

Comparative Analysis between Small Incision Cataract Surgery and Extra Capsular Cataract Extraction

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ABSTRACT

Background: People with cataracts living in developing countries, have limited facilities to cope with high demands of cataract surgery. These countries share the largest backlog of cataract surgeries, which are intumescent, mature and hyper-mature lenses (white cataracts).

Aim: To compare both surgical procedures for the follow up recovery of cataract patients in high volume eye hospital setting.

Methods: In a single masked randomised controlled study, 360 willing subjects, aged 40–80 years, with operable cataract were evaluated to undergo either manual small incision cataract surgery (MSICS) (group 1) or extra capsular cataract extraction ECCE (group11) in Federal Government Services Hospital Islamabad during Jan. 2012 - Dec 2012 by a single surgeon after approval from hospital Ethical committee. Intraoperative and postoperative complications were graded according to the recommendations of Oxford Cataract Treatment and Evaluation Team (OCTET.A $p < 0.05$ was considered statistically significant.

Results: Among 360 first operated eyes, 184 patients of equal gender underwent MSICS while 176 patients had ECCE with PCIOL implantation. Mean age at surgery was 64 years with male predominance of 51.1%. The complications based on OCTET definitions showed that 69(19.1%) patients had Grade I, 15(4.1%) had Grade II and 4(1.1%) had Grade III complications.

Both groups achieved good visual results with minimal complications but group I had better Initial visual recovery. The most common first post-operative day complication was mild iridocyclitis. The induced astigmatism was less in MSICS group compared to ECCE group at first day but after six weeks no much difference was found. In both groups, corneas were clear after three weeks. At 6 month follow-up, 22(12.5%) patients in group 1 and 27(14.6%) patients in group 11 had Elschnig's Pearls.

Conclusion: A huge number of cataract patients are waiting for treatment in the developing world. Both MSICS and ECCE with intra ocular lens implantation can deal with this situation in our country.

Keywords: Cataract, incision,

INTRODUCTION

Cataract comes from the Greek word *καταράκτης* (kataraktēs) meaning the fall of water¹. Worldwide, 285 million people are visually handicapped, 39 million are blind while 18 million are due to cataract. Cataract affects over 22 million Americans after the age 40. About 70% of Americans have cataracts at the age of 75. With advancing age more than 30.1 million populations will be affected by the year 2020². About 4-8 million people are blind in India due to cataract³. In Pakistan nearly 570000 are blind (<3/60) due to cataract and 3 560 000 people have a visual acuity of <6/60 because of the cataract⁴.

Globally approximately 15 million cataract operations are performed each year with an increase of 5 million cases in next 5 years⁵. The most

common surgery performed in the America today is cataract surgery⁶.

The incidence of bilateral cataract blindness in subject over 50 years of age was 4.8% which is highest ratio in Pakistan as well as elsewhere⁷.

Various cataract surgeries dealing with large number of cataract patients should be affordable to everyone. Pakistan, is sixth populous developing country in the world, situated in the World Health Organization's (WHO) Eastern Mediterranean Region⁹. Its gross domestic product (GDP) is declining and majority of its population living below the poverty line¹⁰.

Eighty two percent of all blind above the age of 50 years live in developing countries⁵. Both MSICS and ECCE) are appropriate surgical technique employed in the developing country¹¹. The Idea was to provide latest micro surgical facilities to indigent patients who need good visual and cosmetic results. The current study compares both procedures and their acceptability for the patients.

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MATERIALS & METHODS

In this study, 360 patients, aged 40–80 years, with cataract were assigned to undergo either MSICS (group1) or ECCE (group II) in Federal Government Services Hospital Islamabad during jan.2012-dec2012 by a single surgeon. Two equal half of sample was taken to avoid gender bias. Informed consent from each patient and permission from Ethical committee was obtained. Intraoperative and postoperative complications were analyzed according to the (OCTET) recommendations. The patients were examined at day1, 7 at 6 weeks, 6 months and 1 year after surgery. Complications, astigmatism and visual rehabilitation were assessed and compared.

RESULTS

One hundred and eighty four patients underwent MSICS and 176 patients had planned ECCE. In both groups, all the patients (100%) were turned up for follow-up on day one and better than 98% follow-up at day 7 and weeks 3, 6, and 12. The 6-month follow-up rate was lower in both groups at 96% and 97%.

Both groups achieved good visual results. 85% of the eyes had a 6 week-post-operative best

corrected visual acuity of 6/12 or more in group1 while it was 83% in group II (table-1). The common refractive error was myopia with against the rule astigmatism seen in 71(19.7%). Against the rule astigmatism ATR was common in MSICS group cases with mean of 1.5 D on first day. In conventional ECCE, with the rule astigmatism WTR was in 26% of cases. Early visual recovery was better in MSICS group (table-2). The complications based on OCTET definitions showed that 69(19.1%) patients had Grade1, 15(4.1%) had Grade II and 4(1.1%) had Grade III complications. The most common first post-operative day complication was mild iridocyclitis. The induced astigmatism was less in MSICS group compared to ECCE group at first day but after six weeks there was no difference. In both groups corneas were clear after 3 weeks time. At 6 month follow-up, 22(12.5%) patients in group1 and 27(14.6%) patients in group II had PCO.

Among all patients 49% house wives and 27% farmers (Table-III) were much happy and did not want glasses. 15% teachers and industrial workers required corrective glasses, 7% were not satisfied either and 2% lost the follow-up or reported dead.

