It is a relatively safe procedure with a low over all complication rate, even in the hand of trained village quake and paramedical staff. Most complications are minor and can be managed easily. Though uncommon, complications do represent a significant percentage of cases seen by pediatric surgeons. Often they are required surgical correction. Severe complications are quite rare but mortality has been reported as a result in some severe and untreated cases.

RESULTS

Circumcision like any surgical procedure does carry the risk of complications. Complication rates depend on multiple factors, including anatomic abnormalities, medical comorbidities, surgical techniques and patient age. During a three years period, adverse events following circumcisions can be categorized as either early or late complications. Early complications such as; bleeding, pain, inadequate skin removal and surgical site infection tend to be minor and quite treatable. However, post circumcision bleeding in patients with coagulation disorders can be significant and sometime even fatal. Other serious early complications include chordee, iatrogenic hypo-spedias, granular necrosis, and granular amputation. The latter of course, requires prompt surgical intervention. Late complications include epidermal inclusion cysts, suture sinus tracks, chordee, inadequate skin removal resulting in redundant foreskin, penile adhesions, phymosis, buried penis, urethra cutaneous fistulae, meatitis and meatal stenosis. These are commonly treated in an outpatient setting. Most of the aforementioned conditions are avoidable giving attention to detail and proper technique. Age ranged was from one day to 13 years. Death, bleeding, loss of skin/wound dehiscence, trapped/concealed penis, redundant foreskin, preputial adhesions/skin bridges, meatal stenosis, Ureteral injury (UC fistula + hypospadias) and granular necrosis/granular amputation were present in 1, 14, 2, 8, 2, 4, 1, 4 and 2 cases respectively (Table 1). Bleeding was controlled by simple pressure bandage/ligation with chromic or vicryl 4/0 in most of cases. Bleeding due to hemophilia treated accordingly either with fresh blood transfusion /FFP or by factor 8 injection. Trapped on concealed penis was treated by redoing of circumcision. Urethral fistulae treated by simple closure. Hypospadias repair was performed with tubular incised plate urethroplasty technique. Granular necrosis was put on hyperbaric oxygen treatment. Adhesions freeing and revision were performed to all the cases with prepuctio granular fusion. The patient with partial are total glans amputation were admitted to our ward late and since granular anastomosis was not possible for these patients, a cosmetic improvement was achieved by covering the glans with surrounding tissue (Table 2).

Table 1. Complications of Circumcisions

<table>
<thead>
<tr>
<th>Cases</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bleeding</td>
<td>14</td>
</tr>
<tr>
<td>Loss of skin</td>
<td>2</td>
</tr>
<tr>
<td>Trapped/concealed Penis</td>
<td>8</td>
</tr>
<tr>
<td>Redundant fore-skin</td>
<td>2</td>
</tr>
<tr>
<td>Preputial adhesion</td>
<td>4</td>
</tr>
<tr>
<td>Urethro cutaneous fistula/hypospadias</td>
<td>4</td>
</tr>
<tr>
<td>Granular necrosis</td>
<td>1</td>
</tr>
</tbody>
</table>
Management of Complicated Circumcision in Children

Table 2. Treatment of the complications

<table>
<thead>
<tr>
<th>Cases</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glanular amputation</td>
<td>1</td>
</tr>
<tr>
<td>Meatal stenosis</td>
<td>1</td>
</tr>
<tr>
<td>Death</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>38</td>
</tr>
</tbody>
</table>

DISCUSSION

Male circumcision is a common surgical procedure, but few epidemiological studies have reported frequency of adverse events, most commonly bleeding and infection (9). Our review shows that serious adverse events are rare, but there is wide variation in reported frequency of adverse events following circumcision (10). This is likely to be due to several factors directly associated with complications such as age circumcision, training and expertise of providers, the sterility of the procedure (11). The prospective studies in older boys aged 3 to 8.5 months at significant post-operative bleeding (12). The US study in which no complications were seen (13). There was reported to be a great improvement on that by traditional non medically trained providers (14-19).

Only two patients referred to our ward had been circumcised in hospitals. Two of these patients had developed glanular necrosis and one had developed preputial fusion. The patients with glanular necrosis were treated with hyperbaric oxygen treatment. Since the patients with partial or total glans amputations were admitted to our ward late and since glanular anastomosis was not possible for these patients, a revision was performed after the glanular adhesion was removed (Table 2).

It had been reported that circumcision lowers the risk of urinary system infections in children and penis cancer in adults and acts as an important barrier against sexually transmitted diseases (STDs) including human immunodeficiency virus (HIV) infections (20). According to its published report, the American Academy of Pediatrics accepts that circumcision, especially when performed under the age of one, lowers the risk of urinary system infection and future penis cancer development (21). While it has been reported that the data are insufficient to argue for the routine application of circumcision on newborns, Wiswell and colleagues defend routine circumcision for all newborns based on results showing that the risk of urinary system infections was 11 times greater in uncircumcised children (22). Supporting this view, Fussel and colleagues reported that the foreskin leads to bacterial colonization (23). Yet another report states that circumcision does not aid in the prevention of the STDs transmitted through the urethral route and can only provide protection against diseases associated with genital ulcers (24).
societies routinely apply this procedure for religious reasons. For this same reason, hundreds of thousands of children in our country are being circumcised each year, especially in the summer months. In our country, the age for circumcision is usually between 2 and 11 (Average 7) years. It has been estimated that the number of circumcisions performed for medical reasons is less than 10 % of all the circumcisions performed. While a very small percentage of circumcisions are performed in hospitals, most are performed at homes, health centers, schools, and open areas. In towns, most of these circumcisions are performed by experienced doctors, health workers or technicians. In rural areas however, most are performed by unqualified individuals, usually without any anesthesia. According to our review of the circumcisions, a clamping method was most frequently used and on rare occasions, a Plastibell or classical surgical method (29). We also observed that more than 95 % of the circumcisions are performed under local anesthesia. The most widely used anesthetic substance was 4 mg/kg lidocaine without adrenaline and less frequently 2 ml of 20mg/ml lidocaine and 0.125 % epinephrine, diluted 1:2 in serum physiological solution. In our country, communal circumcisions sponsored by charity organizations, local administrations or by political parties hoping for political support are quite common. As a result, circumcisions are often performed in great numbers in a short period of time, usually allowing less than 10 minutes for each child. This is an invitation for various complications. Although the British Medical Association argues that circumcisions should only be performed in cases where it is medically necessary, many voluntary circumcisions are still performed in England (20).

Most of the major complications of circumcision in our patients were mechanical. Only one patient had developed glanular necrosis associated with anesthesia. In developed countries, glanular necrosis is usually associated with the cautery used. Although very rare, circumcisions performed in operating theatre settings where bleeding control is achieved with diathermy can lead to such complications. It had been reported that the probability of arterial injuries would be lessened with the use of a bipolar cautery for this purpose (27).

We cannot neglect the fact that every year in our country hundreds of thousands of children are circumcised for religious reasons. Due to practical and economic reasons, as high as 95% of circumcisions are performed under local anesthesia outside of hospitals. In Western countries on the other hand, circumcisions are usually performed voluntarily and in hospitals. In USA, the cost of circumcision performed under general anesthesia had been reported to be $1,805 compared with the cost of $10 to $20 for circumcisions performed under local anesthesia (28). Therefore, circumcisions performed under local anesthesia are clearly much more cost effective.

Since bleeding control is achieved by diathermy for circumcisions performed in operating rooms, local anesthetics containing adrenaline are not recommended. Instead, 4.5 mg/kg of lidocaine without adrenaline is recommended for this purpose (28). In circumcisions performed outside of hospital settings, local anesthetics containing adrenaline are used to decrease bleeding. In our review of more than 3000 circumcisions performed under local anesthesia, using of 2 ml of 20 mg/ml lidocaine and 0.125 % epinephrine diluted 1 in 2, we did not come across any complications. We believe that the age of the child, the amount of the local anaesthetic applied, injection of the anesthetic to the wrong area, undiluted application of the local anesthetic with adrenaline, and tight wrapping of the penis after the circumcision can be factors leading to glanular necrosis.

Most of the circumcision complications in our series were related to the mechanics of the procedure. The most common problems are related to surgical technique and the inexperience of the person performing the circumcision. Glanular and urethral injury risks are low in circumcision methods using the classical excision technique. However, since the application of this method requires more time and is more difficult to learn, circumcisions are more frequently performed by clamping and guillotine like incisions which is easier to learn and can be done on many children in a short time during communal circumcisions. Provided that it is performed by experienced hands, this is an extremely simple and quick technique in which total peeling of the preputium off the glans, correct placement of the clamp in a way to keep the glans away, and maintaining an angle of 45 degree between the blade and the clamp during the incisions to be made on the penis side of the clamp are important. Application of this technique by unauthorized people who learned the technique by mere observation can lead to glanular, urethral, and corporal injuries. In cases of corporal amputations where the child is older and the incision is suitable, such incisions are reported to be treated by successful anastomosis in clinics with highly improved facilities (29,30). Urethral injuries are usually treated by tubular incised urethroplasty/A.B repair.

We obtained successful results in the penile fistula patients by fistula repair. Especially for the adult age group, fistula repair was performed with catheter under general anesthesia. Preputio-glanular fusions are usually the results of incompletely peeled off preputial skin from the glans, incomplete excision, and insufficient post-circumcision care. Lee Polinsky and colleagues divided such adhesions into 4 groups: Grade
Management of Complicated Circumcision in Children

0 means no adhesion; Grade 1 means the preputium is connected to the corona by a thin film; Grade 2 means adhesion covers less than 50 % of the glans; Grade 3 means adhesion covers 50 % or more of the glans (31). Grade 1 adhesions usually develop in cases where the preputium is not pulled back post circumcision or is incompletely excised. Grade 2 and 3 adhesions develop when the preputium is not peeled off the glans or the preputium is incompletely excised during the circumcision. In the cases we reviewed, 2 patients had grade 2 and 2 patients had grade 3 adhesions. In these patients, the place where the preputium adhered to the glans was excised and the resulting opening on the glans was sutured with 6.0 vicryl. The excess preputial tissues were then excised.

Due to religious reasons, we expect circumcisions will continue to be performed at the same pace in Islamic countries like Pakistan. We strongly believe that in order to prevent major complications, circumcisions performed by people other than authorized health workers, and communal circumcisions should be prevented or at least be performed under supervision. We also assert that aseptic and antiseptic rules are easily broken during communal circumcisions increasing the risk of wound infection and transmission of blood born diseases, such as hepatitis B virus (HBV) infection. We believe that educating communities about this matter is important and would be more effective than legal legislation.

CONCLUSION
1. Circumcision is the most common surgical procedure in our country. However, since circumcisions are also commonly performed by inexperienced individuals at home, in hospitals and during communal circumcisions where high numbers of circumcisions are performed in a short period time, we frequently come across complications of circumcision.
2. Risk reduction strategies including improved training of providers, and provisions of appropriate sterile equipment, are urgently needed.
3. A heightened awareness of the scope and potential for complications will definitely result in a reduced complication rate.

REFERENCES
INTRODUCTION

Large chronic ulcers in the lower limbs associated with comorbid conditions such as diabetes and venous varicosities are a challenge for the surgical community while it bear an increased health burden in terms of morbidity and mortality for the patients. Diabetic and venous ulcers frequently fail to respond to primary surgical techniques such as antibiotics therapy and conventional gauze dressing after debridement. These ulcers in first instance are not suitable for skin grafting techniques due to almost invariable presence of infection, and suboptimal local environment for healing. Oedema, ischaemia, infection and sloughing repeats in a vicious cycle leading to chronic nature of these ulcers.1, 2

The foremost requirement for rapid wound healing is to optimise the local microenvironment in a way where tissue oedema is reduced, inflammatory exudate is lessened and blood flow is increased along with continuous removal of the necrotic debris from the wound bed.3 Once a wound is ready with fresh granulation tissue and good vascularity, it is usually optimal for secondary procedure such as split skin grafting or rotation flap cover.4

Negative pressure wound therapy is a viable option for chronic diabetic and venous ulcers. The response to therapy is quick and ulcers regress in size after at least two weeks of therapy. It is of particular importance in ulcers which may need grafting once the wounds are granulating. Outcome with this modality is independent of the size and type of ulcer, though venous ulcer takes longer to respond as compared to diabetic ulcers.

Conventional methods of wound care involve debridement of the wound bed and its edges which is usually followed by saline wash and application of saline soaked sterile gauze. This basic method of wound dressing can be modified with the application of various substances, antibacterial impregnated dressings and topical antibacterial agents.3 Negative pressure wound therapy (NPWT) is relatively newer technique, where continuous or intermitted negative pressure wound dressing is applied. NPWT provides good local control of wound oedema, increased of

ABSTRACT

Background: Chronic non-healing ulcers pose a significant surgical problem in surgical practice as well as in plastic surgery clinics. Significant advances have been made during the past decade with the introduction of negative pressure wound therapy.

Objectives: To analyse thirty-day in-patient outcome of negative pressure therapy in chronic non-healing ulcers.

Methods: This is a prospective observational study of three years between July 2013 and June 2016. We included 42 patients, in which 32 were diabetic foot ulcers while 10 were chronic venous ulcers. All patients failed conventional therapy including eusol therapy, gauze treatment along with bacterial sensitivity guided antibiotics therapy. Patients with known lower limb ischaemia, coagulation disorders and malignant ulcers were excluded. Vacuum assisted closure was applied, the dressing was renewed and wound evaluated for granulation or healing every three days. Patients either went to split skin grafting or secondary healing.

Results: The mean age was 52.9 ± 6.6 years with a mean symptoms duration of 12.8 ± 17.08 months. There were 22 (52.4%) males and 20 (47.6%) female patients. The mean ulcer diameter at the start of negative pressure therapy was 6.6 ± 1.3 cm. 18 (42.9%) ulcers were superficial (not exposing underlying bone) while 24 (57.1%) ulcers were deep (exposure of muscles and bone). Patients with diabetic foot ulcers had a median time to a favourable response of 21.0 (95% CI, 18.9 to 23.05) days. On the other hand, venous ulcers responded in a median time of 25.0 (95% CI, 23.4 to 26.5) days.

Conclusions: The response to negative pressure therapy is quick and ulcers regress in size after at least two weeks of therapy. It is of particular importance in ulcers which may need grafting once the wounds are granulating.

Keywords: negative pressure wound therapy, chronic foot ulcers, diabetic foot, venous ulcers
blood flow and continuous drainage of local exudate. More recently this technique of negative wound therapy has been commercialised with availability of vacuum assisted dressing and studies are reporting good outcome.6,7,8

Data on the outcome of wounds treated with this technique is scarce. Since we receive a large number of diabetic patients with foot ulcers as well patients with venous ulcers, we designed this study to prospectively record the outcome of patients with chronic wounds who undergo vacuum assisted closure technique. This will strengthen the current evidence base for management of chronic diabetic and venous ulcers.

METHODS

This is a prospective cross-sectional study conducted at the department of General and Laparoscopic Surgery, Hayatabad Medical Complex between July 2013 and June 2016. Forty-two patients were included during the course of the study. Patients between age 18 years and 65 years with diagnosed chronic (>30 days duration) non-healing foot and leg ulcers who failed at least one type of conventional dressing techniques with no or suboptimal healing/granulation/resistant infection. Patients with smaller ulcers of ≤ 3 cm diameter were excluded along with known ischaemic ulcers, osteomyelitis, coagulation defects, severe decompensated comorbid conditions and malignant ulcers.

Diabetic patients were managed in liaison with the endocrinology team using the basal bolus regimen at a dose of 0.5 Units/Kg (50% dose as insulin glargine and 50% as glulisine) while the total amount of insulin was guided by the glucose readings taken at four intervals (pre-breakfast, pre-lunch, pre-dinner, post-dinner).

