VISUAL OUTCOME IN MYOPIC PATIENTS AFTER CLEAR LENS EXTRACTION (CLE)/REFRACTIVE LENS EXCHANGE (RLE) AND IMPLANTATION OF INTRAOCULAR LENS

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ABSTRACT

Objective: To evaluate the visual outcome after clear lens-extraction (CLE)/refractive lens exchange (RLE) and implantation of intraocular lens (IOL) in myopic eyes.

Study Design: A descriptive study.

Place and Duration of Study: This study was conducted in CMH Multan from Jan 2014 to Aug 2015 and CMH Peshawar from Sep 2015 to Dec 2016.

Patients and Methods: Eighty eyes of 40 patients had clear lens extraction by Phacoemulsification and aspiration followed by foldable intraocular lens implantation through 2.75mm clear corneal incision. There were seventeen (42.5%) male patients i.e. 34 eyes and twenty three (57.5%) female patients i.e. 46 eyes. Mean age of patients was 26.8 years. Myopia of -9.00 D to -20.00 D with one year stability were included in the study. Pre op retina was examined in all cases with special emphasis to retinal degenerative changes. All surgeries were performed by the same surgeon, under topical anaesthesia using the same make Phacoemulsification unit. All surgeries were uneventful and patients were followed up for six months after surgery.

Results: Best spherical corrected visual acuity improved by 11.5% postoperatively i.e. 59 eyes (73.75%) had vision of 6/18 or better which increased to 68 eyes (85%) after surgery. Postoperative spherical correction was between -0.50 to -1.50 D and there were no vision threatening complications.

Conclusion: In experienced hands clear lens extraction with foldable intraocular lens implantation is safe and effective way to treat high myopia that is not suitable for laser refractive surgery.

Keywords: Clear lens extraction, High Myopia, Visual outcome

INTRODUCTION

Options to correct refractive errors include refractive corneal surgery, phakic intraocular lenses and refractive lens surgery i.e. clear lens extraction. In cases where refractive error could not be corrected by laser refractive surgery due to cornea which is too thin, too steep or too flat; phakic intraocular lens implantation or refractive lens exchange can be considered[1]. Refractive lens exchange has a role in young patients with anisometropia, in an eye not suitable anatomically for phakic intra ocular lens implantation and in patients above 40 years of age having water vacuoles in the crystalline lens[1]. A French ophthalmologist Abbe´ Desmonceaux in 1776 for the first time proposed refractive lens extraction in high myopic patients and recommended the operation to Baron Michael Johann de Wenzel, an oculist to King George 3 (1724-1790). As no evidence or publication by Wenzel exists, so it is not clear whether such surgery was ever performed[2-4] Vincenz Fukala, a Polish ophthalmologist performed first systematic clear lens extractionin 1887 in a young patient with high myopia. Fukala demonstrated benefit of this procedure in term of improved visual acuity in myopic patients which enabled ophthalmologists widespread in Europe to carry out this surgery. Late retinal detachment following clear lens extraction in high myopic patients led surgeons to abandon this procedure gradually at the beginning of the 20th century[5-7]. New concepts and techniques in lens surgery in the 20th century enabled ophthalmologists to perform clear lens extraction again. The

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introduction of first posterior– chamber intra-ocular lens (PC-IOL) by Harold Ridley in 1949, implantation of first anterior chamber irido-corneal anglefixed intra ocular lens by Baron in 1952, the introduction of ultrasonic emulsification of lens with the irrigation/ aspiration (I/A) technique and the invention of a foldable intraocular lens in the 1980s leading to micro-incision cataract surgery (MICS), revolutionized cataract surgery and reduced post-surgical complications[8]. The aim of this study was to find out the visual outcome of high myopic patients after clear lens extraction and implantation of foldable IOL.

MATERIAL AND METHODS

This descriptive study was conducted in Eye department Combined Military Hospital Multan from January 2014 to August 2015 and Combined Military Peshawar from September 2015 to December 2016 after approval from the hospital ethical committees. Eighty eyes of forty myopic patients were included in this study. Patients from 20 to 38 years of age with bilateral myopia from -9.00 D to -20.00 D and astigmatism of 3 diopters, stable for one year and not happy with the glasses were included in the study. Patients less than 20 years and more than 38 years of age, corneal diseases, Uveitis, history of retinal detachment, macular diseases, glaucomaand sublaxated lens were excluded from the study. Detailed eye examination of anterior and posterior segment was done to record retinal degeneration, macular pathology and rule out previous retinal detachment. Counselling of patients and attendants was carried out with special emphasis on incidence of retinal detachment and surgical outcome. Written informed consent was taken. IOL power was calculated using SRK-T formula. The aim of surgery was to make patient emmetropic or slight (-0.50 to -1.00) myopic. All surgeries was performed by the same surgeon at both centers, using the same make phacoemulsification unit under strict aseptic conditions and topical anaesthesia. A clear corneal self-sealing tunnel incision was given supero-tempor or temporal depending upon the astigmatism with 2.75 mm keratome, continuous curvilinear capsulorehxis (CCC) performed, lens matter removed with phaco-aspiration and simco cannula, foldable monofocal acrylic non chromophoreintra ocular lens implanted in capsular bag, viscoelastic removed, intracameral moxifloxacin, miochol injected and wound sealed, siedel negative with

