

Original Research Article

Outcome of Cataract Surgery in Sub-Urban Hospital in Nepal

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Abstract: **Background:** Manual small incision cataract surgery (MSICS) and phacoemulsification are common procedures for cataract surgery these days. Contrary to phacoemulsification, where its machines are expensive to buy and to maintain; demanding expensive surgical consumables and extensive surgical training, MSICS is emerging as a popular technique with all the merits of phacoemulsification along with its wider applicability, safety, easy learning curve, and low cost and machine-independent nature. Because of this, MSICS is being widely practiced in countries like Nepal. **Aim of the study:** The study aimed to assess the outcome of visual acuity of first-day postoperative patients undergoing MSICS and phacoemulsification group and their effectiveness. **Materials and Methods:** The retrospective study of the visual outcome of the first day of postoperative patients was compared in a large sample of 2083 patients, including 1492 patients with MSICS and 591 patients with phacoemulsification from January 1 2019 to December 31, 2019. Preoperative and postoperative data were collected and analyzed using MS Excel and IBM SPSS V20 to cross-check the analysis outcomes. **Results:** The statistical analysis shows the comparable result of good visual acuity (6/6 – 6/18) in both groups. It also revealed that among the two groups, the occurrence of the post-operative complication is more in the phacoemulsification group. **Conclusion:** In the developing world, MSICS can be taken as a choice because it is cost-effective, machine-independent, and has a reduced chance of postoperative complication. MSICS produces a good visual outcome compared with phacoemulsification.

Keywords: Cataract Surgery, Cost-effective choice, MSICS, Phacoemulsification, Visual acuity.

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INTRODUCTION

The estimated number of people with visual impairment to be 285 million globally and 39 million of them are blind [1]. Globally 1 billion people have a visual impairment that could have been prevented, the majority of them (65.2 million) are accountable for cataract [2]. A worldwide cataract is the cause of blindness for more than 50% of the blind population [3]. Blindness in the developing world is mainly caused by age-related senile cataracts. Half of the 37 million blind reside in the developing world where lack of awareness and resources is common.⁴ Blindness produces significant disability and causes economic impact and carries social stigma too [5]. A cataract is the main cause of bilateral blindness in all zones of Nepal, with a weighted average of 62.2% [6]. Blindness and loss of vision are more serious problems in low and middle-income countries where there is a lack of accessibility and poor government services [7].

Both Manual Small Incision Cataract Surgery (MSICS) and phacoemulsification are common

procedures this days [8]. Phacoemulsification is performed either with ultrasound or laser and involves implantation of foldable intraocular lens (IOL) whereas MSICS involves a rigid IOL. Both the techniques are safe, effective, and have similar visual outcomes [8-12]. MSICS emerged as a popular technique that meets all the merits of phacoemulsification with wider applicability, safety, easy learning curve, and low cost and independence to the machine. Phacoemulsification machines are expensive to buy and to maintain and also demand expensive surgical consumables and extensive surgical training. Our patients presenting with hyper mature hard cataracts make phacoemulsification significantly more difficult and time-consuming.

MATERIALS AND METHODS

This is a hospital-based retrospective study conducted with tenets of the declaration of Helsinki from January 1, 2019, to December 31, 2019 after ethical approval from institutional review committee. All the consecutive patients who underwent cataract surgery either manual small incision cataract surgery or

phacoemulsification during the said period were included in the study. Data pertaining to the recording and reporting departments were reviewed. Detailed information regarding demography, pre-operative presenting visual acuity, and best-corrected visual acuity (if available), intraocular lens power implanted, complications (if any), and post-operative visual acuity on the day of discharge were primarily obtained from file and hospital management information system.

Each patient who visited the hospital for cataract surgery was thoroughly examined under a slit lamp after visual acuity and refraction test. Pupil dilated with 1% tropicamide and fundus examined under slit lamp with 90 diopter lens. However, for mature cataracts with no fundal view were advised for B-scan to rule out any vitreous opacity and retinal detachment. The operable cataract cases were thoroughly counseled for the type of cataract surgery, expected visual outcome, and cost of surgery and planned for cataract surgery of their preference. Out of 2083 patients, 1492 preferred MSICS and 591 preferred phacoemulsification. Those willing to undergo cataract surgery were advised for routine blood tests including random blood sugar and serology tests for HIV, Hepatitis, and biometry for intraocular power calculation.

