



Original Article

Comparison of visual outcome in senile cataract after phacoemulsification and manual small incision cataract surgery.

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Abstract

Background: Different surgical treatment options are used to treat cataracts, such as Manual Small Incision Cataract surgery (MSICS) and Phacoemulsification. The present study compares the visual outcomes of phacoemulsification and MSICS in senile cataract patients.

Methodology: A quasi-experimental study was conducted with 270 patients aged between 50 and 70. Patients diagnosed with senile cataract were included in the study and divided equally into two groups, Group A patients underwent MSICS, and Group B patients underwent Phacoemulsification. Pre-operative visual acuity and Postoperative visual acuity were assessed between the two groups on the 1st day, 1st week, and 1st month.

Results: Significant difference ($p=0.001$) was observed on 1st day of assessing uncorrected visual acuity among both interventional groups. However, no significant difference was observed in uncorrected visual acuity postoperatively on the 1st week ($p=0.093$) and 1st month ($p=0.266$).

Conclusion: Both Phacoemulsification and MSICS are beneficial surgical options to treat senile cataract, with both showing similar efficacy to one another.

Keywords

Vision, Cataract, Phacoemulsification.



Introduction

Cataract can be defined as any type of opacity of the crystalline lens in the eye that affects clear vision, and it might occur due to the development of opaque lens fibres¹. As per the global burden of disease, a cataract is the leading cause of blinding and is the second cause of moderate and severe vision impairment². According to the World Health Organization (WHO) report, approximately 1 billion individuals have a near or distant vision impairment. The primary causes of vision impairment and blindness are uncorrected refractive errors and cataracts³. Moreover, the prevalence of distance vision impairment in low and middle-income countries is estimated to be four times higher than in high-income countries⁴. At the same time, rates of unaddressed near vision impairment are estimated to be greater than 80%⁵.

Age-related Cataract or Senile Cataract is also very common in the population; it is a type of cataract in people more significant than 50 years in the absence of mechanical, chemical, or radiation trauma. The prevalence of Senile Cataract is also too high due to risk factors such as environmental stress (UV light, diabetes, and drug ingestion), smoking, alcohol, and social-economic status⁶.

Cataract surgery is easy, safe, and cost-effective. Cataract blindness is avoidable and surgical intervention can effectively restore any visual impairment⁷. Moreover, various surgical treatment options are used to treat cataracts, such as Manual Small Incision Cataract surgery (MSICS) and Phacoemulsification. However, Phacoemulsification is more expensive, and hence many developing nations have replaced it with a more cost-effective surgical method that is MSICS⁸.

Pakistan, a developing country, also has a very high prevalence of cataracts. Jadoon et al. stating that approximately 570,000 adults are blind, and 3,560,000 eyes have a visual acuity of less than 6/60 in Pakistan⁸. Furthermore, the lack of knowledge and poor social background prevent Pakistan from seeking proper surgical treatment. In light of the prevalence of cataracts in the country, it is essential to assess if MSICS is a much cheaper alternative to Phacoemulsification that can deliver the same

results. The present study is designed to compare the visual outcomes of small incision cataract surgery and Phacoemulsification in patients with senile cataract.

Methodology

A 24-weeks, quasi-experimental study was conducted at Al-Ibrahim Eye Hospital, Malir, situated in Karachi-Pakistan. This experiment was designed following Helsinki's declaration, and the study was approved by the hospital's Ethics and Research Committee, and all patients signed an informed consent form.

Confirmed diagnosed patients with senile cataract aged between 50-70 years were included in this quasi-experimental study. A total of 270 patients consented to participate in this study. The patients were divided equally into two groups by the use of the non-probability convenient sampling method. Group A patients underwent manual small incision cataract surgery, while Group B patients underwent Phacoemulsification. At Baseline, best-corrected visual acuity was assessed using the Snellen eye chart. Postoperative uncorrected visual acuity (UCVA) was assessed using the Snellen eye chart on the 1st day, 1st week, and 1st month after surgery.