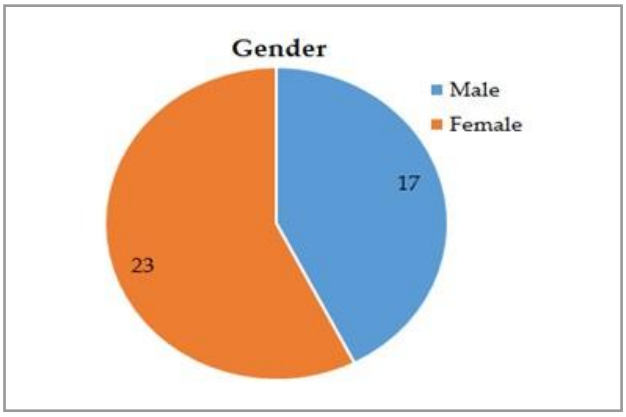

Figure-1: Gender distribution of patients included in the study.

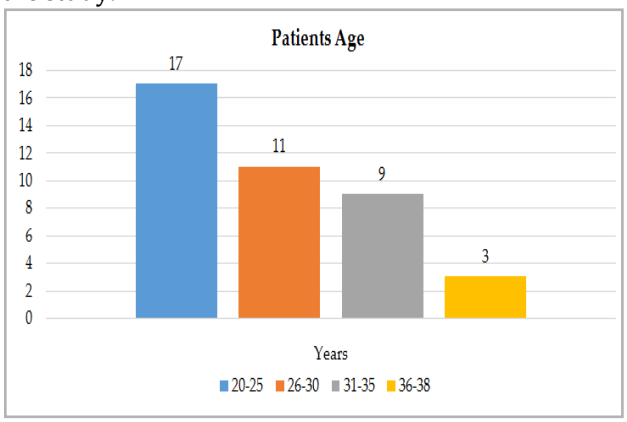

Figure-2: Age distribution of patients included in the study.

hydration, making the eye tense (tamponade effect) at the end of surgery to reduce chances of retinal detachment. Eye pad was applied after instilling a drop of Moxifloxacin and Prednisolone acetate each. Eye pad was removed after 3 hours patient sent home with a combination of dexamethasone ofloxacin and prednisolone acetate drops every 2 hours for two days and then 6 hourly. Patients were followed up and refraction recorded after 3 days, 2 weeks, 6 weeks, 12 weeks and six months. Data was collected using a proforma, filled for all those

patients included in the study. Data included age of patient, gender, pre op vision (BCVA), postoperative vision (BCVA) at day three, 3 months, 6 months, complications and patient satisfaction using Likert scale. In the datasets, the responses from proforma were converted into a numerical scale and analysed using SPSS 17 by applying suitable analysis techniques/ statistics such as percentages and presented as figures and tabulations.

Table-I: Vision of patients – Pre operative vs Postoperative n=80.

BCVA	Pre (OP)	Post-operative		
		Day -3	3 months	6 months
	Number of eyes `n	Number of eyes `n	Number of eyes `n	Number of eyes `n`
6/6	-	6 (7.5%)	6 (7.5%)	6 (7.5%)
6/9	12 (15%)	18 (22.5%)	19 (23.7%)	19 (23.7%)
6/12	18 (22.5%)	20 (25%)	21 (26.2%)	21 (26.2%)
6/18	29 (36.2%)	22 (27.5%)	22 (27.5%)	22 (27.5%)
6/24	14 (17.5%)	9 (11.2%)	8 (10%)	8 (10%)
6/36	7 (8.7%)	5 (6.2%)	4 (5%)	4 (5%)
6/60	-	-	-	-

RESULTS

Both the eyes of high myopic forty patients fulfilling the inclusion criteria were included in the study. Male patients were 42.5% and female 57.5%, fig-1. Majority of patients (70%) were less than 31 years of age who were interested to get good vision without glasses and were not suitable for laser refractive surgery. Mean age of patients was 26.8 years, fig-2. Surgeries were uneventful. Post operatively patients were followed up on day 3, week 2, week 6, three months and six months. Pre operatively no patient had 6/6 vision whereas postoperatively six (7.5%) patients achieved vision 6/6 unaided. After surgery the number of patients who had vision 6/9 and 6/12 increased by 8.7% and 3.7% respectively whereas the number of patients who had preoperative vision of 6/18, 6/24 and 6/36 reduced by 8.7%, 7.5% and 3.7% respectively as is given in table-I. Over all there was improvement in vision after surgery and vision was stable during six months follow up. There were no post-operative vision threatening complications as given in table-II. Mild striate keratopathy developed in 12 eyes that was resolved when patients were reviewed on day 3. Anterior chamber reaction responded well to topical steroids. Posterior capsular opacifications were treated by careful Nd-Yag laser capsulotomy. There was no case of post op retinal detachment during six months follow up. At the end of 12 weeks patient`s satisfaction was measured using a Likert scale as given in table-III. Sixty five percent of the patients were highly satisfied as visual improvement was beyond their expectation. Seven point five percent of the patients were not satisfied because their vision did not improve post operatively but the only advantage they had from surgery was that they got rid of their glasses and will not develop cataract in future. At the end of four weeks eight

Table-II: Complications.

