

Outcome of Cataract Surgery at Secondary Eye Care Facility in Karachi

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ABSTRACT

Purpose: To find out visual outcome of cataract surgery at secondary eye care hospital in Karachi, Pakistan.

Study Design: Surgical audit.

Place and Duration of study: Al-Baseer Eye Hospital, Karachi from January 2019 to January 2021.

Methods: A total of 1540 cataract surgeries were performed. Patients referred from distant eye camps (outside of city limits) were not included. Data collection was done using hospital medical records on patient's age, sex, pre-operative best-corrected visual acuity (BCVA), surgical complications, visual acuity (VA) at 1st post-operative day, 1, 3 and 4 – 16 post-operative weeks, BCVA at 4 – 16 post-operative weeks and causes of poor visual outcome (BCVA worse than 6/60) at 4 – 16 post-operative weeks. For data analysis, IBM SPSS Statistics 23 was used.

Results: Out of 1540 cataract surgeries, 81% (1248) cases underwent phacoemulsification with intraocular lens implantation. Mean age at the time of surgery was 56.24 ± 11.45 years. Males were 54.9% (845) while 45.1% (695) were females. Rate of intraoperative complications was 0.9% (14 cases). Posterior capsule rupture occurred in 0.8% (13 cases), and zonular disinsertion in 0.1% (1 case). At 4 – 16 weeks post-operatively, follow-up rate was 53.8% (828 patients); and the percentages of patients with good, borderline and poor BCVA were 94.7% (784 cases), 2.3% (19 cases), and 3.0% (25 cases) respectively.

Conclusion: Good visual outcome can be obtained after cataract surgery at a secondary eye hospital, provided the surgeons and operating room team are trained, well equipped and follow aseptic measures.

Key Words: Phacoemulsification, Cataract, Posterior capsule, Blindness.

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INTRODUCTION

Blindness due to cataract is a major health problem in many countries. Due to ageing and population growth, the number of cataract patients are expected to increase in coming years.¹ Standard treatment is surgical removal of cataract via phacoemulsification/extra-capsular cataract extraction

(ECCE) or intra-capsular cataract extraction, with intraocular lens implantation or aphakic correction.² Unless the cataract surgery services are increased and improved, more and more people will continue to suffer from cataract-related visual impairment or blindness.³

Despite advancements in the surgical management of cataract, many patients fear having surgery due to poor visual outcomes, especially in many developing countries.³

With increase in number of cataract surgery service providers, the need for routine monitoring of outcomes and complication rate is crucial. Maintaining and improving quality of surgery will produce better results, and motivate more patients to get early

treatment. World Health Organization (WHO) recommends that the visual outcome is recorded in three groups; good vision ($\geq 6/18$), borderline vision ($6/24 - 6/60$), poor vision (worse than $6/60$) anywhere between discharge and 12 weeks postoperatively.³

Data from the tertiary care and free eye camps are easily available but surgical outcomes and complication rate at secondary eye hospitals is scarce. This study was conducted to find out if outcomes of cataract surgery at such facility meet WHO recommendations.

METHODS

The study was conducted after obtaining permission and ethical approval from Al-Baseer Eye Hospital (ERB/04-21/001). We retrieved two years data from the hospital record of Al-Baseer Eye Hospital, Karachi from January 2019 to January 2021. This secondary eye hospital provides community eye health services and standard cataract surgery facility at subsidized rates or free-of-cost for non-affording individuals.

Patients referred from distant eye camps (i.e. outside Karachi) were not included in this study because they are lost to follow up. All patients underwent routine eye examination, including refraction, slit-lamp examination and fundoscopy. Distance visual acuity (VA) was measured using Snellen chart. Blood tests (random blood sugar level, screening for hepatitis B and C, and HIV), blood pressure and cardiac status were checked. Biometry was done by a trained staff. Patients who were fit for surgery were operated after written consent. After all aseptic measures, operation was done under local or topical anaesthesia by skilled surgeons. Depending on case, foldable (single/multipiece) or rigid intraocular lens was implanted. Patients were asked to follow up next day for eye examination. Topical antibiotics and corticosteroids were prescribed for a month and then gradually tapered. Topical NSAIDS (nepafenac 0.1%), hypertonic saline 5% or beta blocker (levobunolol 0.5%) were advised as per need. Subsequent check-ups were done after 1 week and 4 – 16 weeks postoperatively. In patients, who had ECCE, best-corrected visual acuity was recorded 1week after suture removal.

