

A Descriptive Study of Intraoperative Complications in Manual Small Incision Cataract Surgery

Dr. Divya Khatwani¹, Dr. Ajay Tammewar², Dr. Roopa Naik³, Dr. Sneha Murade⁴,

¹Resident, ²Professor, ³Professor & Head, ⁴Assistant Professor, Department of Ophthalmology, DVVPF's Medical College & Hospital, Ahmednagar-414111, Maharashtra, India

Abstract:

Background: In India and other developing countries, senile cataract is the most common cause of reversible blindness. In developed countries, phacoemulsification is a preferred option. It is an expensive procedure which requires high surgical training. Manual small incision cataract surgery (MSICS) is a safe and affordable technique. It involves lesser surgical time and the instrumentation is easier to maintain. This study is undertaken to know the intraoperative complications involved in this technique and the management of these complications. **Methodology:** A total of 50 cases were studied from October 2020-January 2021. It is a hospital based, descriptive cross-sectional study. **Results:** Intraoperative complications occurred in 10 cases (20%). It included iris prolapse in 3 cases (6%), tunnel related complications in 3 cases which included premature entry in 2 cases (4%) and button holing in 1 case (2%), Descemet membrane detachment in 1 case (2%), intraoperative miosis in 1 case (2%), intraoperative hyphema in 1 case (2%), capsule related complications in 1 case (2%) and PC rent in one case (2%). **Conclusion:** Manual small incision cataract surgery is well suited in our country, where there is backlog of cataract cases. It is an effective, affordable technique which involves lesser surgical time.

Keywords: Manual small incision cataract surgery (MSICS), Intraoperative complications, Cataract

Introduction:

A lens is a biconvex, crystalline substance with the main function of transmitting and refracting light. 35% of the refracting power of eye, is contributed by the lens. Any opacification of the lens or its capsule is defined as cataract. The capsule of the lens is thickest anteriorly and is thinnest at the posterior pole. The process of cataract formation has three evident factors that is hydration, denaturation of the proteins and slow sclerosis.¹

The most common cause of curable blindness is cataract. According to World Health Organization, an estimated 20 million people worldwide are visually impaired from bilateral cataract and this growing backlog is a greatest public health challenge.² It is estimated that in developing countries, 90% of the world's visually impaired population resides.³ Every year 3.8 million in India develop cataract, it being the

principal cause of blindness accounting for 62.6%.⁴ There are 12.5 million blind and 50% to 80% of them are due to cataract.^{5,6}

There is no medical treatment to induce the disappearance of cataract once the opacities have formed. Surgical treatment seems to be the definitive management. There have been advances in the microsurgical instruments and operative equipment which aids the cataract surgery effective and very safe. Phacoemulsification and manual SICS have smaller incisions which has made the postoperative recovery and physical rehabilitation of the patients quick.

In India, manual small incision cataract surgery (MSICS) is a commonly performed procedure. It has shown to be a quick procedure with low cost, and low complication rates.^{7,8}

Corresponding Author: Dr. Ajay Tammewar

Email ID: ajaytams@gmail.com

Address: Department of Ophthalmology, DVVPF's Medical College & Hospital, Ahmednagar-414111, Maharashtra, India

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Phacoemulsification requires high energy and a considerable time and effort to emulsify hard cataracts like mature and brunescant cataracts and can affect the endothelium and zonular fibers. Manual SICS has comparatively less damaging effects on the corneal endothelium. The application of phacoemulsification in the community is limited due to its high cost, relatively long curve for learning and its machine dependency.

The chances of striate keratitis, injury to iris and posterior capsular rupture in manual SICS, increases due to the considerable handling inside the anterior chamber. A good capsulorhexis and construction of the scleral tunnel are the crucial steps in MSICS. To decrease the burden of cataract in a developing country, manual small incision cataract surgery can prove as an effective and affordable technique.

