Outcomes of cataract surgery at teaching hospital in Karachi

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Abstract

Objective: To assess outcomes of cataract surgery at a tertiary care hospital in Karachi.

Methods: This retrospective study was conducted at Aga Khan University Hospital, Karachi, and comprised data of patients who underwent cataract surgery from January 2011 to December 2015.

The data was collected using guidelines based on World Health Organisation systems for quality monitoring. Postoperative follow-up was done at 1 day, 1 week, 4 weeks and after 12 weeks. Visual acuity was recorded as good (6/6-6/18), borderline (6/18-6/60) and poor (<6/60). Intraoperative and postoperative complications were also noted.

Results: Of the 570 patient charts reviewed, 527(92.45%) were included in the study. Among them, 302(57.4%) were females and 225(42.6%) were males. The overall mean age of patients was 59.8±7.2 years. There were 275(52.2%) right eyes, 382(72.5%) were myope and the remaining 145(27.5%) were hypermetrope. There were 315(59.6%) patients who suffered from different systemic diseases, with diabetes mellitus being on the top of list followed by hypertension. Pre-operative best corrected visual acuity was good in 35(6.7%) patients, borderline in 355(67.4%), and poor in 137(25.9%).

Conclusion: The surgical outcomes were comparable with previous studies.

Keywords: Cataract surgery, Outcomes, Complications. (JPMA 68: 76; 2018)

Introduction

Cataract remains the leading cause of worldwide blindness and in Pakistan it alone is responsible for 51.5% of blindness, according to Pakistan's National Blindness and Visual Impairment Survey 2002-03.[1] Treatment for cataract being the surgical extraction which usually is followed by intraocular lens implantation. Phacoemulsification is the gold standard these days but in developing countries like Pakistan, extracapsular cataract extraction (ECCE) still remains the largely performed procedure.

Recent advances in technology have made life of everyone very easy and comfortable. Ophthalmologists now can offer patients a wide variety of intraocular lens implants. Following cataract removal, the implantation of intraocular lenses that offer simultaneous near and distance vision correction is now routine.[2] Because of bilateral cataracts 20 million people are blind in the whole world which is expected to rise to 32 million by 2020. More than half of all global blindness is cataract-induced.[3] Safe and predictable cataract surgery outcomes are noticed only in the developed world, the rates of post-operative blindness are surprising in the developing world. Half of cataract operations in China result in blindness.[4] Almost half of all cataract operations in Nigeria entail the centuries-old technique of "couching."[5]

Clinical audit is a tool that can be used not only to monitor quality of services provided by doctors but also tells us whether we are doing it correctly up to the guidelines or not. The World Health Organisation (WHO) has recommended that post-operative visual outcome after cataract surgery should be good (>6/18) in 90% of cases and poor (<6/60) in less than 5% of cases.[6,7]

The current study was planned to assess the surgical results in terms of visual outcome and the complications occurring intra- and post-operatively in order to continuously monitor surgeon's performance and to improve quality of eye care provided to the patient.

Patients and Methods

This retrospective clinical audit was conducted over a 6-week period in February-March, 2016, and comprised data of patients who underwent cataract surgery from January 2011 to December 2015. It was limited to individuals aged over 40 years who had had cataract surgery irrespective of the cause within the preceding 60 months, and who returned for out-patient appointments. Patients excluded were those who had surgery for traumatic cataracts, or who had other ocular procedures such as trabeculectomy performed at the time of cataract extraction. A simple recording form was developed to

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record the following: age, gender, type of cataract operation, length of time since the operation; pre-existing eye disease; visual acuity as the patient presented ("functional vision"-that is, with or without glasses) and after refraction, and findings on examination. Any infective disorder of ocular adnexa was looked for and treated before surgery if present. Keratometry and Amplitude scan (A-Scan) were performed to calculate intraocular lens (IOL) power using SRK T/Holladay II formulae.[5,6] Systemic co-morbids, mainly diabetes mellitus, hypertension and cardiac illness, were looked for as well. Tablet Asprin was discontinued three days prior to the surgery. All the surgeries were performed under local anaesthesia. Peribulbar injection of xylocaine (2ml) was given through the inferotemporal quadrant. Surgical techniques used were phacoemulsification, ECCE, and implantation of foldable one-piece acrylic IOL.

