

Intra-operative and Immediate Post-operative Complications in a High Volume Cataract Surgery Center

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ABSTRACT

Purpose: To find out the frequency of complications in a high volume phacoemulsification set up at a tertiary care eye hospital in Lahore.

Study Design: Quasi experimental study.

Place and Duration of Study: Al-Ehsan Eye Hospital, Lahore, from July 2017 to June 2019.

Methods: Surgical outcomes of 6,902 patients who had undergone phacoemulsification were included. Patients were excluded if they had ocular infections, lid margin diseases, adnexal diseases, those requiring a secondary anterior chamber surgery and those unfit for the procedure due to medical grounds. Every patient underwent a detailed history and complete clinical examination. All patients underwent standard phacoemulsification technique with intraocular lens implantation in most of the cases. Complications encountered during high volume cataract surgery were recorded and their percentages were calculated.

Results: A total of 6,902 patients underwent cataract surgery with 2.66% intra-operative and 6.94% immediate post-operative complications. The most common intra-operative complication was posterior capsular rupture (1.15%). In patients with capsular rupture the intra ocular lens was implanted within the sulcus in 61 cases (0.88%) while in 12 cases (0.17%) anterior chamber lens was implanted because of lack of capsular support. During the surgery intra ocular lens could not be implanted in 7 cases (0.10%) and they were left aphakic. The commonest immediate post-operative adverse outcome was corneal edema with striate keratopathy and decemments folds in 197 cases (2.85%).

Conclusion: High volume cataract surgery using appropriate techniques and sterilization does not compromise the quality of outcomes.

Key Words: Cataract, Phacoemulsification, Vitreous loss.

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INTRODUCTION

There are multiple etiologies that can cause formation of cataracts.^{1,2} Numerous medications were investigated to treat cataract; including sorbitol-lowering agents, aspirin, glutathione-raising agents and antioxidant vitamins C and E.³ The definite treatment of cataracts still remains removal through surgery and implantation of an intra-ocular lens.^{4,5,6} With an advancing age and early presentation, the

disease burden has increased in recent years and despite the advancements in surgical techniques and equipment it poses a significant challenge to the health services.^{7,8,9} This is especially a problem in the developing world where lack of disease awareness, lack of education, under developed health services, financial constraints all add up and compound the problems. High volume cataract surgery is now a common practice in most parts of the developing world.^{10,11}

High volume phacoemulsification is a routine at Al-Ehsan eye hospital, Lahore. A large proportion of patients presenting at the hospital are diagnosed with cataracts and undergo phacoemulsification. In the light of this practice, a study was conducted at the hospital where cases operated by a high volume surgeon were analyzed for per-operative and post-operative complications.

METHODS

Al-Ehsan Eye Hospital, Lahore is a tertiary care eye hospital with a large outpatient and surgical volume. The study was conducted during the period from July 2017 to June 2019. The patients were operated by a single qualified surgeon who operated more than eighty (80) cases per week. Ethical approval was sought and consent was taken from every patient before surgery. This study included all patients between 20 and 90 years, whose best corrected visual acuity did not improve by refraction. Other indications for cataract surgery included diagnosis and treatment of any associated underlying retinal pathology, performing relevant posterior segment investigations such as OCT, FFA, Visual fields etc. Patients were excluded from study if they had underlying ocular infections, lid margin diseases, associated adnexal diseases, those requiring a secondary anterior chamber surgery and those deemed unfit to undergo the procedure on medical grounds.

All patients were recruited from the outpatient department at the hospital. Patients underwent a standard protocol from advice of procedure to surgery. Every patient on presentation underwent a detailed examination that included a brief history, refraction, anterior segment examination and IOP measurement followed by detailed fundus examination. All patients underwent baseline blood tests, viral serology with ELISA and biometry with IOL Master for IOL power calculations. All patients were prepped with disposable

surgical caps and gowns, vitals were recorded, eyes were marked, pupils were dilated using the 2.5% Phenylephrine and 1% Mydracyl eye drops and patients were then taken to the surgical operating room for surgery.

The surgery was performed by the surgeon using two fully equipped eye surgical stations. Each station was manned by an assisting nurse for the surgical trolley and two supporting staff members who assisted in shifting of the patients, providing consumables to the assisting nurse and the surgical team. Each station was equipped with an operating microscope, Phacoemulsification machine, operating table and surgeon chair.

A strict sterilization protocol was followed for the instrument sterilization. The eye to be operated was cleaned with Povidone Iodine solution before the surgery by the assisting nurse. Patients with negative serology for hepatitis B and C viruses were operated first followed by those with positive blood tests for hepatitis B and C viruses. The surgeon switched in between the two operating stations where the prepared patients were ready for surgery. All patients underwent the standard phacoemulsification technique and at the end of each surgery, subconjunctival injections of dexamethasone and gentamycin were given to the patients. Any per-operative event was documented after the surgery.

All eyes were covered with an eye pad and all patients prescribed steroid and antibiotics eye drops. The patients were instructed to remove the eye pads four hours after surgery and start the drops at two hourly intervals. The patients were examined on the next day in outpatient department by the operating surgeon who documented any post-operative complications in the cases.