All the surgery was performed under the peribulbar or retrobulbar anesthetic block with lidocaine 2% with adrenaline 1: 2,00000 IU and hyaluronic acid 1500 IU. Under aseptic precautions, MSICS or phacoemulsification surgery was performed with standard protocol, and complications if any, and type of intraocular lens implanted were recorded. The operated eye was patched with pad and bandage and observed

overnight. On the next day, the operated eye was examined, and complications (if any) and discharging visual acuity were recorded. After thorough post-operative counseling, the patient was discharged under topical antibiotics and steroids. The postoperative visual acuity on the day of discharge was categorized as per WHO recommendation in which good visual outcome defined as 6/6–6/18, the borderline outcome as 6/24–6/60, and poor outcome as 1.00 log units for poor visual outcome.

Data were entered into Microsoft excel 2016 and statistically analyzed with Statistical Package for Social Sciences version 20. For descriptive statistics, percentage, mean, variance was calculated alongside the graphical and tabular presentation. Statistical significance P- values of <0.05 were considered significant. The result obtained is presented using best illustrative visualization method.

RESULT

A total of 2083 patients underwent cataract surgery during the study period at Rapti Eye Hospital. Out of the total, 1188 (57.03%) patients were female and 895(42.97%) were male with a male: female ratio of 1: 1.3. The mean age of the patient was 62.93 ± 16.6 with a range of 9-103 years. Out of the total 2083 cataract surgeries analyzed, 1492 (71.63%) were of MSICS and 591 (28.37%) of the phacoemulsification group. Patients undergoing surgery in the MSICS group were significantly older than patients undergoing surgery in the phacoemulsification group (t-test; $p < 0.003$). Most of the patients were in the age group 60 years and more. Table-1 shows the age and gender distribution of cataract surgery.

Table 1: Age and sex distribution of patients with MSICS and Phacoemulsification

Age	Male		Female		Total	%
	Phacoemulsification	MSICS	Phacoemulsification	MSICS		
< 40	17	16	14	31	78	3.74
40 - 50	19	30	31	61	141	6.77
50 - 60	49	96	84	138	367	17.62
60 - 70	84	243	138	329	794	38.12
> 70	70	271	85	277	703	33.75
Total	239	656	352	836	2083	100

MSICS: Manual Small Incision Cataract Surgery

Out of 2083 patients, 1054 (50.64%) have a visual impairment in their left eye, and 1026 (49.26%) patients have a visual impairment in their right eyes whereas 3 (0.14%) patients have a visual impairment in their both eyes (Figure-1).

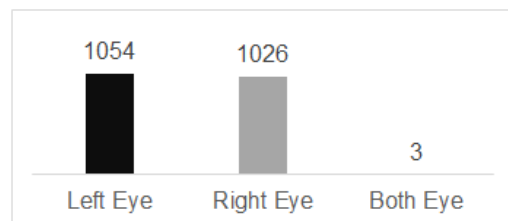


Figure 1: Laterality of Visual impairment

Table 2 illustrates the frequency and percentage of 2083 patients' preoperative and postoperative visual acuity. The preoperative visual acuity (> 1.00 log units) was worse in the MSICS group (46.51%) than the phacoemulsification group (39.59%). Postoperatively, better visual acuity (0.00 – 0.47 log

units) was found almost identical in both groups of surgery (94.57% in the MSICS group and 94.92% in the phacoemulsification group). Post-operative visual acuity of > 1.00 log units was seen in 1.27% patients of the MSICS group and 0.85% patients of the phacoemulsification group.

Table 2: Comparison of preoperative and postoperative visual acuity in two types of surgeries

Visual Acuity	MSICS				Phacoemulsification			
	Preoperative		Postoperative		Preoperative		Postoperative	
	Number	%	Number	%	Number	%	Number	%
0.00 - 0.47 (6/6 – 6/18)	17	1.14	1411	94.57	13	2.2	561	94.92
0.60 - 1.00 (6/24- 6/60)	781	52.35	62	4.16	344	58.21	25	4.23
> 1.00 (<6/60)	694	46.51	19	1.27	234	39.59	5	0.85
Total	1492	100	1492	100	591	100	591	100

MSICS: Manual Small Incision Cataract Surgery

The mean intraocular lens power implanted in both groups was also found identical with mean 22 ±2

D with range 10-34 D in MSICS and 17-31 D in phacoemulsification (Table-3).