Data collection was done using previous hospital medical records on patient's age, sex, pre-operative BCVA, intraoperative surgical complications, VA at 1st post-operative day, 1 – 3 post-operative weeks, 4 –

16 post-operative weeks and BCVA at 4 – 16 post-operative weeks. Visual outcome was recorded in three groups; good vision ($\geq 6/18$), borderline vision ($6/24 - 6/60$), and poor vision (worse than $6/60$). Causes of poor visual outcome (BCVA worse than $6/60$) at 4 – 16 post-operative weeks were found and recorded. Causes of poor vision were surgery (due to intraoperative or immediate post-operative complications), spectacles (due to inadequate optical correction) or Sequel (due to late postoperative complications). Early post-operative complications noted on 1st post-operative day were also evaluated. For data analysis, IBM SPSS Statistics 23 was used. Analyzed data was presented in form of charts, graphs and tables as necessary.

RESULTS

Total 1540 cataract surgeries were performed (Figure 1). Mean age at the time of surgery was 56.24 ± 11.45 years (ranging from 20 to 96 years). There were 54.9% (845) males while 45.1% (695) were females. Percentage of intraoperative complications was 0.9% (14 cases). Posterior capsule rupture occurred in 0.8% (13 cases) and zonular disinsertion with vitreous presentation in 0.1% (1 case). All cases with posterior capsule rupture with vitreous loss were managed with anterior vitrectomy and intraocular lens placement either in posterior or anterior chamber. One patient

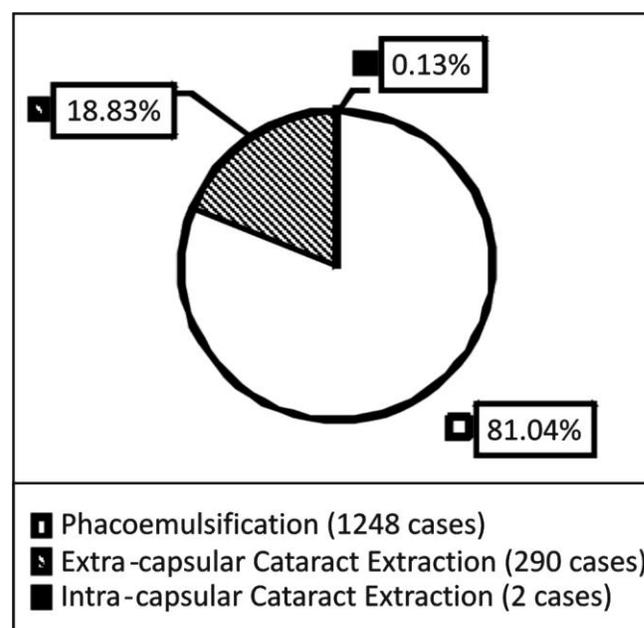


Figure 1: Type of Surgery.

was left aphakic due to insufficient capsular, zonular and iris support. The patient was later referred to tertiary eye hospital for secondary scleral fixation intraocular lens placement.

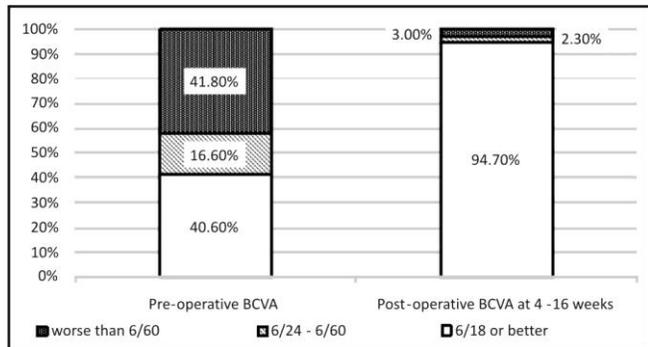


Figure 2: Comparison between Pre-operative BCVA and Post-operative BCVA.

Follow-up rate fell from 81% (1248 cases) from 1st post-operative day to 53.8% (828 cases) at 4 – 16 weeks post-operatively. Among follow-up patients at

1st post-operative day, presenting VA was good in 905 (72.5%), borderline in 146 (11.7%), and poor in 197 (15.8%) cases, while at 4 – 16 weeks post-operatively, the same variables were seen in 742 (89.6%), 52 (6.3%) and 34 (4.1%) cases respectively. With best-correction, cases with good vision increased to 784 (94.7%). In 41 (5%) patients visual outcome was borderline/poor due to residual refractive errors and good VA was achieved with spectacles (Table 1). Comparison between Pre-operative BCVA and Post-operative BCVA is shown in Figure 2.

Causes of Poor BCVA at 4 – 16 post-operative weeks were pre-existing eye disease in 22 (88%) cases, and late s complications in 3 (12%) cases. Pre-existing eye diseases and late post-operative complications are shown in Table 2.