Post-operatively, all patients were treated with topical antibiotics and steroidal anti-inflammatory medications. Hypertonic saline was used in cases of striate keratopathy. Post-operative follow-up was done at discharge, after 1 week, 4-6 weeks and after 12 weeks.

Levels of visual acuity pre- and post-operatively were categorised using the WHO guidelines: Good outcome = 6/6-6/18; Borderline= <6/18-6/60; and Poor=<6/607. All examinations were performed by two observers, and all refractions were performed by one hospital-based optometrist.

Results

Of the 570 patients that underwent cataract surgery, 527(92.5%) fulfilled the study criteria. There were 302(57.4%) females while the rest were males with an overall mean age of 59.8±7.2 years. There were 275(52.2%) right eyes while 382(72.5%) were myope. Besides, 315(59.6%) patients were suffering from different systemic diseases (Table-1).

Table-1: Demographics of study population.

	Frequency	Percent
Mean age (years) 59.8 ± 7.2	n = 527	100%
Gender		
Male	225	42.6
Female	302	57.4
Eye		
Right	275	52.2
Left	252	47.8
Refractive Error		
Myopia	382	72.5
Hypermetropia	145	27.5
Co-morbid		
Nil	212	40.4
Diabetes Mellitus (DM)	155	29.4
Hypertension (HTN)	70	13.3
Ischaemic Heart Disease (IHD)	5	0.94
DM, HTN	75	14.2
DM, HTN, IHD	10	1.8

Table-2: Pre-operative Visual status and Ocular pathologies (n=527).

	Frequency	Percent
Cornea		
Normal	510	96.6
Degeneration	12	2.6
Opacity	05	0.8
Retinopathy		
AMD	08	1.5
Diabetic Retinopathy	45	8.5
Glaucoma		
PAOG	20	3.8
IOP (mmHg)		
<21 mmHg	495	93.9
>21 mmHg	32	6.1
Cataract		
Nuclear Sclerosis	275	52.1
Posterior Subcapsular	25	4.6
Cortical	12	2.7
Posterior Polar	30	5.6
Mix	185	35.0
Vision(WHO)		
6/6 to 6/18 = Good	35	6.7
<6/18 to 6/60 = Borderline	355	67.4
< 6/60 = Poor	137	25.9
Spectacle Dependence	499	94.7
Spectacle Independence	28	5.3

WHO: World Health Organisation. IOP: Intra ocular Pressure
mmHg: Millimetre of mercury;
AMD: Age=related Macular Degeneration
POAG: Primary open angle glaucoma.

Surgical techniques used were phacoemulsification in 523(99.6%) patients and ECCE in 4(0.4%). Besides, 517(98.5%) patients were implanted with foldable one-piece acrylic IOL.

Pre-operative clinical examination showed that 12(2.6%) patients had corneal degeneration and 5(0.01%) had corneal opacities. Age-related macular degeneration was noted in 8(1.5%) patients and 45(8.5%) suffered from diabetic retinopathy. Primary open angle glaucoma was reported in 20(3.8%) patients. Besides, the intra-ocular pressure (IOP) of 495(93.9%) patients was within normal limits, while 32(6.1%) patients' IOP recorded beyond the normal limit. Nuclear sclerotic cataract was the most common type 275(52.1%). Posterior sub-capsular, posterior polar and cortical cataract types were noted in 25(4.6%), 30(5.6%) and 12(2.7%) patients respectively.

Table-3: Post-operative Visual Outcomes {n= 527(437 + 90)}.

	Frequency	Percent
Vision (WHO) without Ocular pathology (n=437)		
6/6 to 6/18 = Good	413	94.5
<6/18 to 6/60 = Borderline	18	4.1
<6/60 = Poor	06	1.4
Vision (WHO) with Ocular pathology (n=90)		
6/6 to 6/18 = Good	78	86.7
<6/18 to 6/60 = Borderline	07	7.8
<6/60 = Poor	05	5.5
Spectacle Independence	457	86.7
Spectacle Dependence	70	13.3
a) Within +1 and -1 DS/DC	61	87.1
b) > +1 and -1 DS/DC	09	12.9
IOP (mmHg)		
< 21 mmHg	497	94.3
> 21 mmHg	30	5.7
a) Steroid Responder	22	73.3
Posterior Capsule		
Tear	08	1.6
PCO		
Within 03 months	06	1.2

PC: Posterior capsule
PCO: Posterior Capsular Opacification
DS: Dioptric sphere
DC: Dioptric cylinder.

