

A Retrospective outcome assessment of Phacoemulsification versus Manual-Small Incision Cataract Surgery for Cataracts

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Received: 03-11-2021 / Revised: 30-11-2021 / Accepted: 28-12-2021

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Conflict of interest: Nil

Abstract

Aim: Phacoemulsification versus Manual-Small Incision Cataract Surgery for Cataracts.

Methods: A retrospective study was conducted in the Department of Ophthalmology, Government Medical College, Bettiah W. Champaran, Bihar, for 1 year. Electronic medical records of the patients were reviewed, and demographic, preoperative, and postoperative data collected included age, gender, preoperative uncorrected visual acuity (UCVA), presence of preoperative comorbidities, intraoperative and postoperative complications, and postoperative UCVA on postoperative day (POD) 1 and 30. The surgeons were classified into three groups based on years of experience after completion of residency training into < 5, 5–10, and >10 years. The intraoperative and postoperative data were analyzed to note any differences among the three groups and between the two procedures.

Results: Among the 150 cases with brunescant cataract reviewed, 100 underwent MSICS and 50 underwent PE. 71 cases (47.33%) were male, and 79 cases (52.67%) were female. Mean age was 67.73 (± 7.16) years in the PE group and 69.52 (± 7.43) years in the MSICS group, which was found to be statistically significant ($P = 0.002$), suggesting that more older patients underwent MSICS. Preoperative documentation showed that 50 cases had PXF, 14 cases with shallow AC, 8 cases with associated posterior polar cataract, and three cases with phacodonesis. A total of 30 intraoperative complications were encountered in both groups. PE group had 10 (33.33%) intraoperative complications with the most common being polymerase chain reaction (PCR) in 6 (60%) cases followed by ZD in 3 (30%). In the SICS group, 20 complications (66.66%) were noted with PCR in 10 (50%) followed by ZD in 6 (30%). The only complication that was not encountered in the PE group was iridodialysis, which occurred in 4 (20) cases of MSICS. The mean postoperative UCVA on POD 1 and POD 30 was 0.44 and 0.33, respectively, for the PE group and 0.44 and 0.31 for the MSICS group, with significant difference seen at POD 30 ($P < 0.002$).

Conclusions: For developing nations where cost and training are the rate limiting factors, where patients tend to present late with harder and complicated cataracts, MSICS is the procedure that serves the need for low-cost, high-volume, high-quality cataract surgery for all.

Keywords: Cataract, MSICS, Phacoemulsification.

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Introduction

Cataract is the chief cause of avoidable blindness in India and throughout the world. The national survey on blindness (2006-2007) shows an estimated 1.0 per cent prevalence of blindness in general population. With 62.6 percent share, cataract continues to be the main cause of blindness [1].

The use of smaller incision with advantages of faster rehabilitation, less astigmatism, early stabilization of refraction and visual acuity with better post operative vision without spectacles led to phacoemulsification being preferred technology where resources are available [2].

Cataract surgery with phacoemulsification is standard care today. Manual small incision cataract surgery claims to have similar advantages of phacoemulsification. In both cases associated co-morbidity, surgical techniques, visual outcome, complication rate vary between them specially in age related cataracts [3]. Hence the present study was conducted to retrospectively assess the outcome of Phacoemulsification versus Manual-Small Incision Cataract Surgery for Cataracts.

Materials and methods:

A retrospective study was conducted in the department of Ophthalmology, Government Medical College, Bettiah W. Champaran, Bihar, for 1 year.

Methodology

Electronic medical records of the patients were reviewed, and demographic, preoperative, and postoperative data collected included age, gender, preoperative uncorrected visual acuity (UCVA), presence of preoperative comorbidities, intraoperative and postoperative complications, and postoperative UCVA on postoperative day (POD) 1 and 30. Patients with other preoperative vision-impairing pathologies

were excluded from the analysis such as corneal opacities and macular disorders. Combined procedures (cataract with penetrating keratoplasty, trabeculectomy, or strabismus surgery), traumatic cataract, and pediatric patients were also excluded. Major intraoperative complications were defined as posterior capsular rupture, zonular dialysis (ZD), iridodialysis, and drop of lens material into vitreous. Postoperative complications were categorized as significant corneal edema defined as increased stromal thickness and Descemet's folds and hazy iris details, fibrinous uveitis, hyphema, and wound leak. Some complications such as Descemet's membrane detachment missed intraoperatively and noted postoperatively were included in postoperative complications. Patients were followed up to POD 30, checked for the presence of any persistent corneal edema and any other complications, and also underwent visual acuity assessment. All patients underwent examinations on the 1st POD with UCVA, vision with pinhole, and slit-lamp evaluation. On POD 30, UCVA and best-corrected visual acuity along with slit lamp evaluation were checked. A Snellen chart was used at 6 m for visual acuity assessment. The surgeons were classified into three groups based on years of experience after completion of residency training into < 5, 5–10, and >10 years. The intraoperative and postoperative data were analyzed to note any differences among the three groups and between the two procedures.