Methodology :

Aim & objectives:

- 1.To estimate the intraoperative complications of manual small incision cataract surgery (MSICS).
- 2.To estimate the factors that lead to intraoperative complications of manual SICS and their management

Study type: Hospital based, Descriptive cross-sectional study

Sample Size: 50 patients were selected coming to a tertiary care centre by simple random sampling method.

Study Duration: October 2020 - January 2021

Inclusion criteria:

- All patients above the age of 40 years of either sex.
- Patients having cataract in at least one eye
- Those who were willing to participate in the study and give a written informed consent

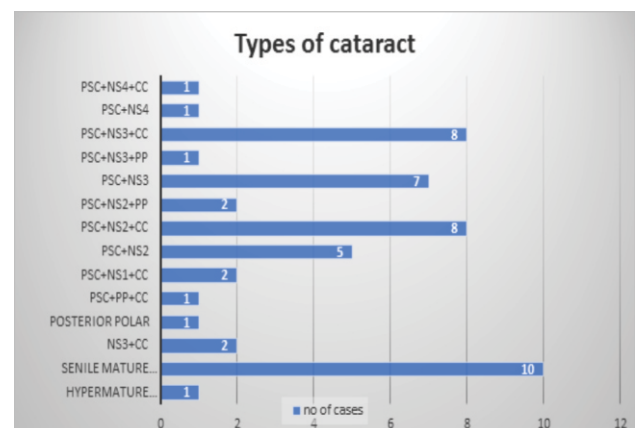
Exclusion criteria:

- Patients having congenital, developmental, traumatic or complicated cataract.
- Patients with pseudoexfoliation
- Patients with corneal opacities or any other corneal ectasia.
- Patients with retinal pathology, glaucoma.
- Any previous intraocular surgery

Method: After obtaining the written consent, patients satisfying the inclusion criteria were considered to proceed with the study. After admission, the patients were examined with the help of a Snellen's chart to check pre-operative visual acuity. A slit lamp examination was done for assessment of the cornea, AC depth and hardness of the cataract. Lens Opacity Classification System (LOCS) was used for grading of the nuclear cataract. Fundus examination was done after dilating the pupil using +20D lens for indirect ophthalmoscopy and a +90D lens for slit lamp biomicroscopy. B-scan was performed in dense cataracts preventing the fundus view. An applanation tonometer was used to check the IOP (intraocular pressure). Sac syringing was done to check the patency of the lacrimal sac. Keratometry was done using an auto-keratometer, axial length measurement using A-Scan & calculation of IOL (intra ocular lens) power by SRK –II formula. Routine investigations that is CBC, blood sugar levels, ECG, urine routine were done for all the patients. They were subjected to a detailed physical and general examination. Physician fitness was taken before proceeding for the procedure. All the cases were assigned to undergo Manual Small Incision Cataract Surgery using peribulbar block (PBB) with posterior chamber intra ocular lens (PCIOL) whose power was decided with SRK–II formula. All surgeries were done by one surgeon.

Results:

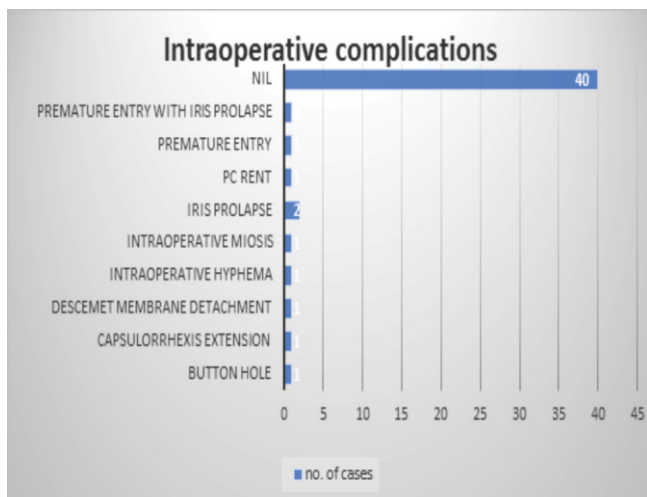
Fig 1: Types of cataract



Out of the 50 cases under study, 10 cases (20%) were with mature senile cataract. 8 patients each (16%) with posterior subcapsular cataract+ nuclear sclerosis grade 2+ cortical cataract and posterior subcapsular