RESULTS

The per-operative complications encountered during the high volume surgery varied in spectrum. The most common intra-operative complication recorded was posterior capsular rupture in 80 cases (1.15%). Vitreous loss with posterior capsular rupture requiring anterior vitrectomy was encountered in 63 cases (0.91%) while 17 cases (0.24%) had no vitreous prolapse. In patients with capsular rupture the intra ocular lens was implanted within the sulcus in 61 cases (0.88%) while in 12 cases (0.17%) anterior chamber lens was implanted. Lens matter drop into the posterior

vitreous cavity was encountered in 4 cases (0.05%) that had capsular rupture. Two cases (0.002%) had nucleus drop during the surgical procedure. During the surgery intra ocular lens could not be implanted in 7 cases (0.10%) and they were left aphakic. While performing phacoemulsification Iris was damaged in 9 cases (0.13%). Per operative surgical hyphema secondary to mechanical trauma was encountered in 5 cases (0.05%). In 4 cases (0.05%) the lens haptics were damaged that required replacement (table 1)

Table 1: Frequency of Per-operative Complications during High Volume Cataract Surgery (Percentage).

Intra-Operative Complications		
Complication	No of Patients	Percentage
Posterior capsular rupture with vitreous loss	63	0.91%
Posterior capsular rupture with no vitreous loss	17	0.24%
IOL implant in sulcus	61	0.88%
AC IOL implant	12	0.17%
Posterior capsular rupture with lens matter drop in vitreous	4	0.05%
Nucleus Drop	2	0.002%
Aphakia	7	0.10%
Iris Chop	9	0.13%
Surgical Hyphema	5	0.07%
Broken Haptic	4	0.05%

Post-operatively the most common adverse outcome was corneal edema with striate keratopathy and decemts folds in 197 cases (2.85%). This adverse outcome was associated with hard cataracts that required excessive chamber manipulation during chopping and phacoemulsification. The most serious complication was intense anterior chamber activity with residual hypopyon in 3 cases (0.04%) on the immediate post-operative day. These patients were promptly treated on the treatment guidelines of post-operative endophthalmitis (table 2).

Table 2: Immediate Post-operative Complications in High Volume Cataract Surgery.

Complication	No of Patients	Percentage
Corneal edema + striate keratopathy and DM folds	197	2.85%
Anteriorchamber reaction (> + 2 Cells)	167	2.41%
Corneal edema	83	1.20%
Displaced IOL requiring repositioning	11	0.15%
Wound leak + shallow	6	0.08%

anterior chamber		
Residual cortex/lens matter	7	0.10%
Hyphema	5	0.07%
Hypopyon	3	0.04%

DISCUSSION

Cataract is the commonest cause of decreased vision in older age in developing countries like Pakistan.⁴ In developing countries the increased number of patients with cataract is due to lack of education, lack of disease awareness, under-developed health facilities and financial constrain. In such circumstances, high volume cataract surgery is now a common practice in most parts of the developing world.

The same high volume surgical approach was adopted in our surgical setting where we focused on different intra-operative and post-operative complications encountered during high volume cataract surgery operated by a single surgeon.¹² The average surgery time was approximately 3 minutes and approximately 8 – 10 surgeries were performed in a single hour. Venkatesh et al. documented 1.9% intraoperative and 12.6% immediate postoperative complications of three high volume surgeons in a community based hospital. Their average surgical time was 3.75 minutes per case.¹³

In a population based analysis in Ontario, Canada the association of annual surgeon volume of cataract procedures with their risk of post-operative adverse events was documented. There were 284 797 cataract surgeries in patients older than 20 years performed at 70 hospitals or eye surgery centers. Fewer than 1 in 200 patients experienced an adverse event (range 0.33% – 0.41%). Surgeons performing 50 to 250 cataract surgeries per year had an adverse event rate of 0.8%. Surgeons performing 251 to 500 cataract surgeries per year had an adverse event rate of 0.4%. Surgeons performing 501 to 1000 cataract surgeries per year had an adverse event rate of 0.2% and surgeons performing more than 1000 cataract surgeries per year had an adverse event rate of 0.1%.¹⁴

In our study over a course of two years the intra-operative and immediate post-operative complications rate in surgeries performed by a single surgeon was 2.78% and 6.94% respectively. The most common problem faced after the cataract extraction was corneal edema with striate keratopathy and folds in decemts membrane in approximately 1.39%. It occurred due to excessive chamber manipulation during chopping of

the lens. This settled approximately after 2 weeks by using intensive steroid therapy every 2 hours in the first week followed by four times a day in the 2nd week. The commonest intra-operative complication recorded was posterior capsular rupture in total of 80 cases (1.15%). The capsular rupture was dealt most commonly with lens implanted in sulcus (0.88%).¹⁵

The modified sterilization and asepsis protocol adopted to facilitate high-volume cataract surgery in our clinical setting appeared to be safe and effective in preventing postsurgical endophthalmitis with a very low frequency comparable to other studies.¹⁶ In a study conducted at Aravind eye hospital on more than 42,000 consecutive cases of high volume cataract surgery, the incidence of endophthalmitis was 0.09% after using a standardized sterilization and prophylaxis protocol.¹⁷

Our study shows that by using appropriate sterilization and asepsis protocol, in the hands of an experienced surgeon, high volume cataract surgery does not compromise the surgical outcome with a very low rate of complications that are comparable to other studies.¹⁸ High volume cataract surgeries are affordable, cost effective and if made a standard practice can help in tackling high levels of preventable blindness in the developing countries.^{19,20} Thus, more data should be collected to develop standard protocols for high volume cataract surgeries.

CONCLUSION

High volume cataract surgery using appropriate sterilization techniques does not compromise quality of outcomes.

Ethical Approval

The study was approved by the Institutional review board/Ethical review board.

Conflict of Interest

Authors declared no conflict of interest.

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Authors' Designation & Contribution

Muhammad Ali Haider; Assistant Professor: *Study Design, Data Collection, Write manuscript.*

Uzma Sattar; Optometrist: *Result, Data Analysis, final review.*

Muhammad Amjad; Consultant Ophthalmologist: *editing, Manuscript review.*