Results:

Among the 150 cases with brunescant cataract reviewed, 100 underwent MSICS and 50 underwent PE. 71 cases (47.33%) were male, and 79 cases (52.67%) were female. Mean age was 67.73 (± 7.16) years in the PE group and 69.52 (± 7.43) years in the MSICS group, which was found to be statistically significant ($P = 0.002$), suggesting that more older patients

underwent MSICS. Preoperative documentation showed that 50 cases had PXF, 14 cases with shallow AC, 8 cases with associated posterior polar cataract, and three cases with phacodonesis [Table 1]. A total of 30 intraoperative complications were encountered in both groups. PE group had 10 (33.33%) intraoperative complications with the most common being polymerase chain reaction (PCR) in 6 (60%) cases followed by ZD in 3 (30%). In the SICS group, 20 complications (66.66%) were noted with PCR in 10 (50%) followed by ZD in 6 (30%). The only complication that was not encountered in the PE group was

iridodialysis, which occurred in 4 (20) cases of MSICS. The mean postoperative UCVA on POD 1 and POD 30 was 0.44 and 0.33, respectively, for the PE group and 0.44 and 0.31 for the MSICS group, with significant difference seen at POD 30 ($P < 0.002$). Postoperative complications were noted in both groups with higher incidence of significant corneal edema in the PE group (18 cases, 90%) compared to SICS (18 cases), which was statistically significant ($P < 0.002$) [Table 1]. In our study, we found that PE was done by more senior surgeons (66%) and MSICS by junior surgeons with < 5 years' experience (40%) ($P < 0.002$).

Table 1: Demography, preoperative data, surgeon experience, and surgical outcomes

PE (n=50)	MSICS (n=100)	P	
Age, mean±SD	67.73±7.16	69.52±7.43	0.002a
Gender			
Male	22 (44)	49(49)	0.127b
Female	28 (56)	51 (51)	
Preoperative clinical features,			
Pseudoexfoliation (n=50)	10 (20)	40 (80)	<0.002d
Shallow anterior chamber (n=14)	4 (28.57)	10 (71.42)	>0.989d
Posterior polar cataract (n=8)	2 (25)	6 (75)	0.2622d
Phacodonesis (n=2)	-	2 (100)	-
Surgeon experience (years),			
>10	33 (66)	15 (15)	<0.002b
5-10	15 (30)	45 (45)	
<5	2 (4)	40 (40)	
Intraoperative complications,	n=10	n=20	
Posterior capsular rent	6 (60)	10 (50)	>0.989d
Zonular dialysis	3 (30)	6 (30)	0.2622d
Iridodialysis	-	4 (20)	0.0783d
Nucleus drop	1 (10)	-	-
Postoperative complications,	n=20	n=24	
Significant corneal edema	18 (90)	18 (75)	<0.002d
Hyphema	-	2 (8.3)	0.014d
Fibrinous membrane	-	2 (8.3)	0.0788d
Wound leak	1 (5)	1 (4.1)	0.0788d
Descemet's membrane detachment	1 (5)	1 (4.1)	0.0788d
Aphakia	-	-	-
Preoperative UVCA (mean±SD)	1.3±0.50	1.27±0.61	<0.002a
UCVA (day 1) (mean±SD)	0.44±0.33	0.44±0.31	0.462a

aMann–Whitney U-test, bChi-square test, cFisher’s exact test. UCVA: Uncorrected visual acuity, SD: Standard deviation, MSICS: Manual small-incision cataract surgery, PE: Phacoemulsification.

Discussion:

In our retrospective analysis of 150 eyes with Brown cataract, both MSICS and PE had good surgical outcomes after surgery. Preoperative comorbidities and ages of the patients were found to be more among the MSICS group compared to PE. Even so, the complication rates encountered with PE (14 cases, 4.59%) and MSICS (39 cases, 5.96%) were not only comparable but also much lesser than those reported by Enany [4]. The one intraoperative complication that we saw in our study that occurred only in the MSICS group was iridodialysis seen in four cases. This could be attributed to the technique of nucleus delivery using the irrigating vectis where the iris can get caught if not performed carefully. Another cause could be poor construction of the sclero-corneal tunnel which is either too deep or insufficient in size for the large nucleus causing iris to prolapse during surgery. This can be avoided by proper tunnel construction with adequate side pockets and careful nucleus delivery. The increased incidence of intraoperative ZD in MSICS could be attributed to the difficulty in prolapsing the hard cataract into the anterior chamber which requires a large capsulorrhexis. The increased incidence of pseudoexfoliation and weak zonular support could also be a contributing factor. PE was associated with higher incidence of postoperative corneal edema compared to MSICS on day 1 which concurs with report by Venkatesh et al [5]. MSICS in our study was however associated with a higher incidence of postoperative wound leak, hyphema, and Descemet’s membrane detachment which again could be attributed to the larger incision size and difficulty in nucleus delivery. This was attributed to the astigmatism induced by the larger incision

in MSICS. The advantage of the larger incision is that grossly subluxated lenses, very hard cataracts, or those with poor endothelial counts are more easily removed [6].

In our institute, surgeons are first trained to become proficient in MSICS before proceeding to PE this could be the reason behind more senior surgeons performing PE and more junior surgeons performed MSICS, especially in harder cataracts. However, since the difference in the number of surgeries among the groups was grossly different, comparison of outcomes could not be made. In a previous study by HariPriya et al., the authors had suggested that even for less experienced surgeons, MSICS is a good starting point [7].

The biggest problem encountered during PE of hard cataracts is the excessive use of energy required in nucleus disassembly. With cataract surgery evolving, newer advances such as the Femtosecond laser and the miLoop, even hard Brown cataracts can be first disassembled before emulsification thus using minimal phaco energy [8,9]. The downside however is the cost of the procedure, instrument, and consumables, which may not be affordable or available to all. Being economically viable, easier to master, and safe even in the hands of less experienced surgeons, MSICS helps reach many more people especially in lower economic regions [10,11].

Conclusion:

In conclusion, for developing nations where cost and training are the rate limiting factors, where patients tend to present late with harder and complicated cataracts, MSICS is the procedure that serves the need for low-cost, high-volume, high-quality cataract surgery for all.

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