Pre-operative best corrected visual acuity (BCVA) was Good in 35(6.7%) patients, Borderline in 355(67.4%) and Poor in 137(25.9%). Spectacle dependence was seen in 499(94.7%) patients (Table-2). Post-operative visual acuity measurements at 12 weeks were sub-divided in patients with and without ocular pathology. In sub group of patients without ocular pathology 413(94.5%) patients' vision was Good, 18(4.1%) patients' vision was Borderline and 6(1.4%) patients had Poor visual acuity outcome (Table-3). Spectacle independence was achieved in 457(86.7%) patients, while 70(13.3%) remained spectacle-dependent, out of whom 61(87.1%) patients' refractive error was within +1 and -1 DS/DC (Dioptric Sphere/ Dioptric Cylinder) and remaining 9(12.9%) patients' refractive error was more than +1 and -1 DS/DC respectively. IOP was maintained within normal limits i.e. < 21mmHg post-operatively in 497(94.3%) patients, while the remaining 30(5.7%) patients had IOPs of > 21mmHg out of which 22(73.3%) were steroid responders. Posterior capsular rupture was noticed in 8(1.6%) patients and posterior capsular opacification within 3 months post-operatively was noticed in only 6(1.2%) patients (Table-3).

Post-operative uveitis, cystoid macular oedema, relevant retinal fluid, retinal detachment and endophthalmitis were not reported in this cohort.

Discussion

Cataract surgery is one of the most commonly performed ophthalmic surgeries, and its frequency will increase due to population burden in upcoming years. As cataract technique and technology advances, there is increased need to demonstrate improving outcomes. To the best of our knowledge such a study with detailed surgical outcomes has not been conducted in Pakistan.

Overall, Pre-operative BCVA, according to WHO guidelines, was Good in 35 (6.7%) patients compared with 43% reported by the UK Cataract National Dataset Electronic Multicentre Audit (CNDEMA).[8] Spectacle dependence was seen in 499(94.7%) patients. Pre-operative ocular comorbidities have a significant impact on the benefit of cataract surgery. Many conditions are associated with a reduced potential for maximum BCVA. The prevalence of preoperative recorded co-pathology is less than those published in CNDEMA. Besides, 96.6% of cases had no ocular co-pathology, which is higher to 71.5% found in CNDEMA.[8] The most common pre-operative ocular comorbidity was diabetic retinopathy, followed by glaucoma, corneal degeneration and age-related macular degeneration (ARMD). Overall, the rate of glaucoma reported in this study (3.8%) was less than the 5.44% reported by CNDEMA, with their highest ocular comorbidity being ARMD.[8] In contrast, the prevalence of glaucoma and ARMD in this study (3.8% and 1.5%) were less than those reported in the National Eyecare Outcomes Network (NEON) (11% for glaucoma and 17% for ARMD) and patient outcome research team (PORT) (11% for glaucoma and 14% for ARMD) studies.[9,10]

In our study surgeons performed eye blocks with the occasional case performed by the residents. At our tertiary care centre the topical anaesthesia is the most popular route for anaesthesia. In the NEON and PORT studies, retrobulbar followed by peribulbar blocks were the most common.[8,9] There has been debate about whether akinetic anaesthesia may improve posterior capsule rupture (PCR) rates. The literature does not demonstrate one method to be superior to the other in terms of posterior capsular rupture rate.[12] In our study, the number of patients who had a PCR was eight. Of those who had PCR, 25% (2 patients) underwent kinetic anaesthesia (topical) and 75%(6 patients) underwent akinetic anaesthesia (peribulbar block). There was no statistically significant benefit in this study by using akinetic methods over kinetic methods for avoiding posterior capsular rupture (p=0.78).