Data were analyzed using the statistical package of social science (SPSS) Version 24.0. Difference between the Mean ages among the different groups analyzed by paired "t" test. To evaluate the difference between the two groups at the different periods of follow-up was analyzed through the Chi-square test, and the level of significance was considered $p < 0.05$.

Results

In Group A, the male participants were 72(53.3%), and the female was 63(46.7%). While in Group B, the male participants were 74(54.8%), and the female was 61(45.2%). The mean age of Group A was 54.95 ± 11.0 , and Group B was 57.09 ± 10.59 . A significant difference was noticed between the two groups in uncorrected visual acuity according to the Snellen Eye chart at 1st post-op day (Table 2).

Table 1: Pre-operative best-corrected visual acuity according to the Snellen Eye chart.

Variables		Group A		Group B		p-value
		n	%	n	%	
Best Corrected Visual Acuity (BCVA) Pre-Operative Visit	Perception of light	9	6.7	-	-	<0.001
	Hand Movement	19	14.1	5	3.7	
	Counting fingers	12	8.9	7	5.2	
	1/60	23	17.0	15	11.1	
	2/60	18	13.3	16	11.9	
	3/60	8	5.9	15	11.1	
	4/60	1	0.7	-	-	
	5/60	2	1.5	-	-	
	6/60	14	10.4	15	11.1	
	6/36	18	13.3	25	18.5	
	6/24	3	2.2	13	9.6	
	6/18	6	4.4	14	10.4	
	6/12	1	0.7	7	5.2	
	6/9	-	-	3	2.2	
	6/6	1	0.7	-	-	

*p-value <0.05 is considered significant.

Table 2: Uncorrected visual acuity according to Snellen Eye chart at 1st postoperative follow-up.

Variables		Group A		Group B		p-value
		n	%	n	%	
Uncorrected visual acuity UCVA Operative Assessment 1st Day	Perception of light	1	0.7	-	-	<0.001
	Hand Movement	5	3.7	5	3.7	
	Counting fingers	2	1.5	-	-	
	1/60	12	8.9	4	3.0	
	2/60	5	3.7	2	1.5	
	3./60	6	4.4	2	1.5	
	4/60	-	-	-	-	
	5/60	-	-	-	-	
	6/60	19	14.1	8	5.9	
	6/36	9	6.7	8	5.9	
	6/24	11	8.1	7	5.2	
	6/18	16	11.9	12	8.9	
	6/12	17	12.6	15	11.1	
	6/9	21	15.6	50	37.0	
	6/6	11	8.1	22	16.3	

*p-value <0.05 is considered significant.

In contrast, no significant difference was observed in uncorrected visual acuity according to the Snellen Eye chart at 1st week & 1st-month post-op (Table 3 & 4).

Table 3: Uncorrected visual acuity according to Snellen Eye chart at 1st week of postoperative follow-up

Variables		Group A		Group B		p-value
		n	%	n	%	
UCVA Post-Operative Assessment 1 st Week	Perception of light	-	-	-	-	0.093
	Hand Movement	-	-	-	-	
	Counting fingers	-	-	-	-	
	1/60	-	-	-	-	
	2/60	1	0.7	-	-	
	3./60	-	-	-	-	
	4/60	-	-	-	-	
	5/60	-	-	-	-	
	6/60	5	3.7	1	0.7	
	6/36	3	2.2	1	0.7	
	6/24	5	3.7	2	1.5	
	6/18	8	5.9	5	3.7	
	6/12	17	12.6	12	8.9	
	6/9	48	35.6	43	31.9	
	6/6	48	35.6	71	52.6	

*p-value <0.05 is considered significant.