Admission baseline investigations were obtained including complete blood picture, renal function tests, liver function tests, serum electrolytes, urinalysis etc. Admission samples for culture and sensitivity were also obtained in order to guide the antibiotics therapy. An admission ankle brachial pressure index (ABPI) was also obtained in order to rule out severely ischemic limbs (ABPI cut-off ≤ 0.8). Patients who failed to respond with healing, granulation tissue formation and persistent infection within 30 days of initiation were labelled as treatment failures. Treatment failures were either continued on conventional gauze dressing with sensitivity guided antibacterial therapy, aggressive debridement and occlusive dressing or other plastic surgery techniques after consultation with the plastic surgery team and/or according to the patient preferences.

Data during the clinical course was collected about the demographics, baseline investigations, duration of the ulcer, comorbid, maximal ulcer diameter (cm), depth (partial thickness/full thickness), cultured bacteria if any, treatment duration (length of treatment, LOT), and outcome (healed with secondary intention, plastic surgery referral for grafting, failure).

All wounds were debrided initially at admission. After debridement, the negative pressure dressing was applied. A sterilised foam dressing was applied to the wound bed and a size 12 drainage tube was embedded in the folded foam. A sterile adhesive polyurethane covering (Opsite®) of appropriate size was applied around the wound area with at least 3 cm off-margin cover. The drainage tube was connected the suction machine which produced 125-150 mmHg negative pressure.

The dressing was opened and renewed every 48-72 hours, wound status was assessed for granulation, epithelialisation at the margins and the maximal diameter was measured. Wound status was classified clinically as improved or deteriorating taking into account active infection manifested by necrotic slough and inflammatory exudate production, the need for active surgical debridement and presence of inflammatory markers such as swelling and erythema. If a patient wound status was satisfactory for split skin grafting (healthy granulation, no or minimal inflammatory exudate, no necrosis, regressing wound size) or the epithelialized margins were closer than 3 cm, it was labelled as favourable outcome and was marked as end of the vacuum closure therapy. Wounds with unsatisfactory granulation, progression of size within the 30 days of application of dressing, were labelled as treatment failures or unfavourable outcome. Patients with failed vacuum therapy were discussed with the multidisciplinary team including plastic surgeon, endocrinologist, orthopaedic consultant and general surgeon. Patient was informed of the decision and their consent was obtained of further clinical course.

Data was analysed using SPSS version 22.0 for Microsoft Windows. The chi-square analysis was performed for qualitative dichotomous variables and their significance was determined according to the outcome variables. Independent t-test was performed in order to ascertain significant differences according to the type of diagnosis as well as the type of outcome. Kaplan Meier curve analysis was used to analyse the outcome of the two groups as well as according to ulcer type across the course of treatment.
RESULTS

Of the 42 patients, 32 (76.2%) patients were having diabetic foot ulcer and 10 (23.8%) patients presented with chronic venous ulcer. The mean age was 52.9 ± 6.6 years with a mean symptoms duration of 12.8 ± 17.08 months. There were 22 (52.4%) males and 20 (47.6%) female patients. The mean ulcer diameter at the start of negative pressure therapy was 6.6 ± 1.3 cm. 18 (42.9%) ulcers were superficial (not exposing muscles and bone) while 24 (57.1%) ulcers were deep (exposure of muscles and bone).

There were only 21.4% smokers among the study population, 9.5% (n = 4) had ischaemic heart disease, and 33.3% (n = 14) were hypertensive. The mean treatment duration was 22.3 ± 5.25 days (14-42 days) with 33 (78.6%) patient having favourable outcome while 9 (21.4%) patients had treatment failure or unfavourable outcome at the end of 30th day of treatment. The paired samples t-test for the difference of maximal ulcer diameter at the start and end of negative pressure dressing was performed. An overall mean difference of 1.02 ± 1.25 cm was observed which was statistically significant (p < 0.0001). Table 1

Kaplan-Meier survival analysis was conducted to compare the response of the two types of ulcers (diabetic and venous) to the negative pressure therapy. A similar percentage of censored cases was present in the diabetic ulcers (n = 7, 21.9%) and venous ulcers (n = 2, 20.0%). Patients with diabetic foot ulcers had a median time to a favourable response of 21.0 (95% CI, 18.9 to 23.05) days. On the other hand, venous ulcers responded in a median time of 25.0 (95% CI, 23.4 to 26.5) days. A log rank test was conducted to determine if there were differences in the survival distributions for the two ulcer types. There was a statistically significant difference in survival distributions for the diabetic ulcers vs venous ulcers after application of negative pressure dressing, χ² = 4.39, p = 0.03. Figure 1

<table>
<thead>
<tr>
<th>Table 1: Study sample data according to outcome group</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Outcome</strong></td>
</tr>
<tr>
<td>-----------------</td>
</tr>
<tr>
<td>Age</td>
</tr>
<tr>
<td>favourable</td>
</tr>
<tr>
<td>unfavourable</td>
</tr>
<tr>
<td>Symptoms duration</td>
</tr>
<tr>
<td>favourable</td>
</tr>
<tr>
<td>unfavourable</td>
</tr>
<tr>
<td>Haemoglobin</td>
</tr>
<tr>
<td>favourable</td>
</tr>
<tr>
<td>unfavourable</td>
</tr>
<tr>
<td>TLC</td>
</tr>
<tr>
<td>favourable</td>
</tr>
<tr>
<td>unfavourable</td>
</tr>
<tr>
<td>Creatinine</td>
</tr>
<tr>
<td>favourable</td>
</tr>
<tr>
<td>unfavourable</td>
</tr>
<tr>
<td>Depth</td>
</tr>
<tr>
<td>favourable</td>
</tr>
<tr>
<td>unfavourable</td>
</tr>
<tr>
<td>ABPI</td>
</tr>
<tr>
<td>favourable</td>
</tr>
<tr>
<td>unfavourable</td>
</tr>
<tr>
<td>Treatment duration</td>
</tr>
<tr>
<td>favourable</td>
</tr>
<tr>
<td>unfavourable</td>
</tr>
</tbody>
</table>
DISCUSSION

In this prospective case series of chronic diabetic and venous ulcers we determined that negative pressure wound therapy (NPWT) effectively leads to healing of the chronic mixed thickness wounds which have failed conventional gauze dressing. The relatively rapid wound response in the form of healthy granulating wound bed as well as reduction of wound surface in secondary healing wounds is indicator of the high efficacy of this modality. Wounds can be later managed with plastic surgical techniques once optimal for skin grafting or flap techniques.11

Recent trends in the adoption of NPWT for the treatment of both chronic and acute or subacute wounds is due to its efficacy and the rapidity. This also translates in its cost-effectiveness and long term reduction in morbidity, saving the patient from repeated invasive procedures and the need for repetitive wound debridement and dressings.5, 7, 8 Our results show improved wound healing rates especially in the diabetic population. Although the total treatment duration required for a favourable response was statistically different, it was not associated with any other demographic/clinical factors such as gender, age, duration of symptoms, laboratory parameters. The success of treatment was independent of the size of the ulcer before and after treatment. The duration of treatment was statistically insignificant for the two outcome groups, independent of the ulcer type. Since venous ulcers are more chronic and the local conditions are sub-optimal, more of the venous ulcers failed NPWT.12

In the NPWT patients, pharmacologic or surgical debridement is usually not indicated which leads to avoid the cost of pharmacologic preparations as well as reduces pain and discomfort by circumventing surgical debridement.5, 7, 8 The intermittent removal and change of the sponge dressing in NPWT is only mild to moderately painful procedures and only light sedation and intravenous analgesia is required during the treatment. This makes the NPWT attractive because patients can tolerate the procedure easily. This along with reduced number of dressing change (every 48-72 hours) makes patient more compliant. Less dressing change, reduced need for surgical debridement and lower need of strong analgesia reduces the amount of nursing and monitoring requirements in these patients. Moues et al has reported a lower overall cost and reduced staff requirement in patients with NPWT as compared to the conventional dressing patients.11, 13, 14, 15

Complications of the procedure include early pain after initial application of the dressing, which may be due to the negative pressure in the wound. In addition, local pressure effects such as tissue erosion are due to the tube and hyperaemia around the ulcer. All of these complications are transient and usually reverses with clinical measures such as elevating the tube with foam or cotton underneath, application of non-adherent dressing and the use of intravenous analgesia.16

The subject of interest in our study was the quick response of ulcers to the NPWT. As compared to the studies by Ahmed et al who reported mean treatment duration of 35 days our patients stayed for an average of 22.3 days.

None of our patients were suffering from peripheral vascular disease or osteomyelitis, even the deeper infections were limited to the soft tissues and all ulcers were non-ischaemic type. Patients’ age in our sample was initially of concern because we observed that older patients might not be able to tolerate this therapy for longer duration and especially they would not be compliant, however, it was not a problem, as intermittent discontinuation of the negative pressure therapy and mobilisation of patients helped with maintaining the adherence. We observed no mortality and no sepsicaemia. The limitations of our study were a small sample size and a single centre experience. Large multicentre trials will be needed to elucidate the role of this treatment modality in chronic non-healing ulcers.

CONCLUSION

Negative pressure wound therapy is a viable option for chronic diabetic and venous ulcers. The response to therapy is quick and ulcers regress in size after at least two weeks of therapy. It is of particular importance in ulcers which may need grafting once the wounds are granulating. Outcome with this modality is independent of the size and type of ulcer, though venous ulcer takes longer to respond as compared to diabetic ulcers.

REFERENCES


---

**Senor Doctors from Khyber Teaching Hospitals, Peshawar get promotions**

1. Dr. Syed Dilbagh Ali Shah, Senior Registrar, Orthopedics has been promoted as Assistant Professor.

2. Dr. Muhammad Abid Shah, Assistant Professor of Pharmacology has been promoted as Associate Professor.

3. Dr. Bashir Ahmed Assistant Professor of Psychiatry has been promoted as Associate Professor.

4. Dr. Jamila Mehnaz NAIB AND Dr. Shahnaz Nadir, both Associate Professors has been promoted as Professors of Obstetrics & Gynaecology.

These promotions are aimed at improving the patients’ care, medical education and training of budding specialists. The Management and the Board of Editors of Ophthalmology update congratulate the promoted doctors and wish them a happy and prosperous professional life.

Chief Editor
Efficacy of Epidural Steroid Injections in Management of Low Back Ache & Sciatica
Muhammad Salman FCPS1, Sikander Hayat FCPS2, Syed Dilbagh Ali Shah FCPS3, Prof. Muhammad Ayaz Khan FCPS 4
Orthopaedic Unit, Khyber Teaching Hospital, Peshawar,

ABSTRACT:
Objective: To assess the efficacy of epidural steroid injection (ESI) in patients with low back ache (LBA) and radiculopathy.
Place and duration of study: Orthopaedic department of Khyber teaching hospital, Peshawar from November 2014 to October 2016.
Patients and methods: In this study eighty five patients of both gender with LBA and radiculopathy not responding to conservative treatment were included. Injection methyl prednisolone 80 mg with 2ml of 1% lidocaine was diluted in 8ml of distilled water and injected into the lumbar epidural space. The patients were assessed before and after the procedure clinically. Subjective decrease in pain of ≥ 50% was considered as effective treatment. The patients were reviewed after two weeks, one month and six months after the ESI.
Results: Out of eighty five patients seventy patients were analyzed, among them 45 (64.3%) were male and 25 (35.7%) female. The mean age of patients was 42.2 (±9.71) years. Fifty patients showed symptomatic improvement after the first dose of ESI within two weeks while twenty required 2nd dose of ESI amongst which only six patients improved. The overall success rate was 80%. The gender and duration of LBP was not significantly related to the initial response.
Conclusion: Epidural steroid injections is effective in the conservative management of low back pain with radiculopathy
Key words: Epidural Steroid Injection, Low Back Ache, Radiculopathy, Efficacy.

INTRODUCTION
Low back ache (LBA) is one of the commonest presenting complaint in orthopaedics and is a leading cause of disability worldwide. The lifetime prevalence for low back pain ranges from 50% to 80%. LBA is a disabling condition and can last for months or years. There are various causes of LBA, specific as well as non-specific. Treatment of LBA varies from conservative to operative modalities with varied results. Conservative treatment includes rest, analgesics, traction and sometimes spinal manipulation. Those not responding may require surgical treatment. But complete relief may not be obtained even after surgery (failed back syndrome).

Epidural steroid injections (ESI) are a common treatment option for many forms of low back pain and leg pain. The first reported cases of epidural corticosteroid administration were by Lieve and associates in 1953. They described 20 patients who received caudal epidural injections of hydrocortisone for sciatica. During that decade, several other European investigators reported epidural corticosteroid use. The first cases in the United States were reported by Goebert and colleagues, who believed that painful nerve root compression syndromes were associated with inflammation and edema. These investigators

1Medical Officer, 2Associate Professor, 3Senior Registrar, 4Professor of the Unit

Correspondence: Dr. Muhammad Salman, House No: G 1, Main Masjid-e-Kausar Road, Islamia College Colony, Peshawar, Cell No: +92-333-9116384, Email: salmankh79@yahoo.com

Received: Dec’2016               Accepted: March’2017

Ophthalmology Update Vol. 15. No. 2, April-June 2017
taking permission from hospital ethical committee and informed consent from the patient. In this study eighty five patients of LBA with radiculopathy not responding to conservative treatment were included. Patients who had bleeding diatheses, local infection, motor deficit, prior lumbar disc surgery and refusal of ESI were excluded from the study.

All patients had thorough history, clinical examination, plain radiograph and for the indicated, haematological tests as well. The predominant nerve root involved giving rise to sciatica symptoms was determined on clinical evidence, plain radiological findings and MRI.

The disc level for ESI was located by surface anatomy. Using strict aseptic technique, two milliliters of 1% lidocaine was infiltrating to the skin and subcutaneous tissue for surface anaesthesia. A 20 gauge epidural needle was inserted into the epidural space of the herniated lumbar disc through trans-lumbar route with the bevel upward and stylet in position. The epidural space was identified by loss of resistance to air technique. Injection methylprednisolone 80mg and 2ml of 1% lidocaine was diluted in 8 ml of distilled water and injected into the lumbar epidural space. After the procedure, patients were advised to lie supine in case of bilateral symptoms and to lie on right or left lateral position in case of only right or left sided symptoms respectively. During this period, they were observed for any possible complications. All patients were advised to take mild analgesics (Tab. Diclofenac 50mg 6 hourly for 1 day) during the post-injection period. The patients were first reviewed after two weeks, and then further follow up was carried out at one month and six months after the epidural steroid injection.

VAS score was used for assessment of current back and lower extremity pain, ranging from 0 (no pain) to 10 (worst pain possible). If a patient subjectively reported a decrease in pain of ≥ 50% within two weeks after a single injection, no more injections were administered and ESI was considered as an effective treatment. If the patient didn’t have improvement within two weeks, a second injection was performed. Patients with low back pain not responding to second dose of ESI were considered for surgery.

All the data was recorded on standardized proforma. Bias and confounders in the study were controlled by strictly following the exclusion criteria. The data was analyzed with the help of computer software SPSS for windows version 17. For categorical variables, frequencies were calculated while for continuous variables, mean and standard deviation were calculated. The success rate of epidural steroid injection was presented as percentage.

RESULTS

Out of eighty five patients, five patients were excluded from the study as the patient were not meeting the inclusion criteria. Eighty patients received epidural steroid injection, among them seven patients did not come for follow up for six months and three patients required surgery. The remaining seventy patients were analyzed, among them 45 (64.3%) were male and 25 (35.7%) female. The mean age of patients was 42.2 (+9.71) years. The duration of LBP was < 3 months in 37 patients and > 3 months in 33 patients. Single level disc prolapse was seen in 48 patients (68.6%) and multi-level disc prolapse in 22 patients (31.4%), with the commonest at L4-5, L5-S1.

