A randomized comparative study of visual outcome and complications following manual small incision cataract surgery and phacoemulsification

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1. Introduction

The cataract is the most common cause of reversible blindness in the world. It is nothing but clouding of lens due to senility.¹ In the present scenario cataract is treatable either through Manual small incision cataract surgery or phacoemulsification and replacing cataractous lens with intraocular lens.² Manual small incision cataract surgery (MSICS) requires 5.5-7mm incision and various instruments to remove cataractous lens. Phacoemulsification requires incision of size 2.2-2.8 mm which uses high frequency probe to fragment the nucleus followed by IOL implantation.¹ In order to tame the overload of cataract blindness in the developing world, there must be adequate surgical coverage and cost effective surgical procedures available which gives good visual outcomes² early visual restoration³ and with minimal complications.

Phacoemulsification is more popular in the industrialized countries in the recent years.⁴,⁵ The reasons for this popularity are that phacoemulsification gives better vision,² and emmetropia later. This is not appropriate for middle income countries which have an ample number of cataract patients requiring surgery, because of high costs, high technology dependent, maintenance and staff wages.⁴,⁵ So it is crucial to search for the more cost effective options in low income countries.

2. Objectives

1. To measure the visual outcome following cataract surgery.
2. To compare the complications following cataract surgery.
3. To suggest on the most appropriate treatment options in developing countries like India.

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3. Material and Methods

On approval from the ethical committee, a study was conducted on patients who have undergone either phacoemulsification or manual small incision cataract surgery during the period of 5 months from April 2018 to August 2018) fulfilling the inclusion/exclusion criteria in the department of ophthalmology in Rajarajeswari medical college and hospital, Bangalore. The sample comprised of 50 patients in this study. From the total of 50 patients, 25 patients were enrolled into MSICS and 25 into phacoemulsification. The distribution was done by randomisation. They were studied for a period of 5 months. They were asked to review on immediate post-operative day 1, 2nd week and 6th week. The selected 50 patients with cataract (mature, immature and hyper mature cataract) attending the ophthalmology OPD at Raja Rajeswari medical college and hospital were randomly taken for the study. Patients with the age of above 50 years with unilateral or bilateral cataract were selected and examined. Written approval was obtained from the patients who were selected for the procedure. Detailed history was taken. Visual acuity was assessed with snellen’s chart. Anterior segment evaluation was done by slit lamp. Intraocular pressure was measured using Non-contact tonometry or applanation tonometry. Fundoscopy was done using 78D lens and indirect ophthalmoscope. Basic routine investigations like RBS, SEROLOGY was done. Written informed consent was taken once surgery is planned. Patients were reviewed on the immediate 1st post-operative day, 2nd week and 6th week subsequently.

3.1. Inclusion criteria

1. Patients ready to give consent.
2. Patients more than 50 years of age irrespective of the sex.
3. Patients with no corneal pathology.
4. Patients with no posterior segment pathology.

3.2. Exclusion criteria

1. Patients reluctant to give consent.
2. Patients who are unable to attend the follow-up visits.
3. Patients with co-existing glaucoma, corneal pathology, uveitis, poor pupil dilation (5.0 mm), and other known pathology that could impair visual outcome.
4. Patients with subluxated and traumatic cataract, complicated cataract.

4. Results

Out of 50 patients selected for the study, 25 patients underwent MSICS and 25 patients underwent phacoemulsification. The commonest age group was between 51-60 (Figure 2). There were more women 54% (n=30) than men 46% (n=20) in this study (Figure 1). The distribution was done on randomisation. On the immediate 1st post operative day 34% had UCVA of 6/9 -6/6 where as 44% in phaco group had the same vision. The UCVA of 6/18-6/12 was obtained by 48% of patients in MSICS group and 34% of patients in phaco group and only 18% and 22% had The UCVA of 6/60-6/24 was attained by 18% of patients in MSICS group and 22% in phaco group respectively (Figure 3). During 2nd week visit, half the patients (50%) in MSICS group and more than half (64%) had UCVA of 6/9-6/6. The MSICS group had almost equal number of patients (24% and 26%) with UCVA of 6/60-6/24 and 6/18-6/12 whereas in phaco group 28% and 8% had the same UCVA respectively (Figure 4). The MSICS group accounted for 72% and phaco group accounted for 80% with BCVA of 6/9-6/6 at the end of 6 weeks (Figure 5). Nearly half of the patients had no complications in MSICS group.