Early post-operative complications were noted in 147(11.7%) depicted in Table 3. Majority of the complications were successfully managed medically. Surgical intervention was done where required. No case of acute endophthalmitis was seen.

Table 1: Post-operative visual acuity.

Table 1 (Post-operative Visual Acuity)	Presenting VA at 1st Post-operative Day	Presenting VA at 1-3 post-operative Weeks	Presenting VA at 4-16 Post-operative Weeks	Best-corrected Vision at 4-16 Post-operative Weeks
Good vision ($\geq 6/18$)	905 (72.5%)	914 (81.2%)	742 (89.6%)	784 (94.7%)
Borderline vision (6/24 – 6/60)	146 (11.7%)	110 (9.8%)	52 (6.3%)	19 (2.3%)
Poor vision (worse than 6/60)	197 (15.8%)	101 (9.0%)	34 (4.1%)	25 (3.0%)
Total no. of patients at follow-up visits	1248	1125	828	828

Table 2: Causes of Poor best- corrected vision at 4 – 16 post-operative weeks.

Pre-existing Eye Diseases	Post-operative Complications
Optic atrophy 6 (24.0%)	Persistent Corneal edema 2 (8.0%)
Glaucoma 3 (12.0%)	Dense posterior capsule opacification 1 (4.0%)
Maculopathy (CNV, Atrophy) 6 (24.0%)	
Macular hole 2 (8.0%)	
Retinitis pigmentosa 1 (4.0%)	
Diabetic retinopathy 1 (4.0%)	
Corneal opacity/degeneration 1 (4.0%)	
Amblyopia 2 (8.0%)	
Total 22 (88.0%)	3 (12.0%)

(Total number of patients with poor BCVA at 4 – 16 weeks postoperatively = 25)
(CNV = Choroidal Neovascularization)

Table 3: Frequency of Early Post-operative complications noted on 1st post-operative day.

Table 3 (Frequency of Early Post-operative complications noted on 1 st post-operative day).	
Striate Keratopathy	120 (9.6%)
TASS (Toxic Anterior Segment Syndrome)	19 (1.5%)
Others	8 (0.6%)
• Uveitis	2
• Early PCO	2
• Residual cortical matter	1
• Anterior chamber shallowing	1
• Hyphema	1
• Exposure keratitis	1
Total cases	147 (11.7%)

DISCUSSION

Cataract, which is opacification of natural lens, is affecting approximately 65.2 million people

worldwide.¹ According to Global burden of disease 2017 study, blindness (VA \leq 3/60) and severe vision loss (VA 6/60-3/60) contributes 5% to total burden of vision loss in Pakistan; with cataract being the most common cause (\approx 50%) especially in aged 60 years and above. The burden of vision loss is estimated to further increase by 2025.⁴

Studies suggest that gender disparity, sub-standard cataract surgery services for marginalized communities, lack of trained eye-care workforce with experience or access to advance technology and inadequate pre and post-operative assessment, are most likely reasons for cataract and cataract surgery related vision impairment in developing countries.⁵

Hence, to reduce back-log, there is need for upgrading quantity and quality of cataract surgery service providers. Improving quality of surgery by auditing surgical outcome periodically will produce better results, and motivate more patients to get early treatment. Limburg H had suggested certain parameters useful in monitoring quality of outcomes as per WHO guidelines.

1. Percentage of surgical complications should be less than 10%.
2. Posterior capsule rupture and vitreous loss should be less than 5%.
3. At discharge, VA should be good in \approx 50% of cases, and poor should be less than 10%.
4. At 4 weeks or more post-operatively, presenting VA should be good in atleast 80% of cases, and poor should be less than 5%.
5. At 4 weeks or more post-operatively, BCVA should be good in more than 90% of cases, and poor should be less than 5%.

If not, then causes of suboptimal results should be analyzed, and corrected.^{2,6}

The audit showed that the hospital fulfilled the 1st, 2nd, 4th and 5th criteria as mentioned above completely. However, 3rd criterion was partially fulfilled. Ideally, at discharge, \approx 50 % of cases should have good VA and less than 10% poor outcome. According to this study, at 1st post-op day, though the percentage of good vision was \approx 50% (72.5%) but that of poor outcome was higher than 10% (15.8%), which reduced to 4.1% at \geq 4 weeks post-operatively. In many patients, significant visual improvement was seen after resolution of striate keratopathy and/or removal of tight sutures.

