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Visual assessment between phacoemulsification and small incision with 5.2mm non-foldable intraocular lens implant.

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ABSTRACT… Objective: To compare visual assessment between phacoemulsification and small incision with 5.2mm non-foldable intraocular lens implant. **Study Design:** Experiential Study. **Setting:** Institute of Ophthalmology, Liaquat University Hospital Jamshoro, **Period:** September 2019 to August 2020. **Material & Methods:** We performed cataract surgeries using the non-foldable intraocular lens in 100 patients. Two techniques were performed, dividing patients equally into Phaco (Group-A) and SI (Group-B) cataract surgery. The outcomes of both were analyzed uncorrected visual acuity and complications. **Results:** Of the total 50 patients who underwent phacoemulsification, 55% were male and 45% females in Group-A while Group B (SI surgery) were 45% were male and 35% were female. The intra-operative success rate was 90% in Phaco group and 74% in SI group. In comparison, small Incision group had 10% of patients had difficulty in capsulorhexis, 8% in posterior capsular rupture, 6% in zonular dialysis, 2% iridodialysis, and 0% showing nucleus drip with all complications being higher than in Phaco Group except for nucleus drip (2% vs. 0%). Although, post-operatively, individually groups have similar complications with no notable difference seen, yet astigmatism was lesser in Group A than in Group B. **Conclusion:** Both techniques showed similar outcomes in the uncorrected visual acuity; however, astigmatism and complication rates were lesser in the phacoemulsification study group.

Key words: Complications, Intraocular Lens, Phaco-emulsification, Small Incision Cataract Surgery, Visual Acuity.

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INTRODUCTION

Cataract in the eye is described as the opaqueness in the lens of the eye which hinders vision and is often said to be similar to seeing through a waxed paper.[1]

As per WHO statistics, south-east Asia covers 1/3rd of the world's fort-five million blind adults and more than one million blind children in the world and most of them are living an unhappy and depressed life[2], About three different surveys in India confirms the rise of cataract patients by 2020 to up to 8.25 million.[3] However, amongst the effective surgery is the cataract surgery that has brought a change in many lives.

The first procedure of phacoemulsification was performed about 50 years ago by Charles D Kelman, and now it has become the most commonly used diagnosis in cataract surgery.[4,5] In phacoemulsification, ultrasonic waves go into the eye and break it and sucks the cataract, thus enabling dispersion and aspiration and further a foldable or non-foldable intraocular lens is pressed inside through incision to improve vision.[6] However the rate of complications in the procedure of phacoemulsification is lesser then small incision surgery for cataract patients.[7]

According to Gupta and Raja Gopala's study, etiological factors like genetics, aging, metabolic rate, drug usage, and past eye surgeries can also result in cataract formation.[8] Further using a non-foldable lens has proven to be more affordable than a foldable lens; however, in a study conducted by Henning A, both lenses

gave a visual acuity of 6/18 to 90% to 94% of patients.[9] This study was performed to compare the visual outcomes of phacoemulsification with 5.2mm non- foldable intraocular lens implant and minor incision surgery with 5.2mm non- foldable intraocular lens implant cataract patients.

MATERIAL & METHODS

The detailed study was conducted in Liaquat University Hospital Jamshoro from September 2019 to August 2020 after approval from ethical committee (LUMHS/REC/09), and a total of 100 patients were included between 45 to 75 years presenting in the ophthalmology department and OPD clinics with a confirmed diagnosis of senile cataract and visual acuity reduced to 6/36from September 2019 to August 2020.

Exclusion Criteria

- Patients with fluid pressure (intraocular) readings of more than 22mm Hg
- Patients with high ametropia
- Patients with other eye disorders.
- Patients with chronic anterior uveitis
- Patients were having cataracts and resulting posterior capsule rupture or IOL decantation and corneal edema problems.
- Patients with co-morbidity (diabetes, hypertension, cardiovascular diseases, diabetic retinopathy, macular degeneration due to age and corneal disorders).

Procedure

All operations were performed under local anesthesia after mild sedation. Phaco group Patients (Group-A) were treated using a precise corneal superior incision (approx. 11 O'clock) at 3.2mm, which was engorged to about 5.2mm and then a hard 5.25mm lens was imbedded inside the eye.

Small Incision Group (Group-B) a higher yet straight 1.5mm incision from limbus is done that is stretched to 5.5-6.5 mm with 5.25mm IOL implantation.

We followed up with the patients on, first day, three months, and six months after surgery and noted the mean age, ranges and standard deviation, and complication details. All the data was utilized to analyze the results statistically by SPSS Version 20.

RESULTS

We included a total of 100 patients with 50 in Group-A (Phaco) and 50 in Group-B (SI) with pre-operative demographics showing mean (SD) age of 58.98(7.6) years in Group-A and 56.97(8.06) years in Group-B. However, the sex ratio was 46% to 54% in Group-A and 48% to 52% in Group-B. (Table-I) The recorded uncorrected visual acuity pre-operative was 0.723(0.428) in Group-A and 1.072(0.578) in Group-B, while the IOP(SD) in Group-A was 14.8(2.77) and Group-B 14.286(1.89) with no such measure difference between the groups demographically. (Table-I)

Groups	Group A	Group B
Mean ± SD	58.98 ± 7.67	56.96 ± 8.06
Male to Female (%)	46% to 54%	48% to 52%
IOP(mm Hg) (SD)	14.806 ± 2.778	14.286 ± 1.895
Visual Acuity(SD)	0.723 ± 0.428	1.072 ± 0.578