Table 1: Best corrected visual acuity

Type of Surgery	Visual Acuity	1 st Day		3 Weeks		6 Weeks	
		UCVA	BCVA	UCVA	BCVA	UCVA	BCVA
MSICS	>6/9	02	19	03	33	04	41
	6/12-6/18	13	14	22	09	31	10
	6/24-6/60	25	11	17	03	10	01
	<6/60	07	02	02	01	01	00
ECCE	6/12-6/18	02	17	13	14	21	11
	6/24-6/60	16	19	28	08	14	02
	<6/60	28	08	06	02	02	03

Table 2: Surgery induced astigmatism.

Type Astigmatism	MSICS			ECCE		
	1 st day	3 weeks	6 weeks	1 st day	3 weeks	6 weeks
ATR	31	26	20	4	6	9
0.0-1.0	7	13	17	3	2	4
>2.0	2	3	5	4	4	5
WTR 0.0-1	6	6	4	3	7	9
1.0-2.0	1	1	0	8	6	9
>2.0	2	2	1	12	14	13

Table 3: Comparison of post-operative complications in two groups

Complications	(MSIC)	(ECCE)
Uveitis	03	07
PCO	26	29
Cystoids macular oedema	01	03
Secondary glaucoma	03	06
Ocular watering	10	45
Wound leak	0	02
Unaided visual acuity < 6/18	27	39
Astigmatism > 1.5D	41	71

Table 1: Comparison of intra operative complications in two groups

Complications	(MSIC)	(ECCE)
Difficulty in delivery of nucleus	12	09
PC rent	02	07
Iridodialysis	02	0
Iris prolapse	02	05
hyphaema	08	02
Premature AC entry	02	03
Constricted pupil	10	19
Scleral flap button hole	02	00
Vitreous loss	02	04
Descemet's membrane stripping	03	04

DISCUSSION

SICS was developed in the United States and Israel and was made popular in India where large proportion of surgeries were performed¹².

SICS is a suitable surgical procedure for cataracts in developing countries.¹³This technique is effective for any type of cataract. It is faster, less expensive and less technologically dependent. MSICS gives excellent visual results with minimum complications. Common postoperative complications were minimal corneal edema and hyphaema which improved within 1 week without intervention.¹⁴3% patients had corneal oedema and 2% patients had folds in Descemet's membrane.

The surgical results obtained in our study compare favourably with those mentioned in the literature for MSICS.¹⁵ A study from Mumbai, India showed temporal tunnels to induce less astigmatism compared with superior tunnels for MSICS¹⁶. Posterior capsular opacification occurred in 12.5% of patients, is consistent with other studies¹⁷. SICS is better technique for the large number of cataracts patients in the developing world¹⁸.

ECCE is a time-tested surgery, a method of improving vision related quality of life in developing countries but has lost its edge due to longer surgical time, increased postoperative astigmatism and longer rehabilitation time. Mujaini et al. showed that ECCE in patients with advanced cataract and pseudoexfoliation was quite safe¹⁹similar to our study. In ECCE, postoperative high astigmatism has been an issue in various studies. In our study, the astigmatism was reduced intraoperatively by avoiding tightness or looseness of the sutures. The WHO definition of visual impairment is vision less than 20/60. According to this standard definition both techniques were successful in attaining good vision.

Two patients during MSICS procedure in this study developed inferior iridodialysis but not in ECCE group. Chakraborty S et al found the same.²⁰Gogate PM et al¹⁴ found that posterior capsular rent was more in MSICS group compared to ECCE group but in this study the frequency was more in ECCE group.

The mean OCTET score for intra operative complications was higher for ECCE group in this study which is contrary to other study. Folds in Descemet's membrane were more common in ECCE group in our study than MSICS group.

The mean surgically induced astigmatism in MSICS group was ATR 1.05D at 3 weeks time and it was 2.24 WTR in ECCE similar to Kshetrapal A et al who reported that 78% had astigmatism of 1.5D²¹.

88% of patients in MSICS group and 76% of patients in ECCE group attained 6/9 or better vision. The average uncorrected visual acuity of the small incision group was definitely higher than conventional large incision group in this study akin to Xiang Q et al study.²²Gogate et al³ also indicated that 37.3% of ECCE group and 47% of MSICS patients had visual acuity of 6/18 or better after six weeks. This study has found that MSICS gave an uncorrected visual acuity of 6/18 or better in higher proportion of patients than ECCE at six weeks. Intra and post-operative complications were similar in both groups but transient post-operative corneal edema was more common in MSICS group in this study.

Jakhanval SP et al noticed that rehabilitation time was better in MSICS than in ECCE group.²³akin to our study.

Patients having BCVA of >6/12 in our study were 184 (88.88%). This was similar to Gogate study of 86.7% but better than Gurung et al. study of 72%. In our study, a higher BCVA may have been due to the lower postoperative astigmatism²⁴.

According to WHO guidelines 85% of cataract surgeries should get GOOD visual outcome. Our study shows 83% similar results. The WHO recommends that poor visual outcomes should not be more than 5%. In this study it is worse than WHO criteria but still better than other studies²⁵. Another finding in current study is that among 7% of the patients having poor visual results, women had higher proportion than men (23 vs 12- female, male ratio) and another 8% having irregular pupil, female/male ratio was (28 vs 12) is in line with the observation of the Pakistan National Blindness and

Visual Impairment Survey²⁶. This explains the fear of operation or its poor results were present among women than men.²⁷This gender difference needs to be more elaborated in future.

CONCLUSION

A long queues of cataract patients outside hospital are found in the developing world. These patients having visual aquity as counting fingers/hand movement (CF-HM) are much benefited with SICS-IOL as far as visual improvement to 6/18-6/12 is concerned.

Recommendations: Various cataract surgical techniques dealing with this backlog should be affordable to the patients.

Conflict of interest: No conflict of interest present

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