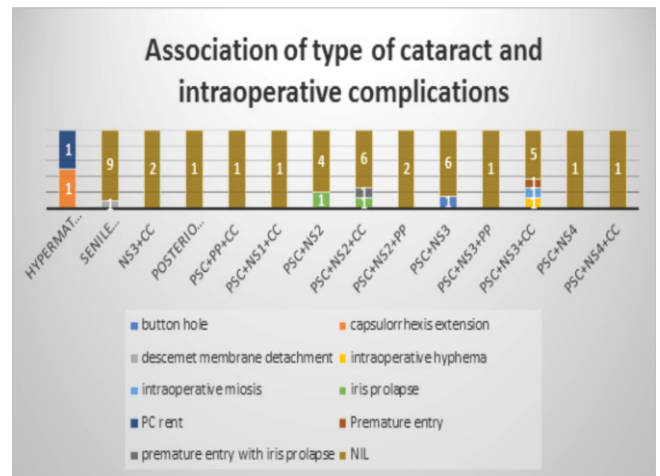
cataract + nuclear sclerosis grade 3 + cortical cataract, 6 cases (12%) with posterior subcapsular cataract+ nuclear sclerosis grade 3, 5 patients (10%) with posterior subcapsular cataract + nuclear sclerosis grade 2, 2 cases (4%) with hypermature cataract, 2 patients (4%) with nuclear sclerosis grade 3 + cortical cataract, 2 cases (4%) with posterior subcapsular cataract+ nuclear sclerosis grade 1 + cortical cataract, 1 patient (2%) each of posterior polar, posterior subcapsular cataract + posterior polar + cortical cataract, posterior subcapsular cataract+ nuclear sclerosis grade 3 + cortical cataract, posterior subcapsular cataract + nuclear sclerosis grade 4, posterior subcapsular cataract + nuclear sclerosis grade 4 + cortical cataract.

Fig 2: Intraoperative complications



A total of 10 patients were observed with intraoperative complications out of the 50 patients that underwent manual small incision cataract surgery. The following intraoperative complications were studied in our study. 2 cases that is 4 % of the study population was observed with iris prolapse, premature entry in 1 case (2%), premature entry with iris prolapse in 1 case (2%), capsule extension in one case (2%), intraoperative hyphema in one case (2%), intraoperative miosis in one case (2%), posterior capsule rent in one case (2%). A total of 40 patients had no intraoperative complications in our study.

Fig 3: Association between the intraoperative complications and the types of cataract



3 cases of Posterior subcapsular cataract + nuclear sclerosis grade 3+ cortical cataract out of the 8 cases under study were associated with intraoperative complications compared to other types of cataract in our study, there was premature entry while tunnel making, intraoperative hyphema and intraoperative miosis. Both the cases of hypermature cataract in our study were associated with intraoperative complications, one case had a capsulorrhesis extension another had posterior capsule rent. Out of the 10 cases of senile mature cataract, one case showed Descemet membrane detachment and others were associated with no intraoperative complications. One case of posterior subcapsular cataract+ nuclear sclerosis grade 2 and one case of posterior subcapsular cataract + nuclear sclerosis grade 2 + cortical cataract had iris prolapse. Another case of posterior subcapsular cataract + nuclear sclerosis grade 2 + cortical cataract had premature entry with iris prolapse. Button holing of the tunnel was seen in posterior subcapsular cataract + nuclear sclerosis grade 3.