Fifty patients showed symptomatic improvement after the first dose of ESI within two weeks while twenty required 2nd dose of ESI amongst which only six patients improved. The overall success rate was 80%. The gender and duration of LBP was not significantly related to the initial response. (table 1)

Table 1: Possible clinical outcome predictors for ESI at short-term follow-up

<table>
<thead>
<tr>
<th></th>
<th>Improvement (n = 56)</th>
<th>No Improvement (n = 14)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>42 ± 10.2</td>
<td>43 ± 7.54</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>39 (86.7%)</td>
<td>6 (13.3%)</td>
<td>3.5</td>
</tr>
<tr>
<td>Female</td>
<td>17 (68%)</td>
<td>8 (32%)</td>
<td></td>
</tr>
<tr>
<td>Duration of LBP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;3months</td>
<td>29 (78.4%)</td>
<td>8 (21.6%)</td>
<td>.129</td>
</tr>
<tr>
<td>&gt;3months</td>
<td>27 (81.8%)</td>
<td>6 (18.2%)</td>
<td></td>
</tr>
</tbody>
</table>

DISCUSSION

Low back pain is the fifth most common problem that leads patients to seek medical attention, comprising 2.8% of physician office visits in an analysis of the National Ambulatory Medical Care Survey data. The treatment of low back pain with radicular involvement has remained a matter of controversy because of multifactorial etiology and varying therapeutic modalities. Non-steroidal anti-inflammatory drugs, anti-depressant, parenteral steroids, transcutaneous electrical nerve stimulation (TENS), traction and ultrasound have been used alone or in combination but without any proved efficacy. ESI have been used for years in the management of low back pain. It is minimally invasive and effective treatment modality in many orthopaedic centers. Epidural steroid is found to be beneficial in prolapsed intervertebral disc, spinal canal stenosis and degenerative disc disease, where as in non-specific back pain, facet syndrome, metastatic and metabolic causes; it is found to have no benefit. Our study showed significant relieve of the symptoms after epidural steroid injection for low backache with radiculopathy. Fifty patients showed symptomatic improvement after the first dose of ESI within two weeks while twenty required 2nd dose of ESI amongst which only six patients improved. The overall success rate was 80%. Our findings support the studies
done by Swerdlow et al and Winnie et al. They reported the success rates ranging from 63% to 80%. Watts et al performed a meta-analysis of 11 placebo-controlled trials on the efficacy of injections in the treatment of sciatica (nine of the same trials were considered by Koes et al). A clinically relevant response to treatment was at least 75% reduction in pain. Watts et al concluded that epidural steroid injections are effective in the management of sciatica.

In 2005, the WEST study, a large multicenter trial of epidural corticosteroid injections for sciatica, was reported. Two hundred twenty-eight patients with unilateral sciatica of 1 to 18 months' duration were randomized to receive either three epidural steroid injections or three inter-ligamentous injections over a three-week period. At three weeks, those receiving epidural steroids demonstrated a significantly greater reduction in pain, but no difference between groups was seen from six to 52 weeks of follow-up monitoring. The authors concluded that epidural steroid injections afforded patients earlier relief of pain but no long-term decrease in pain or the need for surgery. In several studies patients were followed after ESI for periods ranging from weeks to one year, showed to be beneficial.

Different type of steroid have been used for ESI like hydrocortisone, betamethasone, triamcinolone and methylprednisolone. However none proved to be superior over another. We used methylprednisolone 80 mg as it has relatively long duration of action. Methyl prednisolone is well known for its anti-inflammatory properties and also stabilizes neural membranes, suppress ectopic neural discharges, and may have direct anesthetic effect on small unmyelinated nociceptive C-fibers.

Our study had a limitation that patients were not followed up for long time. There are several factors for varied results like patient selection, technique of injection, dosage of steroid and follow up. The use of an ESI has been debated due to its poor long term results for managing LBP. However, the patients experienced periodic aggravation of LBP even after relief by an ESI, the ESI has a role because it can control severe LBP at each episode. To avoid overuse of steroids, strict guidelines are necessary for the frequency or interval of ESIs. Therefore, the main role of the ESI is to relieve back pain sooner and help patients quickly return to normal activities.

CONCLUSION

We concluded that epidural steroid injections is effective in the conservative management of low back pain with radiculopathy as it facilitate earlier pain relief and return to normal activities.

REFERENCES:

An Audit of Management of Blunt Abdominal Injuries in Children: (5 Years single institutional study)

Muhammad Uzair FCPS (Paed. Surg)\textsuperscript{1}. Riaz Ahmed Khan Afridi (Plast)\textsuperscript{2}. Mussarat Hussain MBBS\textsuperscript{3} Mohammad Ishaq FCPS (Ortho)\textsuperscript{4}. Prof. M. Jahangir Khan FCPS(Paed. Surg)\textsuperscript{5}.

\textbf{ABSTRACT}

\textbf{Objective:} To know the frequency of different abdominal visceral injuries, preoperative clinical findings, per operative findings, postoperative outcome and role of non operative management in blunt trauma abdomen in children.

\textbf{Material and Methods:} This descriptive study was conducted in the paediatric surgery unit, Lady Reading Hospital Peshawar over a period of five years from January 2010 to January 2015. All paediatric patients with age range from 1 year to 13 years having blunt trauma abdomen were included in the study. Patients with penetrating trauma, open abdominal wounds, or burns were not included. All paediatric patients with history of blunt trauma abdomen irrespective of any etiology were admitted to emergency department. Demographic features, mode of injury, initial clinical presentation, investigation, non operative management, any surgical intervention, preoperative findings and postoperative outcome were noted in a predesigned Performa.

\textbf{Results:} A total number of 285 patients were managed during study period. Injury mechanisms were road-traffic-accidents (RTA) in 140(49\%), falling from height in 115(40\%), child abuse in 7(2.4\%) animal hitting in 15(5.2\%) and sports related injury in 8(3\%), 45(14\%) had laparotomy while 245(86\%) patients were treated by non operative management (NOM) . Associated extra abdominal injuries were encountered frequently, head injury in 7(2\%), chest injury in 11(4\%), upper limbs fractures in 13 patient (4.5\%), spine fracture with paraplegia in 3(1\%) patients, pelvic fractures in 16(5\%) patients, urethral injury in 21(7\%), lower limbs fractures in 24(15\%), and soft tissue injury in 65(23\%).

\textbf{Conclusion:} Blunt trauma abdomen is a major cause of morbidity and mortality in children, conservative management is safe option in majority of hemodynamically stable blunt trauma abdomen patients.

\textbf{Key Words:} Blunt trauma Abdomen, RTA (Road Traffic Accident), Non-operative Management (NOM).

\section*{INTRODUCTION}

Trauma is the number one cause of death in the pediatric age group\textsuperscript{1}. Blunt trauma comprises the vast majority of paediatric injuries worldwide\textsuperscript{2}. Following the head and extremities, the abdomen is the third most commonly injured anatomic region in children. Abdominal trauma can be associated with significant morbidity and may have a mortality rate as high as 8.5\%.

The abdomen is the most common site of initially unrecognized fatal injury in traumatized children\textsuperscript{3}. Motor vehicle-related injuries, whether as vehicle occupants, bicyclists or pedestrians are the most common cause of pediatric blunt abdominal trauma. Other mechanisms of blunt abdominal trauma include falls, sports, child abuse and recreation-related injuries\textsuperscript{4}.

Current strategies of non-operative management for most (90\%) blunt solid organ injuries developed out of the observation that most solid organ injuries would ‘heal themselves’ and that operative intervention could indeed interfere with this process\textsuperscript{5}. Appropriate NOM of injured children reduces the risks of blood transfusion and length of hospital stay compared with the surgical group\textsuperscript{6}.

The rationale of the current study was to determine the frequency of different abdominal visceral injuries, preoperative and per operative findings and role of non-operative management in hemodynamically stable blunt trauma abdominal injuries in children, to avoid non therapeutic laparatomies in hemodynamically stable patients.

\section*{MATERIALS AND METHODS}

This prospective descriptive study was conducted in Paediatric surgical department Post graduate medical institute Lady Reading Hospital.
An Audit of Management of Blunt Abdominal Injuries in Children

Patients with history of blunt trauma abdomen irrespective of any etiology were included in the study. Patients with penetrating trauma, open abdominal wounds, or burns were not included. A Total of 285 patients of either gender from 1 year to 13 years of age were enrolled in the study.

All these patients whose parents gave informed consent were admitted to paediatric surgical unit emergency department. On admission, all patients were assessed and resuscitated according to the ABCDE approach of the Advanced Trauma Life Support (ATLS) protocol. History of the mechanism of injury was obtained in all patients. All patients underwent abdominal ultrasonography, x ray abdomen erect and pelvis and in selected patients CT abdomen and pelvis were performed.

All these patients were subjected to serial physical examination by senior paediatric surgeons along with support of necessary hematological, biochemical and imaging studies. Patients were kept nothing by mouth along with nasogastric tube suction till the improvement of clinical condition of the patients i.e return of bowel movements, improvement in abdominal tenderness and passage of flatus or stools. Patients with hemodynamic stability were monitored by serial clinical examination and necessary investigation and patients with hemodynamic instability after intravenous fluid challenge and blood transfusion were subjected to laparatomy. Demographic features, clinical findings, investigation performed, peroperative findings were recorded in a predesigned Performa and statistical analysis were done by SPSS version 19.

RESULTS

A total of 285 patients were enrolled during study period. 190 (66%) were male patients and female were 95(33%). Age range was 1 year to 13 years, mean age was 7.83 years. Male to female ratio was 3.7:1. Similar findings were noted by several authors of male predominance (33%), male to female ratio was 3.7:1. Similar findings were noted by several authors of male predominance.

In our study mean age is 7.83 years, ranging from 1 -13 years. Boys were 190 (68%) and girls were 95 (33%), male to female ratio was 3.7:1. Similar findings noted by several authors of male predominance and age around seven years. RTA was the most frequent cause of injury in our study contributing.

<table>
<thead>
<tr>
<th>Etiology</th>
<th>n= 140</th>
<th>%age</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Road traffic accident(RTA)</td>
<td>140</td>
<td>49.12</td>
</tr>
<tr>
<td>a. Pedestrians</td>
<td>95</td>
<td>33.33</td>
</tr>
<tr>
<td>b. vehicle occupant</td>
<td>35</td>
<td>12.28</td>
</tr>
<tr>
<td>c. Bicyclist</td>
<td>10</td>
<td>3.50</td>
</tr>
<tr>
<td>2. Animal related injury</td>
<td>15</td>
<td>5.26</td>
</tr>
<tr>
<td>3. Sports related injury</td>
<td>9</td>
<td>3.15</td>
</tr>
<tr>
<td>4. Child abuse</td>
<td>7</td>
<td>2.45</td>
</tr>
<tr>
<td>5. Fall</td>
<td>114</td>
<td>40</td>
</tr>
<tr>
<td>Total</td>
<td>285</td>
<td>99.98</td>
</tr>
</tbody>
</table>

Table 2: Details of Abdominal visceral Injuries in 40 operated patients and operative procedure performed.

<table>
<thead>
<tr>
<th>Organs</th>
<th>N= 40</th>
<th>%age</th>
<th>Procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small intestine</td>
<td>18</td>
<td>45</td>
<td>Primarily repair</td>
</tr>
<tr>
<td>Liver</td>
<td>7</td>
<td>17.5</td>
<td>All repair</td>
</tr>
<tr>
<td>Spleen</td>
<td>5</td>
<td>12.5</td>
<td>1 Nephrectomy</td>
</tr>
<tr>
<td>Kidney</td>
<td>3</td>
<td>7.5</td>
<td>2 Repair</td>
</tr>
<tr>
<td>Bladder injury</td>
<td>1</td>
<td>2.5</td>
<td>Primarily repair over DJ stent</td>
</tr>
<tr>
<td>Bladder injury</td>
<td>1</td>
<td>2.5</td>
<td>Repair with suprapubic cystostomy</td>
</tr>
<tr>
<td>large bowel injury</td>
<td>3</td>
<td>7.5</td>
<td>Colostomy</td>
</tr>
<tr>
<td>Diaphragmatic Injury</td>
<td>2</td>
<td>5</td>
<td>Repair with chest tube intubation</td>
</tr>
</tbody>
</table>

DISCUSSION

Childhood trauma will be number one disease globally in 2020 as expected by the World Health Organization (WHO), who published their third World Report on Child Injury Prevention in December 2008. Abdominal trauma accounts for 8-10% of all trauma admissions to paediatric hospitals.

In our study mean age is 7.83 years, ranging from 1 -13 years. Boys were 190 (68%) and girls were 95 (33%), male to female ratio was 3.7:1. Similar findings noted by several authors of male predominance and age around seven years. RTA was the most frequent cause of injury in our study contributing.
about 49% of all blunt abdominal injuries followed by falls from heights (table 1), which is similar to Raza et al. Ultrasound/FAST was performed in all the patients as initial diagnostic tool, CT Abdomen was performed in selected patients (26%) who were hemodynamically stable but had persistent pain abdomen after 24 to 48 hours of observation. Other investigations urethrogram, MCU, cystogram, IVU and CT urography were also performed for doubtful urological injuries exclusion. Imaging findings and, peroperative findings were given in table 3. In current study small bowel injury was most frequent injury noted as compared solid organ injury. Similar findings were reported by Chirdan et al. But other Western and African studies contradict our findings, which show spleen and liver were the most frequent organ injured in blunt trauma abdomen. We cannot explain our findings on this basis because of nature of our road traffic accidents, mode of transport, poor condition of our rural and urban road networks, education of traffic rules, lack of awareness of safety measures i.e. seat belts, helmets, air bags which is very different from western countries and this largely effects the mode of road side accidents in our country and their consequences.

Non-operative management has become the standard of care for managing solid organ injuries, and is successful in more than 95% in appropriately selected patients. The failure rate of non-operative management is 5%. Nonoperative management was successful in 86% of our patients while 14% of the patients underwent laparotomy. Our results are comparable with other authors. Mohammad AG et al and Velhamos et al. Non therapeutic laparotomy was carried out in 5(1.7%) patients who had persistent symptoms of peritonitis and repeated investigation show no obvious pathology after 48 to 72 hours of observation by a dedicated trauma management team. The rate of non therapeutic laparotomy in patients with abdominal trauma has been reported in trauma literature to range between 7% and 40% (McFarlan, 1995; Leppaniemi et al, 1995; Musau et al 2006) The overall non therapeutic laparotomy rate in this study was 1.75% a figure which is significantly low compared with other studies Siddig & Ahmed, 2008; Suthar & Mewada, 2012 and Phillipo L et al 2013. This significantly low rate of non therapeutic laparotomy shows improvements in trauma care facilities in this level 1 trauma care centre, dedicated trauma care team with experience of dealing pediatric trauma patients for more than 20 years and availability of modern diagnostic and therapeutic facilities.

CONCLUSION

Blunt abdominal trauma remains a major threat to the health and well-being of children. Road traffic accidents contribute in majority of blunt abdominal injuries and a big source of morbidity and mortality, which can be prevented by adopting safety measures of driving and community awareness of road safety rules. The majority of blunt abdominal injuries to solid organs can be managed non-operatively, but surgical consultation should be obtained prior to committing this course of treatment. Serial examination and re-evaluation is mandatory by a dedicated pediatric trauma management team with considerable experience in dealing pediatric blunt trauma, while treating any injury non-operatively.