It has been reported that superior corneal incisions

induce greater corneal astigmatic change than temporal incisions.[13,14] Overall results from a study showed the surgically-induced astigmatism (SIA) centroid (or summated vector mean) was 0.46 D at 92° in the superior incision group and 0.28 D at 79° in the temporal incision group.[14] Although the power of these vectors suggests less SIA for temporal incisions, the axes of the SIA are both near vertical. This is intuitively correct for temporal incisions (SIA being expressed, by convention as a steepening effect) but appears anomalous for superior incisions. Other studies have also found that less astigmatism was induced by temporal incisions compared to superior incisions.[13,15] In our study, mean SIA magnitude was 0.856±0.85D with a mean axis of 70±69° in the superior incision group, and 0.90±0.81D with a mean axis of 91±90° in the temporal incision group. Although there was a greater magnitude of induced astigmatism with the superior group compared with the temporal group, which is contrast to literature, the difference of 0.06 D is clinically insignificant. Overall, for temporal incisions, there was a greater flattening effect of 0.03 D compared with a flattening effect of 0.004 D for superior incisions on the relevant axes, but again, the effect appears too small to be clinically insignificant.[16] More accurate analysis was not possible, as data on the exact axis of incisions were not available.

In our study PCR rate of 1.6% was lower than most rates reported in literature. The Swedish National Cataract Register had an overall PCR rate of 2.1%, one study reported a rate of 4.9% and another reported a rate of 4.1%.[17-19] CNDEMA included vitrectomy as part of PCR rates as it believed that the majority of cases may prompt an anterior vitrectomy.[8] In our patients, not all PCR necessarily resulted in an anterior vitrectomy. Also, not all anterior vitrectomies were results of PCR. Hence, the rates of PCR and anterior vitrectomies in our study may be different from those found in literature.[9]

Within these follow-up appointments, 6(1.2%) eyes had posterior capsular opacification (PCO) which is a long-term complication. Consequently, one would not expect the recorded rate in this audit to reflect long-term rates.[21,22] Of the 527 cases, there was no case of endophthalmitis.

Postoperative best-measured VA was recorded for 527 (100%) eyes. After cataract surgery, 413 (94.5%) eyes had good or equivalent best-measured VA compared with pre-operative measurements. Spectacle independence was 86.7%. There were 06 (1.4%) eyes with poor post-operative best-measured VA compared with pre-operative VA. Of these 3(50%) eyes were one line worse off compared with their pre-operative best-measured VA. There were 53(10%) eyes of patients who had at least one pre-existing ocular comorbidity. The most common pathology associated with impaired post-operative VA was diabetic macular oedema, followed by corneal degeneration.

Of the 570 eyes that underwent cataract surgery, 395 (75%) had recorded preoperative target spherical equivalents. Of these 88% were within ±1 D of target spherical equivalent post-operatively by automated refraction. There were 396 (75%) eyes within ±0.5 D of target spherical equivalent. The UK National Health Service set a benchmark for refractive outcomes.[23] of 85% of eyes achieving a final spherical equivalent within 1 D and 55% of eyes within 0.5 D. In the Swedish National Cataract Register, 55% of 17 056 surgeries resulted in a spherical equivalent equal to, or between -0.5 and 0.5 D.[24]

The current study had its set of limitations. First, there was missing data on post-operative BCVA (e.g. with subjective refraction). Another limitation was the use of Snellen over a testing method such as Logarithm of the minimal angle of resolution (logMAR), which is more based on the physiology of vision. The retest reliability with logMAR is more than Snellen, and its use would give a more accurate picture of changes pre- and post-operatively.[25] Some of the complications of cataract surgery may in fact be due to patient predisposition. For instance, differentiating CMO from other forms of macular oedema can be challenging, and a better diagnosis may be made retrospectively several months after data collection for this audit had finished. Hence, data on PC opacification rate may be artificially low as this occurs usually at least 2 years post-operatively. Similarly, this audit is unlikely to provide representative information on retinal detachment rates. It is known that at 5-10 years after cataract surgery, 26% of eyes have a VA worse than 6/12.[24,25]

Conclusion

The study demonstrated that VA improvement and surgical complication rates at the study centre were either comparable or low with those reported for phacoemulsification in the literature.

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Conflict of Interest: None.

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