Table 4: Uncorrected visual acuity according to Snellen Eye chart at 1st month postoperative follow-up

Variables		Group A		Group B		p-value
		n	%	n	%	
UCVA Post-Operative Assessment 1 st Month	Perception of light	-	-	-	-	0.266
	Hand Movements	-	-	-	-	
	Counting Fingers	-	-	-	-	
	1/60	-	-	-	-	
	2/60	-	-	-	-	
	3./60	-	-	-	-	
	4/60	-	-	-	-	
	5/60	-	-	-	-	
	6/60	3	2.2	-	-	
	6/36	1	0.7	-	-	
	6/24	2	1.5	1	0.7	
	6/18	11	8.1	4	3.0	
	6/12	13	9.6	10	7.4	
	6/9	17	12.6	22	16.29	
	6/6	88	65.18	98	72.59	

*p-value <0.05 is considered significant.

Discussion

Our study aimed to see if there will be an improvement in people's visual acuity with cataracts once manual small incision cataract surgery or Phacoemulsification was performed and see which one of these surgical treatment options was the better. Both of the groups showed improvement in uncorrected visual acuity postoperatively. However, a significant difference ($p=0.001$) between both the groups was experienced only on 1st day postoperatively. In contrast, no significant difference was observed on 1st week ($p=0.093$) and 1st month postoperatively ($p=0.266$) between the two groups. Singh et al. conducted a similar study to ours in patients with immature cataracts. The visual outcome on 1st postoperative day was reported with a good visual acuity (6/6-6/18) in 68% of patients who went Phacoemulsification. Good visual acuity of 77% in patients with MSICS leads to an insignificant difference between the groups ($p=0.07$). The study also showed that poor visual acuity (6/60) was observed in 6% in the Phacoemulsification group and 1% in the SICS group⁹. Alternatively, our study showed only 11 (8.1%) patients with a visual acuity of 6/6 in the MSICS after the 1st day and 48 (45.6%) after 1st week. There is a difference in the study results conducted by Singh et al., probably since only patients with immature cataracts were selected. However, his study did confirm that SICS was a faster and cheaper method of Phacoemulsification. Gogate et al. also conducted a study in which he followed 400 patients to compare small incision cataract surgery efficacy. The study showed 192 (68.2%) patients in the Phacoemulsification group, and 117 (61.25%) patients in the manual small incision group had an uncorrected visual acuity of better than or equal to 6/18 at 1st week ($p=0.153$)¹⁰. Whereas in our study, 121 out of 135 patients in the MSICS and 131 out of 135 in the Phacoemulsification had visual acuity of greater than or equal to 6/18. Gogate et al. study coincides with our findings and results, indicating that both surgical methods are excellent; however, Phacoemulsification delivers better visual acuity in both the studies. Both treatment options are highly beneficial to cataract patients, and that both can be used to improve the patients' visual acuity. This was

also in-line with a study conducted by Bhargava et al., which showed substantial improvement ($p<0.001$) in vision after patients underwent both the processes¹¹. However, Phacoemulsification delivered better overall results when it came to visual acuity than MSCIS, but it was insignificant. Ruit et al. also reported that both treatment options showed excellent visual outcomes, but MSICS was substantially faster, less expensive, and required less technology than Phacoemulsification. It was regarded as a more appropriate treatment option to treat cataracts, especially in the developing world¹². A recent study by Rathi et al. concluded that Phacoemulsification gives better uncorrected visual acuity (UCVA) at postoperative day 1¹³. Our study shows that MSICS is as effective as Phacoemulsification and can be used in low social, economic areas to treat age-related cataracts. Further studies can be done to assess and evaluate other different surgical options to see if they are as effective as those in this study. Additionally, the studies must be done in other private and public hospitals led by surgeons to see if the results overlap with our findings.

Conclusion

MSICS and Phacoemulsification showed no significant difference in postoperative uncorrected visual acuity. MSCIS should be considered for senile cataracts as it possesses the same efficacy as Phacoemulsification with less cost and equipment being used.

Conflicts of Interest

The authors have declared that no competing interests exist.

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