REFERENCES

Outcome of Ponseti Method in Correcting Neglected Idiopathic Club Foot upto 5 Years of Age

Umar Hayat FCPS¹, Abdus Samad Khan FCPS², Muhammad Siraj FCPS³

ABSTRACT:
Background: Efficacy of Ponseti method is well established in children up to 2 years of age. The success of this method in neglected cases and older children is not known.
Method: This study was conducted in orthopaedic department of Khyber Teaching Hospital, Peshawar from Jan 2012 to Jan 2015. We prospectively studied 14 children (20 feet) with idiopathic club feet and no history of any previous treatment. All the cases were treated by Ponseti method with few modifications. The mean age at presentation was 3.2 years (1.8 to 5).
Results: In 9 cases (12 feet) painless plantigrade foot was achieved with no need for any extensive soft tissue or bony procedures. Recurrent equinus was observed in 2 patients (3 feet) which were corrected by second tenotomy. Repeat castings were done in 2 patients (4 feet) who had recurrence of forefoot adduction. Posterior release for full correction of the equinus deformity was done in 4 patients (6 feet) who failed to correct fully after ponseti technique. One patient (2 feet) was lost to follow up.
Conclusion: We conclude that Ponseti technique is a safe and cost effective method even for the treatment of neglected cases of idiopathic club foot upto 5 years of age.

INTRODUCTION
Idiopathic club foot is a complex deformity of the lower limb and is the most common congenital anomaly of musculoskeletal system¹. This deformity consists of hind foot varus and equinus, midfoot cavus and forefoot adduction². Many different methods of conservative treatment are used most of which consist of manipulation and serial casting³-¹⁵. Kite method was the method of choice for many years in Brazil². This method proved to be ineffective due to prolonged treatment time and most of the cases ending up in extensive surgery because of incomplete or defective correction. Ponseti applied his technique for the first time in 1963, which was different from Kite¹. Ponseti method consists of corrective manipulations, special technique of serial casting and a possible Tendo-Achilles tenotomy¹⁶. The success rate of 86 to 93% has been reported with this method¹⁷. The purpose of this study is to evaluate the results of Ponseti technique in children presenting after walking and up to 5 years of age with no previous treatment.

PATIENTS AND METHODS
This study was conducted in orthopaedic department of Khyber Teaching Hospital Peshawar from Jan 2012 to Jan 2015. The inclusion criteria were children from 18 months up to 5 years having idiopathic and untreated clubfeet. Syndromatic, paralytic and previously treated club feet were excluded from the study. A total of 14 patients (20 feet) presented. An informed consent was taken from the parents after fully explaining the procedure and its follow up protocols. The Pirani scoring criteria was adopted during follow up visits (table 1)¹⁸.

The Pirani scoring was noted before 1st cast and then subsequently on each follow up visit. The Ponseti method with few modifications was applied. The foot was abducted 30 to 40 degree instead of 70, as recommended for younger children¹⁹. Corrective manipulations were performed for 5 to 10 minutes and long leg cast was applied for one week. At the end Tendo-Achilles tenotomy for correction of equinus was performed under local anaesthesia in clinic if the Pirani score was 0.5 or more. In some feet with incomplete correction simple posterior release was performed to obtain satisfactory alignment of the forefoot and mid foot. Due to problems of compliance for Denisbrown splint in few cases we limited its use to night time and advised ankle foot orthosis to wear during day time for 6 to 12 months (mean 7 months).

Following variables were evaluated in each patient:
1. Age of the child at the first visit.
2. Total number of casts required for correction.
3. Pirani score of each foot at each visit.

These variables were related to the incidence of relapse and the need for further extensive corrective surgery.

RESULTS

There were 9 (64%) male and 5 (36%) female with mean age at presentation from 1.8-5 years. The mean follow up was 22 months (15 to 36). One patient (2 feet) was lost to follow up. All of them presented severe deformities with Pirani score in the range of 4-5. Full correction of the deformity was obtained with mean of 11 casts (8 to 13). The mean time of immobilisation was 13 weeks (10 to 17). Percutaneous tenotomy of Tendo-Achilles was done in all the patients. Mean dorsiflexion achieved after tenotomy was 5° (0° to 15°). Healing of Tendo Achilles was allowed to occur in cast for three weeks.

Table 1: Pirani scoring

<table>
<thead>
<tr>
<th>Parameters in mid foot</th>
<th>mild</th>
<th>moderate</th>
<th>severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curved lateral border</td>
<td>0</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>Medial crease</td>
<td>0</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>Talar head coverage</td>
<td>0</td>
<td>0.5</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parameters in hind foot</th>
<th>mild</th>
<th>moderate</th>
<th>severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Posterior crease</td>
<td>0</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>Rigid equinus</td>
<td>0</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>Empty heel</td>
<td>0</td>
<td>0.5</td>
<td>1</td>
</tr>
</tbody>
</table>

Minor complications occurred in 4 feet (20%) in 4 patients i.e. swelling of toes, erythema and skin bruising.

No major complications like infection, neurovascular compromise or profuse bleeding after tenotomy were observed. Healing of Tendo Achilles was normal in all the patients.

Three feet (15%) in two patients had recurrent equinus for which second tenotomy was done. Four feet (20%) in two patients had recurrence of forefoot adduction which was treated by casting successfully. In six feet (30%) of four patients there was residual hind foot deformity which was corrected by Tendo-Achilles Z-plasty, posterior ankle and sub-talar capsulotomy. Medial release was not required in any case.

DISCUSSION

There is a wide range of treatment options to manage neglected idiopathic club feet i.e. extensive soft tissue releases, application of different types of external fixators, osteotomies and triple arthrodesis.

In our study, good to excellent results were noted in 75% of cases without any extensive procedure as compared to 89% of Shingade et al. after extensive soft tissue and bony procedure. Results of Yagmurlu et al. (2011) closely justify our observation, 31 feet (27 patients) with mean age 2 (1-6) years were treated with Ponseti method. They concluded that Ponseti is effective in the management of clubfoot even after walking age although the treatment may be less effective but surgical procedure if required would be much less extensive.

Although the study population was a bit younger than our study, Tindall et al. 2005 showed good results in 98 of 100 feet. Spiegel et al. (2009) avoided extensive soft tissue procedures in 94% of 260 feet. In contrast to our study they changed cast on weekly basis which need to be studied further.

Our findings also correlated to Verma et al. (2012) from India. All the patients in their study had satisfactory outcome although the study group was younger than ours. Our findings closely resemble the results of Laurenco et al. (2007) in which 16 feet (67%) were made painless and plantigrade without any extensive soft tissue procedure. They achieved only 40 degrees of abduction in the older group, which was our observation as well.

Extensive soft tissue and bony procedure although considered the standard treatment for neglected clubfoot is associated with significant rate of complications. The Ilizarov technique is considered a salvage procedure for the treatment of recurrent and neglected club foot. This technique is time consuming, costly and associated with complications. In our study major cosmetic improvement was observed in all the cases and they were able to wear normal shoes. About 75% of cases had painless plantigrade foot with no need for further extensive surgery.

The results of our study strongly recommend Ponseti technique for the correction of this neglected deformity as it is simple, cost effective and can easily be adopted in developing countries with limited resources. However further studies with large sample size and long follow up are required to establish the efficacy of this technique in our population.

CONCLUSION

We conclude that Ponseti technique is a safe and cost...
effective method even for the treatment of neglected cases of idiopathic club foot up to 5 years of age.

REFERENCES
Effectiveness of Maitland’s Mobilization vs. Mulligan Mobilization in Patients with Cervical Radiculopathy  
(A double blinded randomized clinical trial)

Abdus Samad Khan FCPS¹, Umar Hayat FCPS², Rabia Basri DPT (Physio)³, Anashia Aftab DPT (Physio)⁴

Objective: To compare the effectiveness of Maitland’s and Mulligan mobilizations in patients with cervical radicular pain.

Introduction: There is an increasing interest in the potential benefits of joint mobilizations along with neuro-dynamic and exercise therapy for curing short term neural pain from cervical region. Different types of joint mobilizations yields better results however comparative effectiveness is uncertain. Our aim was to systemically evaluate the comparative effects of two different types of mobilizations for neural pain and function related to cervical spine. Ethical approval obtained from ethics committee of Fauji Foundation Hospital Peshawar.

Material & Methods: Double blinded randomized clinical trial at Fauji Foundation Hospital was studied. Sixty subjects with sub-acute neck pain were included for 2 weeks. Participants were randomly allocated to two groups, control n=30 and experimental n=30. Subjects in the experimental group received Mulligan joint mobilizations and subjects in the control group received Maitland joint mobilizations. Visual analogue scale (VAS) for pain and neck disability index (NDI) for function was main outcome measures.

Result: There was positive effect of both types of treatments on all outcome measures. There was significant difference between group A and group B adjusted to baseline values after 2 weeks of treatment according to neural pain (p<0.00) and Oswestry neck Disability Index being (P <0.00)

Conclusion: Mulligan mobilization along with neuro-dynamics is more effective as compare to Maitland mobilizations along with neuro-dynamics for short term relief in cervical radiculopathy.

Key words: Mulligan joint mobilization, Maitland joint mobilization, cervical radicular pain.

INTRODUCTION

Cervical radiculopathy results from compressive or inflammatory pathology at the level of cervical nerve roots caused by space occupying lesions such as cervical osteophytes, disc herniation and spondylosis¹,². Having an incidence of 83 per 100,000 persons the prevalence rate is expected to rise due to modern age sedentary lifestyles and increased use of computer technology at work places³,⁴. In cervical radiculopathy fifth decade is the most commonly affected age group and involve C6, C7 nerve roots more frequently¹⁵.

Conservative treatment for cervical radiculopathy has shown promising results. Treatment options include therapeutic exercises, manual therapies, modalities (IFT, TENS), massage therapy and medications ²,⁴,⁶,⁷.

The Maitland concept is the process for evaluating, analyzing, investigating and treatment of musculoskeletal disorders through manipulative physical therapy⁴. Maitland’s mobilization technique involves the application of passive and accessory oscillatory movements to spinal and vertebral joints to treat pain and stiffness⁷. These movements are graded 1 to 5 depending on the condition of the patient. Stretching techniques are also prescribed in Maitland technique to treat muscle spasm ¹⁰,¹¹.

Mulligan Mobilizations along with neuro-dynamics is more effective to the Maitland Mobilization for the treatment of cervical radicular pain and function related to neck movements.

Mulligans Mobilization with movement is nowadays getting high reputation in the treatment of musculoskeletal problems. Mulligan in 1993 called it a manual treatment where force is applied in the form of glides in the position of function and it’s applicable in the situations where the patient reports pain with any specific movement¹²,¹³,¹⁴. Mulligan mobilizations reduces pain and improves functionality in many musculoskeletal condition. Mulligan technique involves mobilization of the spine in weight bearing position, directing the mobilization parallel to the spine facet planes. In this technique spine mobilization is combined with movements of the peripheral joints to
Effectiveness of Maitland’s Mobilization vs. Mulligan Mobilization in Patients with Cervical Radiculopathy

Pronaterteres syndromes etc.

1. Visual analogue scale (VAS): A numerical measurements:

Outcome criteria: Painful cervical facet at or below C5 on examination and distraction test were positive, at least one Painful cervical facet at or below C5 on examination and positive upper limb nerve tension test.

Exclusion criteria: Patients of both sexes, age 35-55 years with sub-acute neck pain radiating unilaterally (more than 3 days and less than 3 weeks), Sparling and distraction test were positive, at least one Painful cervical facet at or below C5 on examination and positive upper limb nerve tension test.

Outcomes criteria: Patients with severe muscle spasms, patients with abnormal cervical spine curvature, associated radial or ulnar nerve radiculopathy, patients who cannot lie prone for Facet Mobilization e.g. pregnant female patients with reflective medical conditions e.g. Rheumatoid arthritis, Ankylosing spondylitis etc, radicular pain due to Carpal tunnel, Pronaterteres syndromes etc.

Outcome measurements:

1. Visual analogue scale (VAS): A numerical standard scale for grading pain intensity. VAS reported to be reliable in determination of acute and sub-acute pain in musculoskeletal conditions.21,22

2. Neck disability index (NDI): NDI is modification of the Oswestry low back pain index (OLBP) and is a 10-item scaled questionnaire which is used for evaluating functional activities related to neck movement. NDI achieved a high degree of internal consistency and reliability23.

The patients were diagnosed by orthopedic surgeon according to standard diagnostic criteria. The patients were given informed consents. All patients were evaluated according to study inclusion and exclusion criteria. The data for VAS and NDI was taken by the orthopedic surgeon and then patients were assigned by him into 2 groups randomly by computer generated sequences. The patients were given a closed envelop with written treatment options that was either Mulligan or Maitland joint Mobilizations and referred to the physiotherapist. The rest of exercise plan, ergonomics and precautions were same in both groups.

The subjects in Group A were given neuro-dynamics with Maitland joint mobilizations and subjects B was treated Neuro-dynamics with Mulligan mobilization. Both therapist and patients were blinded in this study.

Group A: this group received Maitland joint mobilizations of transverse glides, Unilateral posterior anterior glides was used with 3 sets, 30 repetitions on symptomatic facets. The facets targeted were C5, C6, C7, and C8.

Group B: This group received Mulligan mobilizations. A total of 20 oscillations (1 oscillation / one second) were given with a total duration of 15 min. The Facets targeted were C5, C6, C7, and C8.

RESULT

The Mean Age of the patients was 48.9±5.76 in group A and 48.8 ± 5.62 in group B. The sample constituted of n=13 men, n=17 women in group A and n=15 men, n=15 women in group B. Using t-test for the two independent groups, the age difference was not found statistically significant at alpha .01 levels. Graph in figure 1.1 shows t-test statistics for both groups after treatment.

The mean of VAS for group A and B after treatment was 3.3±1.18 and 2.7±1.11 respectively; similarly the mean for NDI for group A and B after treatment was 8.6±1.31 and 6.6 ±1.21 respectively. The mean difference for VAS between groups (group A and B) was 14.26 with 95% CI that was statistically significant P value <0.00. Similarly the mean difference for NDI between groups (group A and B) was -3.33 with 95% CI, that was also statistically significant P value <0.00.
Effectiveness of Maitland’s Mobilization vs. Mulligan Mobilization in Patients with Cervical Radiculopathy

The development of the excursion, strain and stress through movements always take place at the right angles to justifiable with rationale that in Mulligan mobilizations, the movement favors toward Mulligan mobilizations is therefore far better efficacy of Mulligan to Maitland mobilization. While analyzing outcome measures of current study, it was noted that both groups have shown clinically significant improvement, but the difference found in favors of group B was statistically significant as illustrated above in results. This is in agreement with literature which suggested that mobilizations reduces pain due to neuro-physiological effects on mechano-receptors and inhibition of nociceptors, while the mechanical force during mobilization may include breaking up of joint adhesions, realigning collagen fibers and increasing the fiber parts. Previously a study done by Varshaet al compared Maitland to Mulligan mobilizations in patients with Colles fracture and they concluded that Mulligan mobilization could be used effectively when pain predominates while Maitland could be effectively used when pain is not a major concern. Similar comparative studies conducted by Kazmi SAM et al on adhesive capsulitis and Rajesh Gautam et al on patients with non-radiclarcal cervical pains also reported far better efficacy of Mulligan to Maitland mobilization. The favors toward Mulligan mobilizations is therefore justified with rationale that in Mulligan mobilizations, the movement always take place at the right angles to the plane of joint movement, only in one directions, neural tissue therefore reposed to movements through the development of the excursion, strain and stress in the non-uniform motions, thus the movement associated with Mulligan mainly considered the reason for improving neural pain.

