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RESEARCH ARTICLE
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STUDY OF INTRAOPERATIVE COMPLICATIONS OF SMALL INCISION CATARACT SURGERY

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ABSTRACT

Background

Small incision cataract surgery is the most commonly performed surgery for Cataract in developing countries. This procedure is safe and effective to increase the output of cataract surgical services, at the same time affordable. The present study is undertaken to know the incidence of intraoperative complications and how best the complications can be minimized and treated.

Methods

A total of 125 cases studied from August 2022 to January 2023. Intraoperative complications were studied and managed. Visual outcome following these

Complications were studied by noting the best corrected visual acuity after postoperative 1st Day, 3rd Day, 7th Day, 2 weeks, 3 weeks, 4 weeks, 5 weeks, 6 weeks following surgery.

Results

Intraoperative complications were Posterior capsule rent in 27 (21.6%), Iris Prolapse/dialysis 27(21.6%), Zonular dialysis 16(12.8%), Incision and tunnel related complications 8(10%), Descemet's detachment 10(8%), Capsule related complications 22(17.6%), Chemosis during peribulbar block 6 (4.8%), small pupil 5(4%), others like nucleus drop 2 (1.6%) of cases.

Following early detection and management of these complications the visual outcome was satisfactory after 6 weeks postoperatively. Best corrected visual acuity of 6/6- 6/18 was achieved in 98.4% of cases

Conclusions

Small incision cataract surgery is good technique which provides early and good visual outcome. Overall the complications of small incision cataract surgery are less and the procedure is well suited in our country, where there is large number of backlog of cataract cases.

Key Words: Small incision cataract surgery; Intraoperative complications.

INTRODUCTION

Cataract is the main and biggest cause of curable blindness in India and worldwide. It has been estimated that 3.8 million people develop blinding cataract every year in India as against 2.7 million cataract surgeries done every year.[1,2] In India, it is the principal cause of blindness accounting for 62.6%.[3] Lens is a transparent, biconvex, crystalline structure placed between iris and the vitreous in a saucer shaped depression, the patellar fossa. Cataract is development of any opacity in lens or it's capsule.[4]

Extra capsular cataract extraction (ECCE), manual small incision cataract extraction (MSICS), phacoemulsification (Phaco) are the common type of cataract surgery techniques performed worldwide.[5] Both Phacoemulsification and MSICS achieved excellent visual outcomes with low complication rates. MSICS is a more appropriate surgical procedure for the treatment of advanced cataracts in the developing world.[6,7]

Postoperative complications though inevitable, if adequate preventive measures are implicated such as timely diagnosis and appropriate management of complications, ocular morbidity can decrease. In presence of weak zonules, it may lead to severe complications of lens subluxation and vitreous loss.[8] Posterior capsular rent (PCR) is the most common potentially sight threatening intraoperative complication during cataract surgery.[9,10] Intraoperative Complications of SICS (Small Incision Cataract Surgery)

1. Anaesthesia related complications
2. Superior rectus muscle laceration and/or hematoma
3. Excessive bleeding during preparation of conjunctival flaps or during incision into the anterior chamber
4. Incision related complications

a) Irregular incision leading to defective coaptation of wound
b) Button holing of anterior wall of tunnel due to superficial dissection of scleral flap
c) Premature entry into the anterior chamber due to deep dissection
d) Scleral disinsertion due to very deep groove incision

5. Descemet's detachment
6. Iris injury and Iridodialysis
7. Complications related to anterior capsulorhexis

a) Escaping capsulorhexis
b) Small capsulorhexis
c) Very large capsulorhexis
d) Eccentric capsulorhexis

8. Posterior capsular rupture (PCR)

a) During forceful hydrodissection
b) By direct injury with any instrument
c) During cortex aspiration

9. Zonular dehiscence
10. Vitreous loss
11. Nucleus drop into vitreous cavity
12. Posterior loss of lens fragments
13. Expulsive choroidal haemorrhage
14. Iris prolapse [4,11]

AIMS AND OBJECTIVES

Primary Objective

- To study the intraoperative complications of small incision cataract surgical operation and their management.

Secondary Objective

- To study the visual outcome following the management of intraoperative complications.

MATERIALS & METHODS

The present Prospective study was conducted for a period of 6 months on 125 eyes with cataract in LTMMC & LTMGH, Sion, Mumbai, India.

Inclusion Criteria

- Patients between 40 – 80 years of age.
- Patients confirmed to have operable cataract.
- Patients undergoing Small Incision Cataract Surgery.