Table 3: Comparative Analysis of IOL use in both types of surgery

Phacoemulsification					MSICS				
Number	Mean	Minimum	Maximum	SD	Number	Mean	Minimum	Maximum	SD
591	22	17	31	2	1492	22	10	34	2

MSICS: Manual Small Incision Cataract Surgery

IOL: Intraocular Lens, SD: Standard Deviation

In this study, a total of 10 (0.48%) patients had intra-operative and post-operative complications. Out of which 4 (0.27%) patients were in MSICS and 6 (1.02%) patients were from the phacoemulsification group. Premature entry and striate keratopathies were the most frequent intra-operative and immediate post-operative complications. The complications that occurred in this study are presented in Figure-2.

wider applicability. MSICS is more popular in developing and underdeveloped worlds where high-volume surgery is the norm [15]. Because of the cost-effectiveness and safety profile comparable to phacoemulsification, MSICS has been the procedure of choice in the developing world [16].

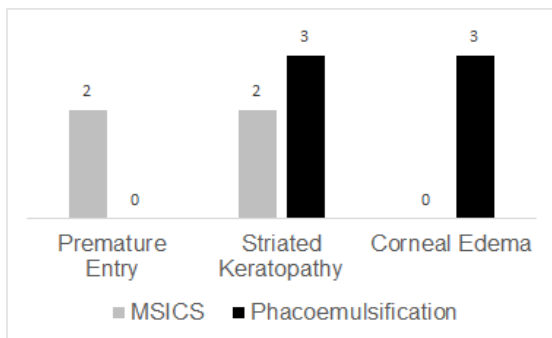


Figure-2: Comparison of postoperative complication in both groups

MSICS: Manual Small Incision Cataract Surgery

DISCUSSION

The major objective of cataract surgery during these days is to restore visual acuity with fast postoperative recovery and with no or minimal complication [13]. Phacoemulsification is the preferred technique in the developed world [9, 14]. MSICS offers a similar advantage to phacoemulsification because of less surgical time required, low-cost technology, and its

This study shows comparable visual outcomes of good visual acuity with MSICS as compared to phacoemulsification on the first postoperative day. The preoperative and postoperative visual acuity was categorized as good (6/6 – 6/18), borderline (6/24 – 6/60), and poor (< 6/60)10. The corresponding log MAR units used for the above-stated visual acuity in this study are 0.00 – 0.47 log units for good visual outcome, 0.60 – 1.00 log units for the borderline visual outcome, and > 1.00 log units for poor visual outcome. The visual outcomes on the first postoperative day in this study are comparable with the previous studies [10, 14, 16-18]. Ravindran et al., also reported statistically insignificant visual outcomes on the first postoperative day [19]. Phacoemulsification has the distinct advantage of early visual rehabilitation because of the small incision size but it is an expensive and technology-dependent procedure. Most of the people in the developing world do not have access to this facility. MSICS is cheaper and more appropriate for advanced cataracts in developing countries [20].

In this study, intraocular lens implanted in both groups (phacoemulsification and MSCIS groups) also shown an identical mean size of 22 D with an identical standard deviation of 2. There has been no difference in

the mean size of IOL used for both groups. There were few complications noted on the first postoperative day in each group. Comparatively less number of complication was found in MSICS group (0.27% out of 1492 patients) than phacoemulsification group (1.02% out of 591 patients). This is suggestive of the safety and effectiveness of MSICS with skilled hands [18].

CONCLUSION

This study concluded that visual outcome on the day of discharge was comparable in MSICS and phacoemulsification in our hospital. However, a prospective study with long-term follow-up is recommended. In the point of view of cost-effectiveness and efficiency and with a reduced chance of postoperative complication, MSICS may be a preferred technique in countries like Nepal.

LIMITATION OF THIS STUDY

The major limitation of study is being retrospective and failed to record visual outcome in subsequent follow-up visits. All the surgeries of this study had been carried out by multiple surgeons.

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