This study is carried out on sub-acute radiating neck pain; the finding of this study is only applicable to this category. The sample size of the current study did not allow for subgroup analysis of the effects of mobilizations on patients of different genders and on different age groups, the literature also lack findings on that aspect. Like most of the other studies, current study also evaluated for short term benefits of mobilizations in cervical pathology, future studies are therefore needed to address these limitations by taking large sample size with various phases of cervical pain along with evaluation of long term effects of such interventions.

CONCLUSION

The study suggested that Mulligan Mobilizations along with neuro-dynamics is more effective to the Maitland Mobilization along with neuro-dynamics for the treatment of cervical radicularch pain in terms of pain and function related to neck movements.

REFERENCES


Figure 1: VAS post treatment for Group A and B NDI post treatment for Group A and B
Effectiveness of Maitland’s Mobilization vs. Mulligan Mobilization in Patients with Cervical Radiculopathy


19. Dr. Mayur Solanki (M. P. T) 1, Dr. Chandni Shah (M. P. T) "Effectiveness of Mulligan Mobilization versus Neural Mobilization in Patients with Cervical Radiculopathy". 2319-7064 Index Copernicus Value (2013)


ABSTRACT:

Objective: To study cases of acute febrile illness with positive malaria parasite (MP)in children coming to OPD at THQ Hospital Katlang.

Background: Many children visit OPD with acute febrile illness mostly suffering from Malaria, which is one of the most killer diseases in the world. It kills over a million each year. Majority of these deaths are in children.

Study Design: Descriptive

Material and Method: This is hospital based study conducted at T.H.Q Hospital Katlang from January 2010 to December 2012. Data was analyzed and results were presented as charts and tables.

Results: Eight (n=800) hundred Patients(n=500 males and n=300 females) with acute febrile illness were examined. Five hundred (n=500)patients were clinically suspected as malaria in OPD randomly. They were advised routine tests and thin smears for malaria parasite and its specie. Malarial parasites were seen in n=180 (30%) cases. Plasmodium vivax was seen in majority cases n=164 (91.1%) cases. Plasmodium Falciparum was seen in cases n=14 (7.7%) cases. Two cases n=2 (1.1%) were mixed infections. There was no case of Plasmodium malaria or ovale. All the patients were treated in outpatient and all improved with treatment.

Conclusion: Eight hundred patients were examined. Five hundred patient n=500 were clinically suspected as malaria. Out of 500 cases 180 (36%) cases were malaria parasite positive. Plasmodium vivax was the predominant specie in this study.

Keywords: Malaria, febrile illness.

INTRODUCTION

Many children present with acute febrile illness are viral or bacterial but malaria is one of the main causes in this part of the country. Malaria has played a major role in human history causing harm to more people than perhaps any other infectious disease. Malaria has overwhelming importance in developing world today, with estimated 300 to 500 million cases and more than 1 million deaths each year. Most deaths occur in infants and children. Plasmodium vivax is the predominant specie in Africa, Haiti and New Guinea, Plasmodium ovale is the least common and is transmitted mainly in Africa. Ratio of Vivax to falciparum is 60:40 for the whole country. The incidence of Falciparum increases as one goes towards south, in some areas the ratio of vivax to Falciparum is 20:80.

The slide positivity rate is 2.5 % for all Pakistan but in some village up to 60 % especially after floods. Falciparum has 30% resistance to Chloroquine and in some areas as high as 80-100%and it is of R1 and R2 and R2 type. Some plasmodium resistance to Fansidar and Halfan has also been reported in Afghanistan Plasmodium Vivax is the commonest type (85%) of all cases. The integrated management of child illness (IMNCI) promoted by the World Health Organization (WHO) and UNICEF is a strategy for identification and management of childhood illness from 1 Week to 5 years at primary care level. It will greatly improve child heath. The new born less than 1 month are protected from malaria by maternal immunity. The WHO in collaboration with World Bank and UNICEF launched roll back malaria strategy with millennium development goals in 2000. The aim was to control malaria cases up to 50% by year 2010 in Pakistan. Early diagnosis and treatment is major roll back malaria (RBM) strategy to control malaria. For diagnosis microscopy is the standard procedure. Malaria is a curable disease provided the treating physician can suspect and diagnose it early.

WHO recommends that if a child in a malarial area has fever but it is not possible to confirm it with blood smear, treat the child as for malaria, keeping the above facts in mind the present study was conducted. Objective of the study: It was to identify malaria parasite and its specie in children with acute febrile illness coming to children OPD at T.H.Q Hospital Katlang.

Plasmodium vivax is the predominant specie in the area of Mardan District of KPK. They respond well on oral chloroquine therapy and get immediate response.

MATERIAL & METHODS.

It was a hospital based study conducted at T.H.Q Hospital Katlang, Distt Mardan. This hospital
is 40 bedded hospital, having four children specialist in Medicine, Surgery and Gynecology. This hospital receives patients from Swat and Bunair to Shankiari near Mardan.

Patient from one month to 16 years who had acute febrile illness, fever, vomiting loose, motion, convulsions and cough were included in the study. Patients who had other disease like enteric fever, UTI, GE, Pneumonia, were excluded from this study. Routine laboratory test like hemoglobin level, compete blood count, blood sugar level were done in all cases. Identification of malaria parasite and its specie was done on thick and thin films. Peripheral smear was stained with Giemsa stain at laboratory of T.H.Q Hospital Katlang and in few cases at a registered private laboratory. Patient was treated in the outpatient and was put on chloroquine 10mg /kg stat, 5mg /kg after 6 hour and then OD for 2 days.

Falciparum and mixed cases were put on ACT (as advised by WHO), patient were also given supportive treatment in the form of cold sponging, fluids, and antipyretics where ever needed. Data regarding age, sex, malaria parasite parasite was analyzed and the results expressed and presented as shown in tables, charts and graphs. Permission from EDO (Health) Mardan was also obtain to undertake this study.

**RESULTS**

Eight hundred patients including 500 males and 300 females children with acute febrile illness were examined. Majority of patients were between 2-10 years of age. Mean age was 8 years. More male children were affected than female children. Malaria parasite were seen in 180 (36%) patients with acute febrile illness. Out of these 180 cases 164 (91.1%) were vivax and 14 (7.7%) were falciparum. Two cases (1.1%) were mixed malarial cases.

Plasmodium vivax was the predominant specie in this study. The Falciparum specie increases as one goes towards the south of the country. No case of Plasmodium ovale or Plasmodium malariae was reported in this study.

<table>
<thead>
<tr>
<th>Total patients examined with acute febrile illness.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
</tr>
<tr>
<td>500 Cases</td>
</tr>
</tbody>
</table>

**Acute febrile illness with positive M.P.**

<table>
<thead>
<tr>
<th>Plasmodium vivax</th>
<th>Plasmodium falciparum</th>
<th>Plasmodium ovale</th>
</tr>
</thead>
<tbody>
<tr>
<td>164 (91.1%)</td>
<td>14 (7.7%)</td>
<td>Nil</td>
</tr>
</tbody>
</table>

**DISCUSSION**

Pakistan is one of moderately endemic countries for malaria. There is variation in prevalence form area to area. It affects all age groups even neonates. Finding malaria parasite in a blood smear is the gold standard for diagnosis of malaria. Determination of specie of malaria is also important as resistance to chloroquine and other drugs have been reported. In our study of 180 positive cases majority (70%) were 3 to 4 years. Similar pattern was seen in the study of Junejo A.A et al and Aijaz M etal. Majority (60) of patients were between 2 to 10 years. This could be due to high mobility and more exposure to mosquitoes at this age period.

There was male predominance in our study. Male were 500(62.5) and female were 300(37.5). Male predominance was also reported by Hozhabris etal. This could be because of the fact that male babies are given preference over female children and are brought to hospital for treatment. In this study malarial parasites were positive in 180(20%) cases that were clinically suspected as malaria. It was little lower than that reported from Baluchistan where malarial parasites were seen in (34.2%) cases. This could be because of the fact that our laboratory is of T.H.Q Hospital and there is only one malarial supervisor at the hospital. In this study Plasmodium vivax was the predominant specie 164(91.1%) in comparison to falciparum 14(7.7%).

This is opposite to studies from western part of the country where Junejo et al reported Plasmodium falciparum predominance (58.9) over vivax (41.09%). Yasin Zai and Kakarsulenam Khel J K also reported falciparum predominance (71.7%) over vivax (28.2%). Similarly Akbar Ju in his study has reported falciparum predominance (65%) over vivax (35%). The vivax predominance in our study is in keeping with Shaukat Raza who stated that the ratio of vivax to falciparum is 60:40 for the whole country.

The falciparum specie increases as one goes towards the south of the country. No case of Plasmodium ovale or Plasmodium malariae was reported. In our study other studies done locally have not reported any case of Plasmodium ovale or malariae. For example the studies done by Murtaza et al and Nizamani A, et al did not report any case of Plasmodium ovale or malariae.

**CONCLUSION**

Eight hundred (800) cases of acute febrile illness were examined. Five hundred cases of acute febrile illness were suspected to be suffering from malaria. Out of these 500 cases 180(36%) were found to be malaria parasite positive with predominance of vivax 164(91.1%). This indicates that Plasmodium vivax is the...
predominant specie in this part of the country. All vivax malarial patients were put on oral chloroquine. All these patients improved indicating that chloroquine is effective in plasmodium vivax infection.

**Recommendation:** Malaria usually presents as acute febrile illness in children. Many of these patients are having malaria. Plasmodium vivax is the predominant specie of malaria in this part of the county. Patients should be put on chloroquine in acute febrile illness, in endemic area. Where no other cause for the fever is found, chloroquine is mandatory as a prophylactic in all suspected cases in that area.

**Acknowledgement:** I am thankful to Mr Akhtar Naem laboratory technician and Sartaj khan. Malaria Supervisor T.H.Q Hospital katlang for helping in data collection. I am also extremely thankful to the staff of children ward for helping patients and Health inspector Feroz Din Senior Technician for typing this study.

**REFERENCES:**

3. Malaria in; DR Maltelvon Blum Roder (ed) practical paediatric guide; the international assistance mission (IAM), Kabul, Afghanistan;1999,23
4. Brain Coulter, Tropical Paediatric Medicine, Mortality in; Dr Jim Beattey, Professon Robert Carachi (eds) Practical paediatric Problem, A Text book for MRCR , Hodder Arnold;2005,629
6. Roll back malaria Programme DGHS NWFP, Global situation, NWFP. Govt .pk/ health /reports/ roll back malaria.
8. Malaria, Treatment; in; Pushpendramangon (ed) Revision classes in paediatrics; Jaypee , 2008,260
12. Aijaz MS, Murtaza Lo, Ahmad IR, Zehrah, Frequency of Malaria in children with acute febrile illness, a hospital based study, medical channel 2010, 16(1), III-3.
ABSTRACT

Objective: To evaluate the results of aggressive approach in the treatment of complicated appendicitis in children.

Material and Methods: This study was conducted on pediatric patients with complicated appendicitis at the department of Paediatric Surgery, Medical Teaching Institute, Lady Reading Hospital Peshawar from January 2016 to December 2016. After clinical examination, relevant investigations and primary assessment those children with proven diagnosis of complicated appendicitis were included in this trial. After admission and primary resuscitating, patients kept NPO at least for 6 hours, antibiotic therapy was initiated and laparotomy through right transverse incision was performed under general anesthesia. In this approach there is no need for further treatment, waste of time, performing final treatment in one stage.

Control of infection and not to let the pus spread in peritoneal cavity is the prime requirement.

Results: Among 70 children with acute complicated appendicitis, male to female ratio was 4:1 and age range was from 3 years to 13 years. Through upper right transverse incision 42 cases were operated and 28 cases by lower right small transverse incision. The most common final diagnosis was appendicular abscess, observed in 40 patients. Primary wound closure was performed in all 70 patients and placement of drain in peritoneal cavity in right lower quadrant was done only in 3 cases with wound infection and 4 cases with chronic abdominal pain that were managed conservatively. Only one patient was re-admitted and underwent re-laparotomy because of bowel obstruction.

Conclusion: According to our findings the current non-operative approach to complicated appendicitis in children needs a revision.

Key Words: Paediatric, Appendicitis, Complicated, Management.

INTRODUCTION

Acute appendicitis, the term is attributed to Fitz [1], it is the most common surgical condition of the abdomen. 250,000 cases are diagnosed annually in the United States and there is widespread geographic variation in the incidence of appendicitis and there is a reasons that are not entirely clear [2]. However, the total number of appendectomies performed has decreased, which is apparently secondary to an increase in non-surgical management and improvement in diagnostic techniques [3]. Male to Female ratio is 4:1 and is most common in the teen and twenties [4].

The lifetime risk for appendicitis is 8.6% for males and 6.7% for Females [5]. Although the disorder is uncommon in infants and the elderly, these groups have a disproportionate number of complications because of delays in diagnosis and the presence of co-morbid conditions. Appendicitis is less frequent in third-world countries [6], and those with acute suppurative appendicitis can expect an uneventful recovery with a short hospital stay, while those with perforated or gangrenous appendicitis are fraught with potential complications like infections.

Early referral from primary health care centers, proper diagnosis, aggressive resuscitation and prompt surgical intervention by paediatric surgeon is necessary to save the child from complication. There is a limited need of peritoneal drain and limited lavage of N/saline in children. Primary wound closure and post-operative N/G tube for 24-48 hours is desired to reduce the paralytic ileus. Expansion the paediatric surgery services in the periphery is the need of the hour.

Racial and seasonal difference are noted, with appendicitis being more common in whites communities seen during the summer months and controversy as to the optimal treatment of complicated appendicitis [8,11]. However, regardless of where and with what frequency it occurs, appendicitis remains an enigma - a simple disease that, despite best efforts, remains the most commonly misdiagnosed surgical emergency. Although diagnosis and treatment have improved, appendicitis continuous to cause significant morbidity and still remains, though rarely, a cause of death. Common complications of acute appendicitis
include: localized peritonitis, abscess formation, flegmon and general peritonitis. Peritonitis mandates urgent surgery but flagmon/ mass is managed by conservative approach and antibiotic therapy for couple of days till clinical and para clinical signs subside and they would undergo delayed surgery for appendectomy two months later. In this approach patients have to be admitted in hospital again. Those who advocate this approach, suggest that appendicectomy is not feasible in the presence of severe inflammation. So in this article we aimed to evaluate the results of aggressive approach in treatment of complicated appendicitis in children and tried to perform the final intervention in acute inflammatory face at the time of admission and evaluate the complication in follow up period.

**MATERIAL & METHODS**

In this prospective study, the results of the new approach for complicated appendicitis in children was immediate laparotomy and appendectomy with management of complicated situation by irrigation and lavage of peritoneal cavity or drainage was evaluated and proforma were filled out for each case.

The advantages of this method include no further treatment or re-admission, time and cost saving, shorter hospital stay, fewer hospitalization induce complications such as nosocomial infections, prevent missing cases and performing final treatment in one stage, local control of infection and not to let the pus to spread in peritoneal cavity.

*Disadvantages of method:* It includes safe appendectomy may not be feasible, operation in inflamed and contaminated field may lead to infectious complications such as intra abdominal abscess or wound infection, and bowel laceration.

After clinical examination and primary assessment those children with proven diagnosis of complicated appendicitis were included in this trial. After admission, in paediatric surgery ward and primary resuscitation, patients were kept NPO for at least for 6 hours and antibiotic therapy was initiate, laparotomy through right transverse incision was performed under general anesthesia. First the infected and inflamed area was walled off by abdominal pads and if the inflammation was localized to the right lower quadrant we did not extend the incision and only local irrigation of right lower quadrant and pelvic cavity was performed. Complete irrigation was done in the presence of generalized peritonitis. If there was a severe omental adhesion, partial omentectomy was done to prevent further deserosation.