Percentage of intraoperative complications was 0.9%. Most common was posterior capsule rupture (0.8 %), which is lesser than that reported in other studies (0.99% - 4.8%).⁷⁻¹⁰ Rate of zonular dehiscence found in this study (0.1%) is also slightly lesser than that reported by Paracha and Sanaullah et al. (0.2%).^{9,10}

The most common early post-operative complication seen at 1st post-op day was striate keratopathy (9.6%), rate of which is lower than that observed by Paracha (10.7%) and Mirza et al.^{9,11} Second most common complication was toxic anterior segment syndrome TASS (1.5%) which occurred in clusters. This could be due to intra operative factors (surgical instruments or intraocular medications/solutions/IOL) or post-operative topical medications toxicity. Further studies are recommended to find and address causes for such complications. KK Shoaib had reported outbreak of TASS in 14.8% of his patients in two months. Exact cause could not be found. However, increased vigilance resulted in cessation of such cases.^{12,13}

The conclusive finding of this study was the percentage of best-corrected good vision at \geq 4 weeks postoperatively which was 94.7%. Good visual outcome of our study was higher than that reported in a national survey of Pakistan 2007 (50.1% \geq 6/18 with best-correction), LRBT Free Eye Hospital in Lahore (68%), Khalifa Gul Nawaz Teaching Hospital, KPK (80.5%), Aga Khan University Hospital, Karachi (93.3% and 94.5%), Punjab eye camps conducted by surgeons from Hamdard University Hospital (21.4%), and Lower Dir District Malakand (40.5%),^{5,10,14-17} but lower than that reported at Marie Adelaide Leprosy Centre Karachi (97.2%).⁹ Studies conducted in other developing countries showed good visual outcome in 91.7 % in India, 78.8 % in Ibadan (Nigeria), 26.6% in Ethiopia, and 89 % at a regional hospital in Ghana.¹⁸⁻²¹

Causes for Poor BCVA at 4 – 16 post-op weeks were mostly due to selection (88%) followed by sequel (12%). Similar findings were reported by Paracha and FK Hashmi et al, where majority of cases with poor/borderline BCVA had pre-existing ocular diseases.^{9,15}

Three patients suffered from poor BCVA due to late post-operative complications. Out of two patients with persistent corneal edema, one was referred to cornea specialist. The other patient had coexisting optic atrophy and was kept on topical medications.

Third patient with dense posterior capsule opacification, was lost to follow-up, though he was counselled about the need for capsulotomy at postoperative visit.

Percentage of follow-up visit was 53.8% (828 patients) at 4 – 16 weeks post-operatively as depicted in table 1. Possible reasons for decrease in follow-up could be good vision, travel restrictions due to COVID-19 pandemic, unstable health or socioeconomic conditions.

However a study by Limburg H. suggested that those returning for follow up were representative of the total, and that at ≥ 6 months postoperatively, the outcome data for the non-attenders did not differ remarkably from those who did attend.²² In light of this, we can reasonably extrapolate our results to those who did not follow-up. In spite of good results, surgeons and associated team members should not stay complacent, rather work harder to maintain, and to increase cataract services effectiveness and efficiency.

Low follow-up rate at 4-16 weeks post-operatively was a limitation of this study. Single-centre study, results from one secondary eye hospital cannot be generalized for other similar centres. Subjective refraction done using Snellen chart instead of Logarithm of the minimal angle of resolution (LogMAR). Literature shows that LogMAR chart is recommended in research studies as it is more reliable than Snellen.²³ Objective residual refractive errors were not analyzed as patients with good vision (6/18 – 6/9) may require glasses to attain VA of 6/6. Late-onset complications occurring beyond 4 - 16 weeks post-operatively were not evaluated.

CONCLUSION

Good visual outcome as per WHO recommendations can be obtained after cataract surgery at secondary eye hospital; provided that the surgeons and operating room team are trained, well equipped, and follow aseptic measures. Routine monitoring by hospitals and surgeons using WHO guidelines will help in assessing quality of cataract surgery services over time.

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Ethical Approval

The study was approved by the Institutional review board/Ethical review board (**ABEH-ERB/04-21/001**).

Conflict of Interest

Authors declared no conflict of interest.

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Authors' Designation and Contribution

Mahpara Mangi; Consultant Ophthalmologist:
Literature search, Data acquisition, Data analysis, Statistical analysis, Manuscript preparation.

Muhammad Khizar Bashir; Consultant Ophthalmologist:
Concepts, Design, Data acquisition, Manuscript editing, Manuscript review.

Mujahid Inam; Consultant Ophthalmologist:
Literature search, Manuscript preparation, Manuscript editing, Manuscript review.

