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Original Article

Comparison of Merits and Demerits of Manual Small Incision Cataract Surgery with Phacoemulsification

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Abstract

Introduction: In developing countries with limited health resources and large populations, cataract extraction should comprise the following features: Inexpensive and affordable, early rehabilitation to avoid economic loss, near emmetropic visual status postoperatively, minimal complications, minimal wound suturing, faster (for increased surgical coverage), and safe and effective.

Aim: The aim is to study the safety, reliability, and effectiveness of phacoemulsification and manual small incision cataract surgery (MSICS) techniques.

Materials and Methods: This observational comparison study was conducted in 100 patients with cataract. The study groups were randomly allocated into 2 groups, 1 group underwent MSICS and the other group underwent phacoemulsification with posterior chamber intraocular lens. On the 40th post-operative day and 6th month of post-operative follow-up visit, uncorrected visual acuity (VA), best-corrected VA, and corneal astigmatism by keratometry were studied in both groups.

Results: In the present study, VA outcome of both groups was comparably the same. Mean induced astigmatism after cataract surgery and intra- and post-operative complications such as corneal edema and posterior capsular rupture were found to be slightly higher in MSICS than in phacoemulsification group.

Conclusion: To conclude, both surgical procedures are equally safe and effective in skilled hands.

Key words: Best-corrected visual acuity, Manual small incision cataract surgery, Uncorrected visual acuity

INTRODUCTION

Cataract remains the leading cause of avoidable blindness worldwide.[1] In most developing countries, blindness is associated with considerable economic and social implications, which impacts on the current difficulties of vulnerable populations who reside in underserved areas. Over the past decade, manual small incision cataract surgery (MSICS) has become an established surgical alternative to phacoemulsification. Numerous randomized controlled clinical trials have proved both techniques to be safe and effective for rehabilitating the vision of cataract patients.[2-4] The advantages of both techniques are sutureless, require small incisions, and result in faster visual rehabilitation. Studies on the efficacy and safety of MSICS for cataract surgery show that, being a variant of extracapsular cataract surgery, MSICS also has similar intra- and post-operative complications. The considerable handling inside the anterior chamber during nucleus delivery increases the chances of iris injury, striate keratitis, and posterior capsular rupture. Proper care is needed for scleral tunnel construction. Post-operative inflammation and corneal edema are rare if surgeons have the expertise and patience. The final astigmatism is less than that in the extracapsular cataract surgery and almost comparable to that in phacoemulsification. Endothelial cell loss and intra- and

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post-operative complications are relatively similar between procedures.[5] In phacoemulsification, an ultrasonic probe is used to emulsify the cataractous crystalline lens, and the debris is aspirated with high vacuum through 3.2 mm wound. In MSICS, the entire crystalline lens is removed through a self-sealing scleral tunnel incision (5-7 mm) and rigid intraocular lens (IOL) implanted.

Aim

The aim is to study the safety, reliability, and effectiveness of phacoemulsification and MSICS surgical techniques.

MATERIALS AND METHODS

The present study was a randomized prospective study of comparing two cataract extraction procedures. A total of 100 patients with cataract were randomly selected for this study. Inclusion criteria: All patients between 35 and 70 years, normal anterior chamber depth, and adequate pupillary dilatation. Exclusion criteria: Patients with Grade IV cataract, traumatic cataract, subluxated nucleus, complicated cataract, and corneal disorders. After completing pre-operative evaluation, the study groups were randomly allocated into 2 groups, 1 group underwent MSICS and the other group underwent phacoemulsification with posterior chamber IOL (PCIOL). On the 40th post-operative day, uncorrected visual acuity (UCVA), best-corrected visual acuity (BCVA), and corneal astigmatism by keratometry were studied in both groups.

RESULTS

A total of 100 patients were selected for this study; 40 underwent phacoemulsification with PCIOL and 60 underwent MSICS. In phacoemulsification group, most of the patients were in the age group of <50 years, and in MSICS group, most of the patients were in the age group of 50-60 years (Table 1). In phacoemulsification group, 25 were females and 15 were males. In MSICS group, 30 were females and 30 were males (Table 2).

On the 40th post-operative day, mean surgically induced astigmatism in phacoemulsification group was around 1.100476, and in MSICS group, it was 1.124333. On the 6th month of post-operative visit, mean astigmatism in phacoemulsification group was 1.1125, whereas in MSICS group, it was 1.333125. It shows that mean induced astigmatism is higher in MSICS than in phacoemulsification group. Intraoperative complications were around 4.4% in phacoemulsification group and 10% in MSICS group. All patients in both groups had IOL implanted.

DISCUSSION

The phacoemulsification group had most number of patients in the age group of <50 years, and in the MSICS group, most number of patients were in the age group of 51-60 years. There was a female preponderance over male patients (45 versus 55). On the 40th day post-operative follow-up visit, 92 out of 96 patients had visual acuity (VA) ≥6/18 and the other 4 had deteriorated vision. On the 6th month of post-operative follow-up visit, 50 out of 52 patients had VA ≥6/12 and the other 2 had deteriorated vision. VA outcome of two surgical groups was comparatively the same which is comparable to that of Balent *et al*'s. study.[6] Induced astigmatism in the 40th day and 6th month follow-up was comparatively less in phacoemulsification (Tables 3 and 4).[5] In the phacoemulsification group, 2 cases out of 40 had intraoperative complications, and in the manual phacoemulsification group, 6 out of 60 cases had intra- and post-operative complications in the form of corneal edema, posterior capsular rent, and zonular dialysis. Hence, in this study, phacoemulsification group produced