Exclusion Criteria

- Subluxation or dislocation of lens.
- Patients with complicated cataract, traumatic cataract, Pre-existing zonular weakness.
- Other ocular pathologies like corneal opacity, uveitis etc.
- Severe dry eye syndrome with corneal erosion.
- Conditions affecting macula and retinal pathologies.

Methodology

The study was initiated after clearance from the Institutional Ethics Committee and Board of Review Studies of the hospital. All persons fulfilling the inclusion criteria were enrolled. Detailed clinical history was recorded in case proforma.

Study Parameters: Visual acuity assessment was done by using Snellen's chart

- Slit lamp biomicroscopy examination of anterior segment and cataract grading.
- Intraocular pressure was checked with Applanation tonometer preoperatively and digitally postoperatively
- -Fundus examination using indirect ophthalmoscope

Statistical Methods

Sample Size Calculation

Sample size was calculated by following formula $N = (Z \text{ for } 1\text{-alpha})^2 \times p \times q / d^2$

N= sample size

D = absolute precision

Z = z score for 95% confidence interval = 1.96

Q = 100-p

P = 8.8% = total intra operative complications

D as 5%

Sample size was 125

Statistical Analysis

Data was entered into Microsoft Excel (Windows 7; Version 2007) and analyses were done using the Statistical Package for Social Sciences (SPSS) for Windows software (version 22.0; SPSS Inc, Chicago). Descriptive statistics such as mean and standard deviation (SD) for continuous variables, frequencies and percentages were calculated for categorical Variables were determined. Association between Variables was analyzed by using Chi-Square test for categorical Variables. Unpaired t Test was used to compare mean of quantitative variables between groups. Level of significance was set at 0.05.

RESULTS

Age (Years)	No.	Percent
≤ 50	1	0.8
51-60	27	21.6
61-70	48	38.4
71-80	49	39.2
Mean (SD)	67.33 (8.30)	
Range	46-80	

Table 1: Distribution of Study Subjects according to the Age (N=125)

Complications	No.	Percent Out of 125
Iris Prolapse	27	21.6
Posterior Capsular Rent	27	21.6
Zonular Dialysis	16	12.8
Small Capsulorrhexis	11	8.8
Escaping Capsulorrhexis	11	8.8
Descemet's detachment	10	8.0
Chemosis during Peribulbar Block	6	4.8
Premature entry	5	4.0
Button Holing of anterior wall of tunnel	5	4.0
Small Pupil	5	4.0
Nucleus Drop	2	1.6

Table 2: Distribution of Study Subjects according to the Intraoperative Complications (N= 125)

Complications	No.	BCVA		P Value
		6/24-6/60 (n=70)	<6/60 (n=55)	
Iris Prolapse	27	16 (22.9)	11 (20.0)	0.700
Posterior Capsular Rent	27	16 (22.0)	11 (20.0)	0.700
Zonular Dialysis	16	12 (17.1)	4 (7.3)	0.101
Capsulorrhexis	12	8 (11.4)	4 (7.3)	0.433
Escaping Capsulorrhexis	11	5 (7.1)	6 (10.9)	0.476
Descemet's detachment	10	10 (14.3)	-	0.003*
Chemosis during Peribulbar Block	6	-	6 (10.9)	0.004*
Premature entry	5	-	5 (9.1)	0.010*
Button Holding of anterior wall of tunnel	5	1 (1.4)	4 (7.3)	0.097
Small Pupil	4	-	4 (7.3)	0.021*
Nucleus Drop	2	2 (2.9)	-	

Table 3: Association between BCVA and Intraoperative Complications

Management	No.	Percent Out of 125
Anterior vitrectomy and Iris Claw Lens	30	24.
Iris Repositioning and Suture at Tunnel	16	12.8
Anterior vitrectomy and PCIOL in Sulcus	13	10.4
Capsulorrhexis Converted to can opener Capsulotomy	11	8.8
Capsulorrhexis Enlarged by 2 to 3 relaxing incisions	11	8.8
Iris Repositioning	11	8.8
Air Bubble Injection beyond the point of Descemet's detachment to reappose flap	10	8

Ocular Compression	6	4.8
Intracameral Adrenaline (Adrenaline 0.001%)	5	4.0
Tunnel at deeper plane	5	4.0
Suturing of Tunnel	4	3.2
Pars Plana vitrectomy with nucleus removal	2	1.6
Abandoned Incision Site and made new Incision	1	0.8

Table 4: Distribution of Study Subjects according to the Management

DISCUSSION

One Twenty-five cases of Small Incision Cataract Surgery were studied for intraoperative complications and management of these complications. Visual outcome was studied at postop day 1, day 3, day 7, 2 weeks, 3 weeks, 4 weeks, 5 weeks, 6 weeks.