* Tying the omentom was done by silk strings. Appendix and inflamed tissues were exteriorized into the out of abdominal cavity if possible and appendectomy was done out of the abdominal cavity. Omental and visceral wall were broken down gently by finger fracture method and a safe appendectomy was done and drain was placed and primary wound closure was on the basis of surgeon,s judgment. If there was a fine deserosation it remain intact but large deserosation were repaired by using 4-0 silk.

Finally patients were followed in the ward during post operative days and also as outpatients and they were evaluated for early and late complications for at least one month. Information were collected according to our check list/ proforma and also by direct calling to the families by phone.

**RESULTS**

Among 70 children with acute complicated appendicitis 54 patients were male and 16 patients were female age ranged was from 03-13 years. Sonographic evaluation was also formed in 40 cases out of 70 and reports in U/S evaluation were inflammatory mass (19), collection of abscess (08) cases, gangrened appendicitis (07). The most common pre-operative diagnosis at the time of admission according to clinical finding in physical examinations and para-clinical findings such as blood counts and sonography was appendicular abscess that was observed in 40 cases.

Lapratomy was performed through upper right transverse incision in 42 patients and by lower right small transverse incision in 28 patients. Primary wound closure was performed in all 70 patients. Placement of drain in peritoneal cavity in right lower quadrant was done in 14 cases. The most common antibiotic combination which was prescribed in our patients was cephradine+amikacin+metronidazole and in some patients ceftriaxone, ampicillin and gentamicin were also used. Post-operative antibiotics therapy was etended from 2-5 days. Hospital stay was 2-5 days. Safe appendectomy was performed in all 70 cases and postoperative complications were evaluated during few post-operation days in the ward and also as outpatients in long term follow up.

Early complication consist of 6 cases with wound infection that were managed by drainage and irrigation. Chronic abdominal pain was reported in 4 cases during long term follow up that were managed conservatively and only one patient was re-admitted and under went re-laparotomy because of bowel obstruction.

**DISCUSSION:**

The treatment of appendicitis has been continuously refined over 100 years ever since described by Fitz in 1886. The most significant advances was attributed to early diagnosis, antibiotics,
improvements in surgical and anesthetic techniques. The mortality has been reduced to nearly 0% in recent series of children[12,15].

The management of acute appendicitis with immediate appendectomy has been well established and is certainly an acceptable approach in all cases with a well described and expected morbidity and mortality [16]. However, the operative procedure can be much more challenging and potentially dangerous when performed for appendicitis with a large inflammatory mass or abscess is present. Appendectomy is a primary approach in these complicated cases. While signs and symptoms such as peri-umbilical pain relocation to McBurney’s point, tenderness with peritoneal signs, and anorexia help make the diagnosis of acute appendicitis, children often can not relate these symptoms accurately and their physical examination can be challenging and even misleading [17,18]. These difficulties can lead to appendicitis being misdiagnosed are simply over looked and these children often present at a more advanced stage of disease with perforation. If the disease continues to progress a phlegmon or well defined abscess can result.

The optimal treatment of appendicitis at this advanced stage is not well established. Older reports can be found in the literature that advocated non operative therapy in children with delayed appendectomy [19,20]. However, these studies suffered from a relatively high number of patients who failed non operative management, eventually requiring primary appendectomy. Comparing these studies hospital stay and duration of antibiotics therapy are longer in these methods compared to our cases and according to the literature as children can not localize infected process by omental and visceral wall as good as adults, so non operative management may lead to peritonitis in a greater proportion, more recently, some authors have advanced immediate appendectomy in cases of complicated appendicitis [21] although this approach can certainly be technically challenging in the presence of a large peri-appendiceal inflammatory mass or abscess. Others have advocated delayed appendectomy in selected populations [22,23]. Among 70 children with acute appendicitis male to female ratio was 4:1. Minimum age was 3 years and maximum age was 13 years.

The initial diagnosis according to clinical findings in physical examination was appendicular abscess that was observed in 40 cases. In Roach study among 360 who had evidence of perforation, 92 had an intra abdominal abscess or right lower quadrant phlegmon [12] the most common final diagnosis was appendicular abscesses that was observed in 40 patients. The most common antibiotic combination before surgery which was prescribed in our patients was cephradin+amakacin+meteronidazole.

In Pearl study, the most common pre and post operative antibiotic in those with perforated appendicitis were ampicillin/gentamicin/clindamycin or flagyl 41%, cefoxitim 34 %, or unasyn in 15% . finally in our study safe appendectomy was performed in all 70 cases and post operative complication included 6 cases with wound infection and 4 cases with chronic abdominal pain that were managed conservatively.

Only one patient was readmitted and underwent re-laparotomy because of bowel obstruction. Using the silk for omentectomy was not accompanied by any complication although they were used in infected area. So as primary conservative treatment and delayed appendectomy needs at least two periods of hospital admission, longer antibiotic therapy and sometimes treatment failure that will lead to operative intervention , and primary aggressive approach to complicated appendicitis which was accompanied with acceptable results and complications, we suggest primary operative approach and a safe appendectomy in complicated appendicitis in children.

CONCLUSION

Since there is no paediatric surgical set up in the periphery, most of these patients are mismanaged. The following grid lines are recorded.

1. Early referral from primary care health.
2. Proper diagnosis, aggressive resuscitation and prompt surgical intervention by paediatric surgeon.
3. Limited need of peritoneal drain in children.
4. Limited lavage of N/saline in children.
5. Primary wound closure.
6. Post-operative N/G tube for 24-48 hours to reduce the paralytic ileus.
7. The government should expand the paediatric surgery services in the periphery.

REFERENCES

1. Fitz RH Perforating inflammation of the vermiform appendix, with special reference to its early diagnosis and treatment. Trans Assoc AM Physicians (1886); 107-44.
6. Becker T, Kharvanda A Bachur R. Atypical clinical features of
Management of Complicated Appendicitis in Children


Comparison Between two Different Modes of Central Venous Catheterization in Patients Undergoing Cardiac Surgeries

Nasreen Laiq, FCPS (Anaes)1 Shahid Khan, FCPS (Anaes)2 Abdul Malik, FCPS (Cardiothor-Surg)3

ABSTRACT:
Objective: To observe the rate of complications and ease of insertion between two different modes of central venous catheterization in patients undergoing cardiac surgeries.

Material and Methods: This randomized clinical control study was conducted in the department of Cardiothoracic Anesthesia MTI/LRH from March 2014 to December 2015. A total number of 100 patients were randomly assigned in one of the two groups, i.e., 50 in Internal jugular group and 50 patients in subclavian group for central venous catheterization. Patients' demographic data, rate of complications and number of attempts between the two groups were recorded and compared. Calculations were done using the SPSS, software package, version 17.

Results: There was no statistically significant difference between the ages, sex, weight and the type of surgery in the two studied groups. Efficacy in terms of number of attempts were more in subclavian group compared to internal jugular group. Rate of complications were more in subclavian group compared to internal jugular group (P value < 0.05) except sepsis rate which was noted to be high in internal jugular group (P value < 0.05).

Conclusion: Internal jugular vein is an easy access having less complications for central venous catheterization compared to subclavian vein.

Key words: Central venous catheterization, internal jugular, subclavian vein.

INTRODUCTION
Central venous catheterization (CVC) is an essential and common intervention, becoming more and more popular in emergency rooms and intensive care units (ICU). Its use is important and vital in patients undergoing cardiac surgeries, CVC is mostly used for central venous pressure (CVP) monitoring. Critical patients having difficult venous access in peripheral veins, requiring dialysis in renal failure, cardiac pacing in heart block, intravenous drugs, blood and parenteral nutrition are administered through this route.1,2,3 Besides its extreme importance and indications in ICUs as well as in certain surgeries, it has also some complications due to its mal-positioning. There are different routes for its insertion, having its merits and demerits. Because of the low incidence of complications, subclavian vein is being preferred, as it is easily tolerated and accepted by the patients.4 Unfortunately this typical approach is associated with multiple complications, such as arterial and nerve injury, infection, difficult for insertion, pleural puncture and pneumo-haemothorax due to variation in anatomical landmarks.5 Internal jugular canulation, is preferred because it has relatively less complications and more advantages in terms of ease of insertion even by less experienced persons.6 The aim of this study was to compare the risk of mal-position and complications between the catheterizations of internal jugular vein and subclavian vein.

Internal jugular vein is an easy access having less complications for central venous catheterization as compared to subclavian vein.

MATERIALS AND METHODS
Patients undergoing primary open heart surgeries (coronary artery bypass grafting, mitral, aortic valve replacement and intra cardiac repairs) performed on cardiopulmonary bypass were included in the study. This study was conducted in the department of cardiothoracic anesthesia MTI/LRH from March 2014 to December 2015. A total number of 100 patients were randomly assigned in one of the two groups, i.e. 50 in internal jugular group and 50 patients in subclavian group. Approval from Institutional Research and Ethical Board Medical Teaching Institute, Lady Reading Hospital Peshawar was taken before the study. An informed consent was also obtained from each patient enrolled in the study. Standard anaesthetic techniques were used for induction of anesthesia. Same drugs, according to body weight in mg/Kg were used for each
Data collected included patients demographics, site of catheterization (jugular and subclavian region), any complication i.e., catheter misplacement, bleeding etc. were noted in two groups. For Subclavian approach, the patient was in the supine position, the area to be punctured is cleaned and draped. A point at the junction of the medial one third and lateral two thirds of the clavicle in the right infra-clavicular area was used as a puncture point. The needle is inserted downward, inward and towards the contra-lateral shoulder. Catheters were fixed after blood aspiration.

Internal jugular vein was punctured in the neck at a point, medial to the upper end of sternocleidomastoid at right angle to the thyroid cartilage and lateral to the carotid pulsation. Needle was inserted downward, inward and towards the ipsilateral shoulder. Seldinger’s technique is commonly used for central venous catheters after blood aspiration through internal jugular vein. In case of catheter misplacement, it was replaced by another one. SPSS version 17, was used for data collection and analyzed in Mean ± SD. Chi-square test was used for statistical analysis. P<0.05 was considered statistically significant.

RESULTS

Patients demographics are given in Table No 1. There was no statistically significant difference between the Ages, sex, weight and the type of surgery in the two studied groups. Efficacy in terms of ease of insertion was more in internal jugular group as the number of attempts were less i.e., 10% in internal jugular group compared to 16% in subclavian group. (P value < 0.05) Rate of complications were more in subclavian group i.e., arterial puncture was seen in 6% of patients, while it was only 2% in internal jugular group (P value < 0.05). Mal-position of Catheter was seen in 4% internal jugular vs 8% in subclavian group (P value < 0.05). Haemothorax was seen in 1% and in 3% in internal jugular and subclavian group respectively. (P value < 0.05). Pneumothorax were noted in 1% of patients in internal jugular compared to 4% in subclavian group. Rate of sepsis was noted to be high in internal jugular group i.e., 10% vs 6% in subclavian group (P value < 0.05).

DISCUSSION

A number of complications can occur with central venous catheterization including arterial puncture, bleeding, misplacement, pneumothorax, haematoma, vessel and nerve injury, infection, thrombosis, and kinking of the catheter. CVP is accurately monitored with the correct placement of the central venous catheter. Incorrect placement of the catheter is usually detected by chest radiography and is commonly related to early catheter malfunction. Rueß et al. reported, rates of misplacement to be 5.3% in the internal jugular

<table>
<thead>
<tr>
<th>Table 1: Preoperative patient profiles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient Profiles</td>
</tr>
<tr>
<td>Age (years)</td>
</tr>
<tr>
<td>Sex (M / F)</td>
</tr>
<tr>
<td>Weight</td>
</tr>
<tr>
<td>CABG/Valve replacement/ICR</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 2: Complications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complications</td>
</tr>
<tr>
<td>Attempts for insertion of CVP</td>
</tr>
<tr>
<td>Injury to Artery</td>
</tr>
<tr>
<td>Mal-position of Catheter</td>
</tr>
<tr>
<td>Haemothorax</td>
</tr>
<tr>
<td>Pneumothorax</td>
</tr>
<tr>
<td>Sepsis</td>
</tr>
</tbody>
</table>
Comparison Between two Different Modes of Central Venous Catheterization in Patients Undergoing Cardiac Surgeries

The internal jugular vein is considered to be an easy access having less complications for central venous catheterization compared to subclavian vein. However, further research needs to be done to provide a definitive answer on the benefits of internal jugular catheterization in critical patients.

REFERENCES


Revision of Admission Criteria for Medical Colleges in Pakistan

Fatahiya Kashif, M.Phil.1 Jariya Wajahat, M.Phil.2 Adnan Malik MBBS 3

ABSTRACT:
Objective: To identify the imperfections in Pakistani Medical College admission criteria compared to the international standards and their impact on the performance of 1st professional medical students.

Study design: Longitudinal partly interventional Qual Quan study.

Place and duration of study: This study was carried out in the Department of Medical Education at Sialkot Medical College from 1st November 2016 to 31st October 2017.

Methodology: 200 freshmen medical students belonging to a public and a private medical college, were recruited in this study. Their academic progress was followed for one year, using formative and summative assessment tools and the results were analyzed using Microsoft excel.

Results: Analysis of year round progress of the students revealed a positive correlation between the internal assessment and students’ performance in the 1st professional part I exam. Despite the interventional strategies to improve learning, the students selected on low merit failed to score as good as the ones selected on merit.

Conclusion: In Pakistan, premedical education and Medical College Admission criteria are lacking in some of the basic aspects. The system needs to be restructured according to global standards, so that our students are equipped with the basic knowledge of a good doctor as well as researcher.

Key words: Premedical Education, Medical Schools, Medical Students, School admission criteria.

INTRODUCTION
The health profession is one of the most demanding careers. The physician today is a vibrant personality with multiple dimensions. In order to excel, he should have a lifelong commitment to learning, and active involvement in research. Personal qualities like motivation, research skills and early scholarly habits are fundamental for a prospective physician1,2. The first step in the making of a good doctor lies in the selection criteria for entrance into a medical college.

Over the last two decades, there has been mushrooming of a significant number of (from 38 to 101 twenty years back), in public and private medical colleges across Pakistan. In only the last decade, Pakistan Medical and Dental Council (PMDC) has approved more than 40 new medical colleges3. Currently there are 101 PMDC approved medical schools operating across Pakistan. Because of the unplanned nature of affairs, the geographical distribution of medical colleges does not reflect the population density. Most of the medical colleges are located in Punjab, KPK and Sind whereas

If Pakistani educational system is not updated and reorganized, our physicians will not be able to share a significant role in shaping the future of medicine. Revision of admission criteria for entrance into medical colleges and re-structure of MCAT according to international standards is strategically important.

Pakistan’s largest province Baluchistan (347,190 km²), accommodating a population of about 13.16 million, has only one public medical college, one private which is less than one decade.

Moreover, the medical colleges in the other provinces are concentrated in the major cities like Lahore, Rawalpindi/Islamabad, Peshawar and Karachi. Lahore alone (having an area of 1,772 km² and a population of 5.143 million) has got 20 medical colleges (6 public and 14 private) which account for one medical college/0.2 million people compared to one medical college/6.5 million people in Baluchistan. The private sector medical colleges are either owned by entrepreneurs who are not experienced in the field
of medical education or a handful of doctors who have launched the project for business purposes.

Despite the fact that the admission criteria for both public and private medical colleges are according to the rules set by PMDC, the student lot entering the private medical colleges is significantly different from the public sector. The public sector is preferred because of low educational expenditure and better infrastructure. Although the private medical colleges offer an opportunity for the unlucky students who could not get admission in the public sector, at the same time, we have to put up with the pool of students who are less motivated and lower in merit. The merit list of private medical colleges starts where the merit list of public sector ends. By inducting low merit students, purely on financial basis, the quality of education suffers. Last year PMDC announced its new regulations on admission criteria but still these have not been implemented4.