Event	Total number of eyes n=80
Irregular Wound	2 (2.5%)
Striate keratopathy	12 (15%)
Descemet detachment	Nil
Posterior capsular rupture	Nil
Anterior chamber reaction	3 (3.75%)
IOL displacement	Nil
Posterior capsular opacification	7 (8.75%)
Retinal detachment	Nil

Table-III: Patients visual satisfaction using likert scale.

Scale	Interpretation	Number of patients n=40
4	Highly satisfied	26 (65%)
3	Satisfied	9 (22.5%)
2	No comments	2 (5%)
1	Not satisfied	3 (7.5%)

patients (20%) required spherical myopic glasses in the range of -0.75 to -1.50 Diopters and eleven patients (27.5%) cylindrical prescriptionin the range of -0.75 to -2.00 Diopters. Reading glasses were prescribed to all patients.

DISCUSSION

This study provides six months follow up data on 80 eyes of 40 myopic patients who underwent clear lens exchange (CLE)/ refractive lens exchange (RLE) performed over three years period by a single surgeon at two different centres. Visual outcome on six months follow up was stable. In our study majority of the eyes improved and reached a final vision equal to or better than the preoperative vision as was shown in other various studies. In a study by Saeed *et al* in Karachi reported that preoperative vision in their patients was 6/12 or better in 50% eyes which increased to 70% postoperatively (20% increase), with no vision threatening complications like retinal detachment[9]. A study conducted by Vega, Alfanso and Villacampa, revealed that the postoperative best spectacle corrected visual acuity (BSCVA) was better in 83.68%, equal in 12.63% and worse in 3.68% cases[10]. Gris and his colleagues reported that there was 23.6% increase in the number of patients having BCVA of 6/9 or better postoperatively[11]. In a study Colin and Robinet, revealed that uncorrected visual acuity (UCVA) improved by 100%, best-corrected visual acuity (BCVA) improved by 2 lines or more in 75% and BCVA deteriorated by 0-4%[12]. Gabric and his colleagues in their study found out that refractive lens exchange was predictable within 1 D in 87.5% and within 2 D in 95.8 % of cases[13]. Guell *et al* reported improvement in BSCVA and mean postoperative spherical equivalent of -1.50D after clear lens extraction[14]. Clear lens extraction can give patients a predictable refractive outcome inall types of refractive errors, a rapid postsurgical recovery and as a bonus cataract free life[15]. In Germany a study analysing trends in refractive surgery over a period of 3 years, revealed that LASIK was a predominant type of laser refractive surgery, but refractive lens exchange (RLE) remained one of the most common non corneal procedures, and in fact was more popular than phakic IOLs[16]. Refractive lens exchange provides greater depth of focus than phakic lenses through the use of multifocal IOLs. However a comparative study of phakic IOLs and refractive lens exchange revealed that selection between these two procedures depends on various factors, such as age of patient, expectations, lifestyle and personality[17]. In young (<55 years of age) and myopic patients, retinal detachment following the procedure is a concern and it is best to perform refractive lens exchange in patients with complete posterior vitreous detachment. Since refractive lens exchange is entirely an elective procedure, so minimizing the risk is critical to successful outcome for which several conclusions has emerged through literature review[18,19]. First, a careful preoperative examination and counselling followed by complete funding examination is required determining the state of the vitreous body. Referral to a vitreoretinal specialist may be done if there is any doubt concerning the nature of a lesion or the indication for prophylaxis. Second, during surgery minimal disturbance of the intraocular environment must be ensured. Micro-incisional techniques maintains a stable chamber, construction of a round and centred continuous curvilinear capsulorehxis (CCC), effective cortical cleaving hydrodissection, efficient aspiration of lens material, safe cortical clean-up, careful introduction of the IOL and at the end a seidel negative incision closure[15,20,21]. Third, YAG capsulotomy should be avoided if possible. Construction of a capsulorehxis that completely overlies the edge of IOL optic, use of cortical cleaving hydrodissection, meticulous cortical clean-up, and implantation of sharp posterior edge IOL, all facilitate maintenance of a clearpos-terior capsule. By following these guidelines, we may be able to obtain the maximum benefits with the least possible risks[15,19]

CONCLUSION

In experienced hands clear lens extraction with foldable intraocular lens implantationis safe

and effective way to treat high myopia that is not suitable for laser refractive surgery.

CONFLICT OF INTEREST

All authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest (such as honoraria; educational grants; participation in speakers' bureaus; membership, employment, consultancies, stock ownership, or other equity interest; and expert testimony or patent-licensing arrangements), or non-financial interest (such as personal or professional relationships, affiliations, knowledge or beliefs) in the subject matter or materials discussed in this manuscript.

CONFLICT OF INTEREST

This study has no conflict of interest to be declared by any author.

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