Table 1: Distribution of the study patients according to age group

Age	Phacoemulsification	Manual phacoemulsification
<50	25	10
51-60	10	30
>60	5	20
Total	40	60

Table 2: Distribution of the study patients according to gender

Sex	Phacoemulsification	Manual phacoemulsification
Male	15	30
Female	25	30

Table 3: Distribution of VA after 40-days follow-up

Vision	Phacoemulsification	MSICS
6/6-6/9	30	46
6/12-6/18	2	10
6/24-6/36	2	-
6/60	2	2
<6/60	-	2

MSICS: Manual small incision cataract surgery, VA: Visual acutity

Table 4: Distribution of VA after 6-month follow-up

Vision	Phacoemulsification	MSICS
6/6-6/9	17	27
6/12-6/18	2	3
6/24-6/36	1	-
6/60	-	
<6/60	-	2

MSICS: Manual small incision cataract surgery, VA: Visual acutity

fewer complications than the MSICS group which is slightly varying from that of Gogate *et al*'s. study which states that there was no difference in intraoperative complications among the both surgical techniques. Despite lower post-operative astigmatism after phacoemulsification, the UCVA of these patients was not significantly better.[3] Notably, the increased astigmatism in small incision cataract surgery (SICS) in one series from Miraj, India, was responsible for better UCVA compared to phacoemulsification.[5] Although the lack of post-operative astigmatism improved distance UCVA in phacoemulsification patients, it was associated with impaired UCVA at near.[5] The unaided near vision was important even in illiterate, rural communities for daily activities and for differentiating currency and not just for reading and writing. Hence, astigmatism is an issue in differentiating the two techniques; it does not seem to have much impact on functional vision. The comparable results in UCVA and BCVA, intra- and post-operative complications, and endothelial cell loss make SICS an equivalent technique to phacoemulsification.[5] The smaller incision size during phacoemulsification resulted in statistically lower post-operative astigmatism.[7] However, this did not translate into a clinically significant difference in UCVA. 6/18 is considered to be normal vision by the WHO for most tasks, and 6/9 is the international driving license standard in many countries. Normal vision (6/18) post-operatively (UCVA and BCVA) was reported in relatively equivalent number of SICS and phacoemulsification patients. Against the rule, myopic astigmatism helped more patients achieve better UCVA at near after SICS. SICS was almost half the cost of phacoemulsification with easier learning curves. The duration of surgery was also lower. In a limited resource setting with large number of beneficiaries awaiting cataract surgery/backlog of cataract blind, MSICS is the technique of choice over phacoemulsification.[8] With MSICS, the expenses are vastly reduced as compared to considerable expenses in acquiring and maintaining phacoemulsification machine. There is no need to spend on consumable items such as the phacoemulsification tip, sleeves, tubing, and probe. Further, in SICS, always polymethylmethacrylate IOLs are used which are much cheaper than foldable IOLs. MSICS and phacoemulsification have similar clinical efficacy, but MSICS costs less.[9]

CONCLUSION

Both techniques achieved excellent visual outcomes with low complication rates. Phacoemulsification group produced slightly less mean induced astigmatism. In this study, visual outcomes were comparably same in phacoemulsification and MSICS groups. Both are equally safe and effective in skilled hands to acquire better visual outcome. Since MSICS is significantly faster, less expensive, and less technology dependent than phacoemulsification, it may be a more appropriate technique in eyes with mature cataract in government setups.

REFERENCES

1. Pascolini D, Mariotti SP. Global estimates of visual impairment: 2010. Br J Ophthalmol 2012;96:614-8.
2. Gogate PM, Kulkarni SR, Krishnaiah S, Deshpande RD, Joshi SA, Palimkar A, *et al*. Safety and efficacy of phacoemulsification compared with manual small-incision cataract surgery by a randomized controlled clinical trial: Six-week results. Ophthalmology 2005;112:869-74.
3. Gogate P, Ambardekar P, Kulkarni S, Deshpande R, Joshi S, Deshpande M. Comparison of endothelial cell loss after cataract surgery: Phacoemulsification versus manual small-incision cataract surgery: Six-week results of a randomized control trial. J Cataract Refract Surg 2010;36:247-53.
4. 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. Am J Ophthalmol 2007;143:32-8.
5. Gogate P, Optom JJ, Deshpande S, Naidoo K. Meta-analysis to compare the safety and efficacy of manual small incision cataract surgery and phacoemulsification. Middle East Afr J Ophthalmol 2015;22:362-9.
6. Balent LC, Narendrum K, Patel S, Kar S, Patterson DA. High volume sutureless intraocular lens surgery in a rural eye camp in India. Ophthalmic Surg Lasers 2001;32:446-55.
7. Gills JP, Sanders DR. Use of small incisions to control induced astigmatism and inflammation following cataract surgery. J Cataract Refract Surg 1991;17 Suppl:740-4.
8. Venkatesh R, Chang DF, Muralikrishnan R, Hemal K, Gogate P, Sengupta S. Manual small incision cataract surgery: A review. Asia Pac J Ophthalmol (Phila) 2012;1:113-9.
9. Muralikrishnan R, Venkatesh R, Prajna NV, Frick KD. Economic cost of cataract surgery procedures in an established eye care centre in Southern India. Ophthalmic Epidemiol 2004;11:369-80.

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