The entrance requirements, curriculum and mode of instruction vary significantly amongst judiciously different medical universities in Pakistan. A meticulous web search has revealed the admission standards established globally for entrance into a medical school5,6. The quantitative variables include GPA in Chemistry, Biology, Math and English; previous research experience, data interpretation skills, verbal reasoning ability, critical thinking skills and scientific writing. The qualitative variables used by most admission committees include aptitude or interest of the student and personal qualities like ambition or drive, compassion, altruism, respect, integrity, honesty, professionalism, responsible attitude towards patients and profession7. Moreover, some universities also

| Table 1: Medical College Admission criteria; Pakistan vs the developed world. |
|-------------------------|-----------------|-----------------|-----------------|
| Criteria for admission  | Medical college admission test (MCAT, UMAT) | United States | Australia | Pakistan |
|                         | Components | Weightage | Key credit | Key credit | Weightage | Key credit | Key credit | Weightage | Key credit |
|                         | Biology    | Yes        | Based on high school grade | Yes        | Yes        | Yes        | Yes        | Yes        | Yes        |
|                         | Chemistry  | Yes        | Yes         | Yes        | Yes        | Yes        | Yes        | Yes        | Yes        |
|                         | Physics    | Yes        | ?           | Yes        | Yes        | Yes        | Yes        | Yes        | ?          |
|                         | Data interpretation | Yes | Yes | ?          | Yes | Yes | Yes | Yes | ? |
|                         | Logical reasoning | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
|                         | Critical thinking | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
|                         | Problem solving | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
|                         | Scientific writing | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
|                         | Understanding people | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
|                         | Premed GPA | Weightage | Key credit | Key credit | Weightage | Key credit | Key credit | Weightage | Key credit |
|                         | Science    | Yes        | Top 1% of year 12 students selected | Minimum 60% score | Yes | Yes | Yes | Yes | Yes |
|                         | Mathematics | Yes | No | No | No | No | No | No | No |
|                         | Other      | Weightage | Zero to minor credit | Zero to minor credit | Significant credit | Zero to minor credit | Significant credit | Significant credit | Significant credit |
|                         | Institutional entry test | No | No | No | No | No | No | No | No |
|                         | SAT II     | No | No | No | No | No | No | No | No |
|                         | TOEFL/IELTS | Required for international students | Required for international students | No | No | No | No | No |
|                         | Qualitative criteria | Weightage | Significant credit | Significant credit | Significant credit | Significant credit | Significant credit | Significant credit | Significant credit |
|                         | Interview  | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
|                         | Written essays | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
|                         | Recommendations | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
|                         | Verified "Hafiz e Quran" | No | No | No | No | No | No | No | No |

*previously required, but not required according to 2016 regulations *which are still not implemented. ? MCAT missing areas in Pakistani
consider a person’s race, ethnicity and financial stability along with the other criteria.

Table 1 compares the different aspects of admission criteria of US and Australian medical schools with our local standards. Pakistani Medical College Admission Test (MCAT) fails to evaluate the students in the basic research skills mentioned earlier. In the premed GPA, mathematics is left out, and scientific writing, logical reasoning and critical thinking are not acknowledged. Written essays and recommendations don’t have a place in Pakistani admission process. The interviews are subjective and not well structured.

USA has suffered the same situation about a century ago. In the early 20th century, Europe was at the forefront of medical education and scientific research. In continental Europe, no one could practice medicine without having undergone extensive training in a university. In the US, however, 155 medical schools existent at that time, differed significantly in their curricula, assessment methods, admission and graduation criteria.

Rote memorization (ratta in urdu) was a routine and the students lacked problem solving skills. Many American medical schools were small independent, "for-profit" institutes owned by one or more doctors. Quackery flourished in that era and there was no regulation by the state governments. In 1904 the American Medical Association (AMA) decided to reform the medical education. To achieve this objective, AMA created the Council on Medical Education (CME) which laid down its minimum standards for admission criteria and training structure in a medical school. In 1908, the CME assigned the Carnegie Foundation for the Advancement of Teaching, to survey the medical schools across America and Canada in order to filter out the second-rate medical schools and subject them to elimination. Abraham Flexner was chosen to conduct the survey.

In the present day standing of the American medical education takes its root from the Flexner Report (published in 1910) and its outcomes. Flexner identified several schools especially John Hopkins, as the model for medical education. However, out of the 155 medical schools that he visited, only 16 were consistent with the CME standards. He also labeled 14 of the medical schools of Chicago as “the plague spot of the nation”. Within 3 decades following the publication of Flexner Report and its recommendations, there was a noteworthy reduction in the number of medical schools in America from 160 in 1905 to 66 in 1935. Of the 66 surviving medical schools, 57 were part of a university. This scrutiny and execution of stringent regulations led the US out of its dark ages of quackery to the present day cutting edge status of American medical education.

We can compare the present day status of medical education in Pakistan with that of the US a century back. With the budding of these novice institutions; the scarceness of medical teachers has popped up as a serious threat to the quality of education, especially in the non-clinical/basic medical sciences. PMDC is trying to solve the problem by relaxing the criteria for promotion, and introducing four year MD programs in basic sciences. Despite this shortage of medical teachers, each year the existing medical colleges are being approved for increased student intake. This is clearly not in proportion with the influx of inexperienced fresh graduates in basic medical sciences. Secondly, according to the rules laid down by World Federation on Medical Education (WFME), the student intake should be balanced according to the health needs of community and society, which in our case, is not being taken into account.

SUBJECTS AND METHODS:

200 medical students belonging to a public and a private medical college in Sialkot were recruited in a study. It was a longitudinal partly interventional Qual Quan study. The students’ academic performance was followed for one year and the results were compiled and analyzed using Microsoft Excel. The internal assessment of students was based on their year round academic performance. The students’ progress was followed using a weightage scheme based on formative and summative assessment tools.

The formative assessment tools include: participation of students in class during lectures and tutorials, presentation skills, team spirit in group activities and performance in surprise quizzes and assignments. Students were assigned individual IDs in an online Learning Management System (LMS) “Edmodo”, where they were evaluated using online quizzes and assignments. The summative assessment tools include: final grade in monthly tests, term tests and send up examination. Table 2 shows the Weightage scheme of each assessment method which was used to assign a final grade in internal assessment.

Using the CORREL data analysis tool in MS Excel the relationship was studied between the internal assessment of students and their performance in the first professional part I examination conducted by the University of Health Sciences, Lahore. The correlation coefficient in MS Excel has a value between -1 and +1. A value of +1 indicates a perfect correlation between two variables, ie; if variable X increases variable Y also increases and if variable X decreases, variable Y would
also decrease. A value of -1 indicates a perfect negative correlation and a value of zero indicates no correlation.

RESULTS AND DISCUSSION:

Table 3 shows the correlation between internal assessment of students and their performance in the 1st professional exam. The correlation coefficient is 0.74 which indicates a positive correlation.

Table 2: Weightage scheme for internal assessment

<table>
<thead>
<tr>
<th>Assessment tools</th>
<th>Formative assessment 22.5%</th>
<th>Summative assessment 77.5%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Monthly tests</td>
<td>Crash tests</td>
</tr>
<tr>
<td></td>
<td>Term tests</td>
<td>Behavior and Attendance record</td>
</tr>
<tr>
<td></td>
<td>Position in tests</td>
<td>Send up</td>
</tr>
<tr>
<td>Weightage</td>
<td>10%</td>
<td>2.5%</td>
</tr>
<tr>
<td></td>
<td>2.5%</td>
<td>5%</td>
</tr>
<tr>
<td></td>
<td>5%</td>
<td>2.5%</td>
</tr>
<tr>
<td></td>
<td>5%</td>
<td>15%</td>
</tr>
<tr>
<td></td>
<td>2.5%</td>
<td>2.5%</td>
</tr>
<tr>
<td></td>
<td>50%</td>
<td></td>
</tr>
</tbody>
</table>

Table 3: Correlation between internal assessment and 1st professional result based on CORREL data analysis tool of MS Excel

According to the final merit list of 2016 intake, the average aggregate %age (based on matric, FSc and MCAT) ranges from 60-89% (average 76%) in SMC as compared to the narrow range of 88-91% in KMSMC which indicates the wide margin of difference between the two student factions. Fig 2 shows the comparison of students belonging to a public (Khawaja Muhammad Safdar Medical College, KMSMC) and private (Sialkot Medical College, SMC). The low merit influx of the private college is in conformity with the poor outcome in year round progress and final result of the students in professional exam.

It is clear that the product of the juvenile bunch of private medical colleges, is going to harm the overall reputation of Pakistani doctors. And unless some drastic actions are taken, the long term consequences would not have a positive effect on the healthcare management system.

Worldwide, the training approaches of premedical students are being improved and rationalized. At Wake Forest University School of Medicine, USA; high quality math and science instruction is emphasized at elementary and secondary school level. The high school students are involved in discussions about interesting case histories. The medical students are required to submit research papers before graduation. Over the past few decades there has been tremendous progress in the field of molecular medicine. The exact molecular or genetic basis of most of the previously untreatable disorders has been identified and novel therapies are underway. The emerging fields of genomics and proteomics are generating very promising results in terms of dynamic research. Anticipating the future impact of these disciplines on medical research, genetics and proteomics are being introduced to premedical students internationally. When these students enter medical school, they will be ready to meet the upcoming challenges.

If Pakistani educational system is not updated and reorganized, our physicians will not be able to share a significant role in shaping the future of medicine.

CONCLUSIONS AND RECOMMENDATIONS

The distressing state of affairs which is prevalent in Pakistan, can only be resolved by adopting some of the strategies being practiced worldwide like: Revising the admission criteria for entrance into a medical college.

Restructuring the MCAT by introducing international standards like critical thinking, logical reasoning and data interpretation skills. Devising a way to test the motivation and aptitude of students to excel in the medical profession. Merging of groups of 2-3 medical colleges into one unit, thus raising the standards and sharing resources. Bringing the student influx in line with the community health needs.

Acknowledgments: The authors wish to thank the medical students who volunteered for participating in this study.

Funding/Support: None
Other Disclosures: None
Ethical Approval: The ethical approval was received from ethical review board at Sialkot Medical College.

Disclaimer: None
REFERENCES

History of ASPIRIN goes back to 50,000 years

According to a current research undertaken by Alan Cooper from the university of Adelaide, Australia on the fossilized jaw of a young Spanish Neanderthal after genetic analysis trapped in the dental plaque. Calcified plaques preserves the DNA of micro-organisms that lived in the dental spaces and reported in the Journal Nature.

Neanderthal who lived in of El-Sidron now known as Spanish territory, who had a good knowledge of medicinal plants through his inclination, suffered a severe dental ache and chewed green leafy plant of poplar tree containing salicylic acid, the active ingredient of Aspirin. He felt relieved and the herb was widely used as an antibiotic as well as analgesic through the ages.
Waistline Obesity with Reference to Serum Triglycerides

Jariya Wajahat M.Phil¹, Fatahiya Kashif M.Phil²  Prof Zamir Ahmed M.Phil³

ABSTRACT:
Objective: Metabolic syndrome (MS) comprises risk factors for cardiovascular disease, it is mainly linked to insulin resistance and oxidative stress. This study was undertaken to assess the serum triglyceride levels in adults of risk diabetics, diabetics and MS patients with its relation to anthropometric parameter of waist line obesity.
Methods: A total of 80 adults in age bracket of 25-40 years (20 with risk for developing diabetes, 20 diagnosed diabetics, 20 metabolic syndrome patients and 20 controls) were selected among ambulatory patients and people who came to get their fasting sugar checked at laboratory of CMH Lahore. Oxidative stress anthropometric parameters were assessed through detailed history and clinical examination.
Results: The serum triglyceride levels were found to be significantly higher in metabolic syndrome patients as compared to control group.
Conclusion: Raised serum triglycerides and waist line obesity have a strong association.

INTRODUCTION
Obese people are prone to develop metabolic abnormalities which push them into MS. Visible sign of MS is waist line obesity, which is accompanied by disturbances in blood pressure, blood glucose and serum lipid profile. It is caused by over eating and under activity [1]. Obesity which lays the foundation of MS, is a state of chronic oxidative stress. Oxidative stress is defined as physiological stress on the body which is caused by the collective damage by free radicals that are not neutralized properly by antioxidants. Thus obesity is one of the greatest healthcare dilemmas due to its association with MS. It is the silent killer, affecting lives of people of all age groups and deteriorating quality of life of millions through oxidative stress and its sequelae[8]. Dysregulated production of adipocytokines is important contributing factor in pathogenesis of metabolic syndrome. Oxidative stress in accumulated fat leads to development of metabolic syndrome. The underlying mechanism is dysregulated production of adipocytokines and selective increase in reactive oxygen species (ROS) production. This results in out pouring of ROS in peripheral blood. The damaging effects of ROS in turn not only cause insulin resistance but also lead to impaired secretion of insulin from beta cells. This also plays part in pathogenesis of atherosclerosis and hypertension [2]. In non diabetic humans, fat accumulation is closely correlated with markers of systemic oxidative stress[3]. Systemic oxidative stress correlates with BMI[5]. Obesity leads to adipocyte endoplasmic reticulum (ER) stress. This leads to activation of unfolded protein response (UPR), which culminates in apoptosis. The ultimate outcome is insulin resistance[8].

Waistline obesity is a sign of oxidative stress and a reflection of deranged serum triglyceride levels.

Epidemiology: According to World Health Organization (WHO) statistics, the global prevalence of diabetes for all age groups in the year 2000 was 2.8%. This figure is estimated to rise as high as 4.4% by the year 2030. The recorded number of diabetics all over the world in the year 2000 was 171 million. It is expected that this figure will double by the year 2030 [4]. In 2003, India and Pakistan ranked among world’s top ten countries in terms of highest prevalence of diabetes (35.5 million and 6.2 million respectively), and highest anticipated number of people with diabetes by the year 2025 (73.5 and 11.6 million respectively)[7]. Both these countries have the highest number of people with impaired glucose tolerance. For Pakistan, statistics of the year 2003 show that 314 million people (8.2% of the adult population) suffer from impaired glucose tolerance (IGT). It is a major risk factor for type 2 diabetes. By the year 2025 this number is expected to rise to 472 million (9% of the adult population) [8]. Shift from active to sedentary lifestyles with superimposed obesity and increased life expectancy has caused an alarming increase in
prevalence of type 2 diabetes.

This may be only the tip of ice berg as 50% people with type 2 diabetes are not aware of their disease. According to recent calculations by WHO, about 3 million people per year die because of diabetes. These estimates might not be a true reflection of diabetes prevalence in our population since majority of the cases are either not reported or the data is poorly managed. According to International Diabetes Federation (IDF) one fourth of the world’s adult population suffers from MS. As compared to healthy people, risk of death from heart attack in MS is almost double, and risk of encountering heart attack or stroke is almost triple.

According to WHO each year 2.6 million people die because of being overweight or obese, 4.4 million die because of raised total cholesterol and 7.1 million die annually because of raised blood pressure.

**MATERIAL & METHOD**

**Study Population: Sample Size:** The healthy subjects as controls, the patients with high risk of developing diabetes, the diabetics and the metabolic syndrome patients were selected from the ambulatory patients who came to get their fasting sugar checked, on outpatient basis, at pathology laboratory of CMH Lahore. 80 patients were enrolled for assessment of the spectrum of disease and were categorized as controls, high risk individuals, diabetics or metabolic syndrome sufferers on basis of history, physical examination and baseline lab investigations for fasting sugar and lipid profile. An informed written consent was obtained from all subjects recruited in this study. The study was approved by the Advanced Studies and Research Board of the University of Health Sciences, Lahore.