Males constituted the majority, 54.5% as compared to females 45.5% in the present study.Out of 125 cases, patients in the 61 to 70 years age group were maximum accounting for 38.4% cases. Thirty-nine patients were above 70 years.

In our study, cataract was posterior subcapsular 43.2%, mature 19.2%, cortical 21.6%, nuclear 8%, hypermature in 5.6%, posterior polar 2.4% of cases.

Preoperative visual acuity of less than 6/60 was seen in 49.6% of cases. In the present study only 50.4% fitted in the group having pre operative visual acuity 6/36 or better.

Figure 1: Iris prolapse

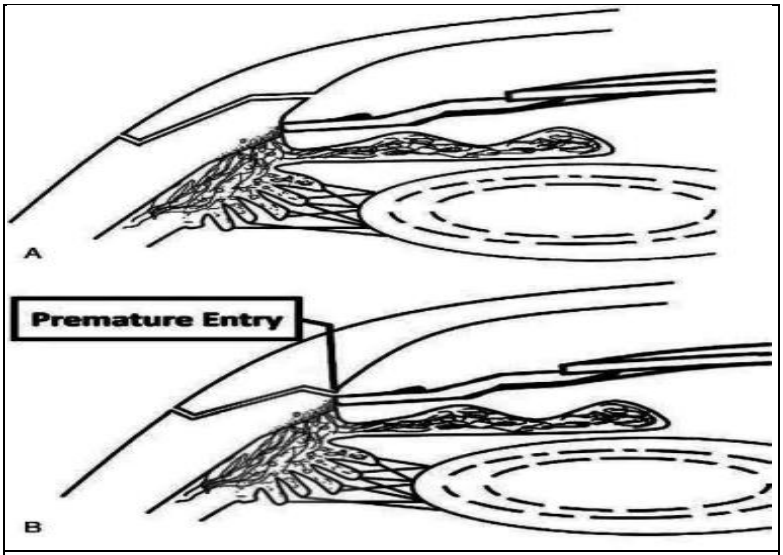

Figure 2 A) Normal 3 planar sclerocorneal tunnel B) Premature entry[12]

Manual small incision cataract surgery with PCIOL implantation was done in 125 cases.
Incidence of PC rent in our study was 21.6% and that of iris prolapse was 21.6%. A study conducted by Ramya M and Soumya Ramani, Department of Ophthalmology, Ramaiah Medical College, India which included 31.5% PC rent and 19.1% Iris prolapse.[13] Gogate PM, Deshpande M, Wormald RP, Deshpande R, Kulkarni SR in a randomised controlled clinical trial on 741 patients aged 40-90 years, reported posterior capsular rent as the commonest major intraoperative complication in 18 of 358 surgeries.[14] Incidence of Zonular dialysis in our study was 12.8% whereas study of intraoperative complications of SICS by Ramya M and Soumya Ramani, Department of Ophthalmology, Ramaiah Medical College, India had 19% Zonular dialysis.[13]
Posterior capsule rent was seen in 21.6% cases in our study. Posterior capsule rupture occurred most commonly due to extension of capsulorhexis or during irrigation aspiration. One case presented as difficulty in prolapsing the nucleus out of the bag. As soon as the complication was noted, anterior chamber w a s filled with viscoelastic material. The situation was assessed, nucleus was prolapsed gradually with Sinskey hook with maintenance of AC with viscoelastic. All patient having PC rent had vitreous loss, so anterior vitrectomy was performed and PCIOL implanted in the ciliary sulcus in 13 Cases and Iris claw lens in 30 cases. Two patients were having nucleus drop, they were rendered aphakic. Schroeder B reviewed sutureless cataract extraction: Complications management in 2003 and reported posterior capsule rupture in (4.5%), zonular dialysis (1.6%), iridodialysis (0.7%), tunnel complications (1.5%) and Descemet's stripping (0.7%) out of 550 patients.[15]
Intra operative complications were occurring mainly due to thin capsule and associated difficulty in performing capsulorrhexis. Iris prolapse was seen in 21.6 % cases in our study. Iris prolapse occurred mostly during delivery of the nucleus. Tunnel construction was faulty in some cases, premature entry into anterior chamber was noted. Iris was reposited at various steps of the surgery and scleral tunnel was sutured at the end of the procedure with 9 -0 nylon interrupted sutures. The cause may be due to either extension of the wound for delivery of large nucleus or increased pressure to deliver large nucleus through small wound. In our study 125 cases were followed up for six weeks after the cataract surgery.
Kongsap P in his prospective study conducted during December 2005 to May 2006 evaluated the intraoperative complications and postoperative complications in patients undergoing cataract surgery. The most common intraoperative complication was iris prolapse (7.37%), followed by posterior capsule rupture (2.11%), transient intracameral bleeding (2.11%) and capsulorhexis tear (2.11%).[16]
In our study BCVA was 6/18 or better in 123 (98.4%) cases. Our study compares well with above studies. The WHO guideline is 90% (BCVA 6/18 or better), our study had fairly met the guideline.
Complications were seen more in cases operated by residents. In case of complication, the supervising surgeon took over and completed the surgery.