The percentage of patients with no complications in phaco group accounts for 42%. The major complication in MSICS group was surgically induced astigmatism 22% followed by post-operative uveitis 18%. Others were being corneal edema 8% and posterior capsular 4% (Figure 6). The most common complication in phaco was PCR (24%). Other complications include corneal edema (16%) and post op uveitis 18% (Figure 7).

5. Discussion

The mean age group of studied population is 55. The male and the female distribution were 20:30 in this study. The parameters such as visual outcome and complications of both the surgeries were studied and statistically compared.
to determine the significant difference between. The phaco
group excelled MSICS group on the 1\textsuperscript{st} day in terms
of Uncorrected Visual acuity (p=0.09). At 2\textsuperscript{nd} week, phaco
again excelled MSICS. (p=0.06). The BCVA were almost
equal in both the cases at the end of 6\textsuperscript{th} week (p<0.001).
The most common complications in both the groups was
found to be post op iritis (22\%) in MSICS and PCR (24\%) in
phaco. (p<0.001)In both the groups, the visual outcome and
complications were almost same with no undue advantages
of phaco over MSICS at 6\textsuperscript{th} week.

Gogate et al\textsuperscript{6} compared phacoemulsification vs MSICS
by randomization in terms of welfare, effectiveness and
astigmatic change. From his study he concluded that at 1\textsuperscript{st}
week the UCV A of 6/18 or better was attained by 61.25\% in
MSICS group and 68.2\% patients in phaco emulsification
group. At 6\textsuperscript{th} week there was a 10\% difference between
the two groups in attaining (81.08 \% and 71.1\% in phaco
and MSICS) the UCVA 6/18 or better. Phacoemulsification
group was exceptionally good in achieving the better
visual acuity. From this study he concluded that both
the procedures are safe to the same degree and achieved
excellent visual outcomes following cataract surgery. Singh
et al\textsuperscript{7} compared MSICS vs phaco terms of complications
and effectiveness in immature cataract patients. On 1\textsuperscript{st}
post operative day SICS group had good visual outcome
than phaco group stating that SICS is an apt procedure for
immature cataracts.
Venkatesh et al.\textsuperscript{5} compared white cataracts by randomization. He concluded that MSICS and phacoemulsification were equally good in terms visual outcome and complications. But MSICS being safer and, cost effective than phaco emulsification. It is proved to be an alternative in the developing countries for mature cataract. Cook et al.\textsuperscript{6} compared visual outcome with equal number of patients by randomisation. On day 1, visual outcomes were equal in both the groups. After 8 weeks, phaco outstood MSICS in achieving good UCVA and CVA. He stated that MSICS is replaceable to phaco in developing and under developed countries. MSICS has unavoidable intra-operative and post-operative complications sometimes. The excessive meddling inside the anterior chamber can damage the endothelium, iris prolapse, striate keratitis, and posterior capsular rent. Surgically induced astigmatism is one of the crucial factors responsible for good visual outcome and early rehabilitation following MSICS surgery. It mainly depends on the size, site, type of the incision. So surgeons should prefer an incision which gives less surgically induced astigmatism following cataract surgery.

A skilled and experienced surgeon will have minimal or no postoperative inflammation and corneal edema following surgery. The commonest complications in phaco are posterior capsule rent with or without vitreous loss and phaco burn. The corneal edema and post op uveitis depends on the phaco time i.e. from the entry to exit of the phaco probe. But the surgeon should consider posterior capsular opacifications later, that needs to be treated with ndyag laser.\textsuperscript{9,10}

6. Conclusion

From this study both MSICS and phaco were equally comparable with each other in terms of visual outcome and complications. But MSICS being faster, safer, with less learning curve, cost effective and less technology dependent can be accepted as an alternative to phaco emulsification in the developing world.

7. Source of Funding

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8. Conflict of Interest

None.

References


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