Individuals were identified as high risk in accordance with the criteria laid down by WHO: High risk individuals were identified as being high risk on fulfilling any one of the following criteria: overweight (BMI > 25) or hypertensive (BP > 140/90) or having HDL cholesterol less than 0.9 mmol/L (<35 mg/dL) or triglyceride higher than 2.82 mmol/L (>250 mg/dL) or having impaired fasting glucose 5.5-6.9 mmol/L (100-125 mg/dL after overnight fast) or impaired glucose tolerance 7.7-11 mmol/L (140-199 mg/dL after 2hr glucose tolerance test).

Diabetics were selected according to the following WHO criteria:

(i) Fasting plasma glucose greater than or equal to 7 mmol/L (126 mg/dL) or

(ii) post prandial plasma glucose greater than or equal to 11.1 mmol/L (200 mg/dL).

Subjects who had central abdominal obesity, defined as waist circumference, measured at midpoint between lower rib and anterior superior iliac spine (Cut off point: waist circumference ≥ 90 cm for males and ≥ 80 cm for females) or BMI ≥ 30 plus any two of the following according to IDF criteria, were labeled as MS patients:

(i) Serum triglycerides ≥ 150 mg/dL (1.7 mmol/L) or specific treatment for this abnormality.

(ii) Low HDL cholesterol ≤ 40 mg/dL (1.03 mmol/L) in males or ≤ 50 mg/dL (1.29 mmol/L) in females, or specific treatment for this abnormality.

(iii) Raised systolic BP ≥ 130 mmHg or diastolic BP ≥ 85 mmHg or treatment of previously diagnosed hypertension.

(iv) Raised fasting plasma glucose ≥ 100 mg/dL (5.6 mmol/L) or previously diagnosed type 2 diabetes mellitus.

Twenty unrelated healthy subjects without history of diabetes or hypertension, matched for age and gender with high risks, diabetics and MS patients were randomly selected from general population to serve as controls.

**Exclusion Criteria:** Patients having any other morbidity due to some chronic infection or disease like cancer were excluded. In our sample three patients turned out to be hepatitis C positive, they were excluded and one patient had tuberculosis, he was also excluded. The participants in control group were healthy individuals and exclusion criteria included over weight, or impaired fasting glucose.

**Sample Collection:** Blood samples were drawn by venipuncture of the cubital vein from each individual after an overnight fast. All samples were taken between 8 and 10 a.m. as they were to be analyzed for fasting blood sugar and fasting samples should not be taken later than 10 am because then gluconeogenesis starts. 5 ml blood was collected in K3EDTA tubes as whole blood for determination of the levels of G6PD. For serum 5 ml blood was taken in a separate vacuum tube, kept standing for one to two hours and then centrifuged at 4000 x g for 10 minutes and serum was separated. Serum samples were stored at -80°C till further analysis.

**History and Physical Examination:** For categorizing the patients a detailed history was taken based on the questionnaire designed for the study and base line blood tests (fasting sugar and lipid profile) were performed. Height and weight were recorded, BMI was calculated by formula: BMI = Weight in kg / [height in m]²

Waist circumference was measured at mid point between lower rib and anterior superior iliac spine. BP was checked, and general physical examination was performed.

**Serology:** Serum Triglycerides were determined by Triglyceride MR Enzymatic colorimetric method.
Waistline Obesity with Reference to Serum Triglycerides

End point) by commercially available kit from Linear Chemicals Spain.

**Principle:** The method is based on the enzymatic hydrolysis of serum or plasma triglyceride to glycerol and free fatty acids (FFA) by lipoprotein lipase (LPL). The glycerol is phosphorylated by adenosine triphosphate (ATP) in the presence of glycerokinase(GK) to form glycerol-3-phosphate(G-3-P) and adenosine diphosphate (ADP). G-3-P is oxidized by glycerophosphate oxidase (GPO) to form dihydroxy acetone phosphate (DHAP) and hydrogen peroxide.

A red chromogen is produced by the peroxidase (POD) catalyzed by coupling of 4-aminoantipyrine (4-AA) and phenol with hydrogen peroxide (H2O2) proportional to the concentration of triglyceride in the sample.

\[
\text{Triglycerides} + 3 \text{H}_2\text{O} \xrightarrow{\text{LPL}} \text{Glycerol} + 3\text{FFA}
\]

\[
\text{Glycerol} + \text{ATP} \xrightarrow{\text{GK}} \text{Glycerol-3-P} + \text{ADP}
\]

\[
\text{G-3-P} + \text{O}_2 \xrightarrow{\text{GPO}} \text{DHAP} + \text{H}_2\text{O}_2
\]

\[
4\text{-AA} + 4\text{ Phenol} + \text{H}_2\text{O}_2 \rightarrow \text{Quinoneimine} + \text{H}_2\text{O}
\]

**Reagent composition:**

<table>
<thead>
<tr>
<th>R1</th>
<th>Monoreagent . PIPES buffer 50mmol/L pH 6.8, LPL &gt; 12KU/L, GK&gt;1 KU/L, GPO &gt;10KU/L, ATP 2mmol/L, Mg ++ 40mmol/L, POD &gt;2.5 KU/L, 4-AA 0.5mmol/L, phenol 3mmol/L, non-ionic tensioactives 2g/L(w/v) Biocides.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAL Triglycerides standard. Glycerol 2.26mmol/L equivalent to 200mg/dL of glycerol trioleate. Secondary standard.</td>
<td></td>
</tr>
</tbody>
</table>

**Procedure:** Reagents and samples were brought to room temperature and pipetted into labeled tubes.

<table>
<thead>
<tr>
<th>Tubes</th>
<th>Blank</th>
<th>Sample</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monoreagent</td>
<td>1.0mL</td>
<td>1.0mL</td>
<td>1.0mL</td>
</tr>
<tr>
<td>Sample</td>
<td>……</td>
<td>10mL</td>
<td>……</td>
</tr>
<tr>
<td>Standard</td>
<td>……</td>
<td>……</td>
<td>10µL</td>
</tr>
</tbody>
</table>

Contents of tubes were mixed and allowed to stand for 15 minutes at room temperature. The absorbance (A) of the samples and standard was noted at 500 nm against the reagent blank.

**RESULTS**

As expected, median serum triglyceride levels were found significantly higher (p < 0.05) in metabolic syndrome patients, i.e., MS group, in comparison to control group, as can be seen in the plot in Figure 1. One Way ANOVA for comparison of mean was inconclusive for this parameter at 95% confidence level.

Comparison of serum TG in each of the study groups is shown in the above plot. The plot can be interpreted for 1) characteristics of data in each group, and, 2) the comparisons of groups as a whole.

![Figure 1: Comparison of TG between groups](image)

**Individual Groups:**

a) **Control:** The data in the control appear to be in the range from 0.5 - 2.5 mmol/L. The lower half of values, below the median appear more compact while the upper half a little more spread out. However it is important to note that there seem to be no outliers in this group which might suggest that the subjects selected for control group may represent healthy individuals. Comparing other groups with this group, therefore, might add more confidence to our statistical analysis of the data.

b) **High risk Group:** The data for high risk group appear compact as compared to controls. Although the median value is only slightly higher than controls. The group has three higher values outside 1.5 times IQR. Three out of 19 subjects showing some kind of extreme trend, yet all the rest in a very compact range, may suggest that some of people with high risk may have extreme levels of serum TG, yet most might have it comparable to healthy individuals.

c) **Diabetic:** The range of serum TG in this group appears spread out as compared to high risks and controls, and spreading appears to be more towards the upper end. And it appears to have a median value higher than controls and high risks, but lower than metabolic syndrome sufferers. It exhibits an extreme value which looks like an outlier.

d) **Metabolic Syndrome:** The data for the high risk group look very much spread out as compared to controls. The spreading appears more towards the upper end. The groups don’t seem to show any extreme values. The median value is quite high as compared to controls, this is in accordance with the results of previous studies which suggest that serum
TG is elevated in metabolic syndrome.

**DISCUSSION:**

The IQR of controls, diabetics and metabolic syndrome patients appears quite similar, while that of high risk group appears compact. This may perhaps be due to the fact that high risks have not yet developed marked dyslipidemia, as the median value for this group appears only very slightly higher than that of documented normal levels of less than 1.7 mmol/L. There appear to be no extreme values in any group towards the lower end. All the extreme values, mild or severe, seem to be towards higher end of the spectrum. This may be due to global trend of consuming saturated fat enriched and energy dense diets, which may cause raise in serum lipid profile levels.

The maximum values in controls are around 2.4 mmol/L, whereas in diabetics, high risks and metabolic syndrome patients these are in range of 3.5 and 4.8 mmol/L, this may be attributed to increased dyslipidemia in these subjects. Leaving aside the outliers, the data spread and IQR of controls, diabetics and metabolic syndrome groups appears to be quite similar, except that the diabetics and metabolic syndrome groups show higher median values. They may be attributed to increased dyslipidemia.

**Analyzing Relationship between Serum TG Concentrations in Blood versus Obesity: Linear Regression:** Using a linear regression model, the relationship between TG and obesity (waist circumference from data taken as the measure of obesity and denoted by W) can be expressed by the following equation.

\[ TG = aW + \beta \]

The parameters \( a \) and \( \beta \) were estimated (with 95% confidence bounds) resulting in the following mean regression equation:

\[ TG = 0.02991 \times W - 0.3741 \]

\[ a = 0.02291 \ (0.00425, 0.04156) \]

\[ \beta = -0.3741 \ (-2.201, 1.453) \]

The mean regression function with 95% confidence bounds is plotted in Figure 2 below:

The plot illustrates a positive relationship between TG and waist circumference, i.e., TG increases with obesity, also, it can be seen from the plot that the observed data points are fairly wide spread around the 95% confidence envelop of the regression model. By eyeballing the data points within the plot, one can see a trend in the data cloud rising from left to right. Our regression model seems to approximate this rising trend. However, it can be seen that all data points do not fall within the confidence bounds of the regression model – which implies that our model is only explaining part of the observed variability in TG.

To quantify how much of data variability in TG is explained by obesity (or the regression model) and how much should be attributed to other factors (known or unknown in the medical science) **Goodness of Fit** analysis was performed. The calculated \( R^2 \) is (where \( R \) being the parameter explaining how ‘good’ the model fits the data):

\[ R^2 = 0.0739 \]

This implies that approximately 7.39% of the variation in TG can be explained by the regression model estimated above. The remaining 92.61% is not explained by obesity alone - being dependent on other factors.

**Significance of Regression Model:** To establish if the regression model produced above is significant at 95% confidence level (i.e., if we repeat our experiment for another 100 times, would the average regression model, i.e., the thick regression, would lie within 95% of the regression envelop shown in the plot above by dotted curves for at least 95 out of the 100 times) we calculated significant p for \( p < 0.05 \). The estimated p value turned out to be: \( p = 0.0168 \)

It can be seen that \( p < 0.05 \). Hence we can conclude that our regression model is significant which further implies that obesity can explain approximately 7.4% variability in serum TG levels in the body.

**Variability within the Groups:** Finally we would like to know if linear regression models, built separately for each group would significantly differ from each other. To find the answer, we conducted a one way analysis of covariance or ANOCOVA test for the four groups. The difference in separate regression models was found insignificant (\( p = 0.3225 \)). This implies that the relationship between serum TG level and waistline
obesity is not significantly different from group to group. This is in line with findings of Cui R and Qi Z et al. who have recently shown that high levels of serum triglycerides and waistline obesity are linked to risk of development of type 2 diabetes mellitus.

Lipid profile is improved by lifestyle changes like healthy eating habits and exercise which decrease waistline and body mass index. Further Ahmed S and Shanmugasegaram et al. have coined waist circumference as a risk factor for cardio-metabolic diseases. Not only that hypertriglyceridemic waist is associated with onset of micro- and macro-vascular complications in type 1 diabetics. Recently Park YM and Zhang J et al have shown that consumption of Mediterranean diet leads to reduction in abdominal obesity along with reduction in insulin resistance and inflammation.

CONCLUSIONS:

Waistline obesity is a sign of oxidative stress and a reflection of deranged serum triglyceride levels

REFERENCES

Instructions to the Authors

All materials submitted for publication should be sent to the journal ‘Ophthalmology Update’. Articles/research papers which have already been published or accepted elsewhere for publication should not be submitted. A paper that has been presented at a scientific meeting, if not published in full in proceeding or similar publication may be submitted. Press reports of meetings will not be considered as breach of this rule.

Ethical Aspects: If articles, tables, illustrations or photographs, which have already been published, are included, a letter of permission for republication (or its excerpts) should be obtained from the author(s) as well as the editor of the journal where it was previously published.

Material for Publication: The material submitted for publication may be in the form of original research, a review article, short communications, a case report, recent advances, new techniques, review on clinical/medical/ophthalmic education, a letter to the editor, medical quiz, Ophthalmic highlights/update, news and views related to the field of medical sciences. Editorials are written by invitation. Report on Ophthalmic obituaries should be concise. Author should keep one copy of the manuscript for reference, and send three copies (laser or inkjet) to the Managing Editor, Ophthalmology Update through E-mail/CD or by post in MS word. Photocopies are not accepted. Any illustrations or photographs should also be sent in duplicate. Authors from outside Pakistan can also e-mail their manuscript. It should include a title page, E-mail address, fax and phone numbers of the corresponding author. There should be no more than 40 references in an original/review article. If prepared on computer, a CD should be sent with the manuscript.

Dissertation/Thesis Based Article: An article based on dissertation submitted as part of the requirement for a Fellowship can be sent for publication after it has been approved by the relevant institution. Dissertation based article should be re-written in accordance with the instructions to authors.

References: References should be numbered in the order in which they are called in the text. At the end of the article, the full list of references should give the names and initials of all authors in Vancouver style based on the format used by the NLM in Index Medicus. It verify the references against the original documents before submitting the article.

Peer Review: Every paper will be read by at least two staff editors of the editorial board. The paper selected will then be sent to one or more external reviewers.

Abstract: Abstract of original article should be in structured format with the following sub-headings: Objective, Design, Place and duration of Study, Patients & Methods, Result and Conclusion.

Introduction: This should include the purpose of the article. The rationale for the study or observation should be summarized.

Methods: Study design and sampling methods should be mentioned. The selection of the observational or experimental subjects (patients or experimental animals, including controls) should be described clearly. The methods and the apparatus used should be identified and procedures described in sufficient details to allow other workers to reproduce the results and references to established methods. All drugs and chemicals used should be identified precisely, including generic names, doses, routes of administration.

Results: These should be presented in a logical sequence in the text, tables and illustrations. Only important observations should be emphasized or summarized.

Discussion: The author’s comments on the result, supported with contemporary references, including arguments and analysis of identical work done by others. Brief acknowledgement may be made at the end.

Conclusion: Conclusion should be provided under separate heading and highlighting new aspects arising from the study. It should be in accordance with the study.

Copyright: Material printed in this journal is the copyright of the publisher of Ophthalmic Newsnet/Ophthalmology Update and may not be reproduced without the permission of the editor/publisher. The publisher only accepts the original material for publication with the understanding that except for abstracts, no part of the data has yet been published or will be submitted for publication elsewhere before appearing in the journal. The Editorial Board makes every effort to ensure the accuracy and authenticity of the material printed in the journal. However, conclusions and statements expressed are the views of the authors and do not necessarily reflect the opinions of the Editorial Board. Publishing of advertising material does not imply an endorsement by the Ophthalmic Newsnet/Ophthalmology Update.

Address for Correspondence: The Chief Editor, Ophthalmology Update, 267-A, St: 53, F-10/4, Islamabad, Pakistan. E-mail: ophthalmologyupdate@gmail.com