CONCLUSION

Despite the modern technology to advance the treatment of cataracts, the greatest challenge in our field continues to be large and there is increasing backlog of cataract blindness in developing countries.
Manual Small Incision Cataract Surgery with its low complication rate has now come to be established surgical procedure for cataract surgery. It gives uncorrected postoperative visual acuity of 6/18 or better in a greater proportion of patients. The complications managed with standard surgical techniques are compatible with good visual outcome.
Although Manual Small Incision Cataract Surgery demands skill and practice from the cataract surgeon, it is a safe, effective, and economical alternative to competing techniques.
Prospective standardised monitoring of cataract surgical outcomes with regular analysis of the causes of poor outcome is an important tool, which individual ophthalmic surgical teams can use to improve the results of their cataract surgery. The emphasis should be on continuous internal audit over time in order to improve results, rather than on inappropriate comparison of results between centres or surgeons.

BIBLIOGRAPHY

[1] Minassian DC, Mehra V. 3.8 million blinded by cataract each year: projections from the first epidemiological study of incidence of cataract blindness in India. British Journal of Ophthalmology 1990;74(6):341-3.

[2] Brian G, Taylor H. Cataract blindness: challenges for the 21st century. Bulletin of the World Health Organization 2001;79:249-56.

[3] Avachat SS, Phalke V, Kambale S. Epidemiological correlates of cataract cases in tertiary health care center in rural area of Maharashtra. Journal of Family Medicine and Primary Care 2014;3(1):45.

[4] Khurana AK. Comprehensive ophthalmology. Jaypee Brothers Medical Publishers 2019.

[5] Allen D, Vasavada A. Cataract and surgery for cataract. BMJ 2006;333(7559):128-32.

[6] Ruit S, Tabin G, Chang D, Bajracharya L, Kline DC, Richheimer W, et al. A prospective randomized clinical trial of phacoemulsification vs manual sutureless small-incision extracapsular cataract surgery in Nepal. American journal of Ophthalmology 2007;143(1):32-8.

[7] Khanna RC, Kaza S, Shantha GP, Sangwan VS. Comparative outcomes of manual small incision cataract surgery and phacoemulsification performed by ophthalmology trainees in a tertiary eye care hospital in India: a retrospective cohort design. BMJ Open 2012;2(5):e001035.

[8] Venkatesh R, Muralikrishnan R, Balent LC, Prakash SK, Prajna NV. Outcomes of high volume cataract surgeries in a developing country. British Journal of Ophthalmology 2005;89(9):1079-83.

[9] Yorston D, Gichuhi S, Wood M, Foster A. Does prospective monitoring improve cataract surgery outcomes in Africa? British Journal of Ophthalmology 2002;86(5):543-7.

[10] Balmer A, Andenmatten R, Hiroz CA. Complications of cataract surgery. Retrospective study of 1,304 cases. Klinische Monatsblatter fur Augenheilkunde 1991;198(5):344-6.

[11] Jaffe NS, Jaffe MS, Jaffe GF. Cataract surgery and its complications. St.Louis: Mosby 1997.

[12] Lin HL, Tseng GL. A spontaneous protruded angle-supported anterior chamber intraocular lens: A case report. Medicine 2019;98(22).

[13] Ramya M, Ramani S. “To determine the occurrence of Various Intraoperative Complications of Manual Small Incision Cataract Surgery Acta Scientific Ophthalmology 2021;4(4):187-90.

[14] Gogate PM, Deshpande M, Wormald RP, Deshpande R, Kulkarni SR. Extracapsular cataract surgery compared with manual small incision cataract surgery in community eye care setting in western India: a randomised controlled trial. Br J Ophthalmol 2003;87(6):667-72.

[15] Schroeder B. Sutureless cataract extraction: Complications, management and learning curves. Community Eye Health 2003;16(48):58-60.

[16] Kongsap P. Manual sutureless cataract surgery with foldable intraocular lens using the Kongsap technique: the results of 95 cases. Journal-Medical Association of Thailand 2007;90(8):1627.