Discussion

In the current study, 50 cases of manual small incision cataract surgery were studied. All the cases were done by same surgeon over a period from October 2020-January 2021.

In our study, 10 cases were with senile mature cataract. Intraoperative complications occurred in 10 cases (20%). It included iris prolapse in 3 cases (6%), tunnel related complications in 3 cases which included premature entry in 2 cases (4%) and button holing in 1 case (2%), Descemet membrane detachment in 1 case (2%), intraoperative miosis in 1 case (2%), intraoperative hyphema in 1 case (2%), capsule related complications in 1 case (2%) and PC rent in one case (2%).

Iris prolapse was seen in 3 cases (6%) which was the complication observed in majority patients in our study. During the delivery of the nucleus, accidental incarceration of iris was observed between the nucleus and wire vectis in 2 cases in our study. In one case, there was premature entry into the anterior chamber and iris prolapse due to faulty tunnel construction. Using an iris repositor, iris was repositioned back at various steps of the surgery. Suturing of the tunnel was done at the end of the surgery with nylon 10-0 to avoid iris incarceration and prolapse postoperatively. Kongsap P⁹ reported that iris prolapse was seen in 7.37% of cases, being the most common complication in his study.

3 cases were observed with tunnel related complications which included premature entry into the anterior chamber in 2 cases (4%), that is the tunnel was deep and button holing in one case (2%) where the tunnel was shallow. Premature entry led to trauma to the iris base leading to intraoperative hyphema which was noted in one case and iris prolapse was observed in another case. In a study conducted by Punitkumar Singh¹⁰, 3 (2.72%) cases had intraoperative hyphema into the anterior chamber due to blood trickling through the tunnel. Management of premature entry was done by suturing the tunnel at end of the procedure with nylon 10-0. Creating the tunnel at a deeper plane and making an entry into the clear cornea 0.5mm anterior than usual to manage button holing of the tunnel.

Descemet's detachment was seen in 1 case in our study (2%). Faulty instrumentation is supposed to be the cause of this complication. It was noticed as a

small detachment and an air bubble was injected intraoperatively to facilitate its apposition. Schroeder¹¹ reported Descemet's detachment in 0.7% of cases. Khanna RC, Kaza S, Palamaner Subash Shantha G, et al¹² evaluated 522 patients in their study who underwent MSICS & observed 7 patients (1.3%) had Descemet membrane detachment.

In our study, one case had intraoperative miosis due to excessive iris manipulation. Visco-elastics were injected into the anterior chamber to manage this complication. Punitkumar Singh¹⁰ in his study had intraoperative miosis in 4 (3.63%) cases.

Capsule related complication was seen in one case, which had peripheral extension of rhexis due to raised intralenticular pressure. This was managed by converting capsulorrhexis into a can opener capsulotomy. Kongsap P⁹ reported capsule related complications in 2.11% cases.

In our study Posterior capsule rent was seen in one case of hypermature cataract. Being a hard cataract, there was a difficulty in prolapsing the nucleus, ultimately leading to rent. The superior rectus bridle suture was released on noticing this complication. The remnants of cortical matter aspirated out by dry aspiration. Viscoelastic substances were injected, it helped to push the vitreous back. Anterior vitrectomy was performed and intra ocular lens was implanted into the sulcus. Chirambo MC¹³ noted 3.4% cases of PC rent, Balmer A et al¹⁴ 2.5%, Gogate P M¹⁵ 5.02%, in his study reported increased incidence of PC rent in hypermature and hard cataract.

Conclusion:

Complications of cataract surgery in India has undergone a decreasing trend during the last decade. In our study, iris prolapse was the common intraoperative complication seen in 3 cases. The wound construction in manual small incision cataract surgery is challenging.

Low cost, shorter surgical time, ability to remove dense cataract and lesser complications makes manual small incision cataract surgery very useful in high volume cataract surgeries where there is a backlog of cataract cases.

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