Table-I. Age, Sex distribution and pre-operative conditions in the Groups

Groups (VA >6/18)	Pre-Operative	Post-Operative
Group-A	52%	92%
Group-B	60%	88%

Table-II. Post-operative uncorrected visual acuity on 1st and six months

In the phase of pre-operative recovery, both Groups were similar with UCVA equal to or greater than 6/18 in 52% to 60%; however, in the next six months (after the procedure), the results astoundingly varied with 92% recovery in patients in Group-A and 88 % in manual incision surgery recovery of patients. (Table-II)

Between the two groups, the success rate was 90% in Phaco group (A) and 74% in SI Group (B). In contrast, 10% of patients have difficulty in capsulorhexis, 8% in posterior capsular rupture, 6% in zonular dialysis, 2% iridodialysis, and 0% showing nucleus drip in Group-B with all complications being higher than in Group-A except for nucleus drip (2% vs. 0%).

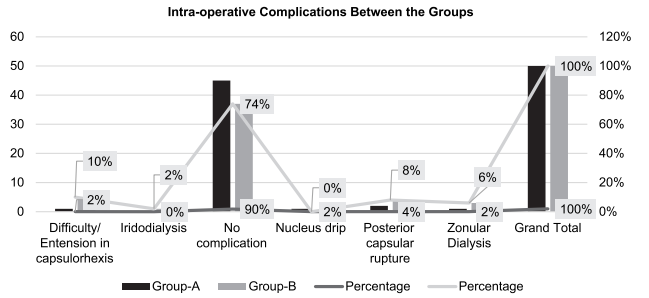

Figure-1. Intra-operative complications between the Groups (A and B)

However, overall both techniques achieved better results in visual outcomes and percentage of success (Figure-1)

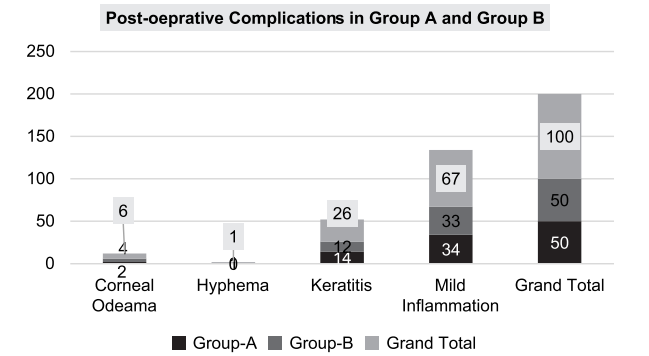

Figure-2. Post-operative complication in Group-A and B

Analyzing Group-A and Group-B post-operatively reveals thatboth groups have almost similar complications with no notable difference seen in both with 2 cases of corneal odeama in Group-A and 4 in Group-B, one case of Hyphema in Group B, 12 in Keratitis in Group-B, and 14 in Group-A. However, inflammation was 49% in Group-B and 51% in Group-A. (Figure-2) Moreover, we recorded mean astigmatism post-operatively after six months in Group A was 1.17 D lower than the small incision Group-B 1.25D.

DISCUSSION

Senile cataract is considered the leading cause of visual impairment and blindness worldwide. In China, about 85% of visual impairment and blindness occurs in people age above 50.[13]

There have been predictions that the statistics of 20 million cataracts would instead double next year.[10] Many researchers suggest that surgical outcome and high surgery cost are somewhat responsible for minor cataract surgery in developing nations.[11] However, many projects, such as the global initiative of Vision 2020: the right to sight is proposed to devise strategies to shrink cataracts in the near future.[12] Globally about 10 million surgical procedures take place yearly, and the cataract surgical rate in North America is 5500, Latin America and Asia it is about 500 to 2000, and western Europe meets at 4000 while Africa, china and other deprived Asian countries the surgical rate is lesser then 500.[12]

In our data of 100 patients, mean(SD) age was 58.98(7.6) years in Group-A and 56.97(8.06) years in Group-B, and the males to female ratio were 46% to 54% in Group-A and 48% to 52% in Group-B while similar findings were recorded in 160 cataract patients the mean age was 61 years ± 1.27 SD in PHACO and 61 years ± 1.31. SD in MISC Group with male to female ratio being significantly similar in both groups, i.e., 53% vs. 47% (Phaco) and 55% vs. 45% in (MISC) group.[20]

Another study reported mean(SD) age of 61.8 (4) years. in Phaco and 60.7(3.5) years. for the MSICS group.[21]

The rate of visual acuity (UCVA) were similar in both groups with UCVA equal to or greater than 6/18 in 52% to 60% (Group-A Vs Group-B) however after 6 months' results varied with 92% recovery of patients in Group-A and 88 % in Group-B. Similar outcomes reported with UCVA better or equal to 6/18 in 75% vs 60% in MSICS although it got better to 90% to 85% respectively.[19]

In our results, the success rate was 90% in Group-A, and 74% in Group-B, i.e., the complication rate was 10% in Group-A. In comparison, previous studies have reported lesser intra-operative complication rates in PHACO groups, i.e., 0.3% to 7.7%.[14] However, PCR rates (posterior capsular rupture) was 4% in Group-A while8% in Group-B (SI surgery), similar to other reported studies.[14,15,16]

Swelling was the most recorded post-operative complication in both groups; however, no

statistical significance was observed between the two groups in our study with Striate keratopathy being (Group-A vs. Group-B 24% vs. 28%), corneal oedema (4% vs. 8%) & Hyphema in Group B only (2%). Mohan P et al. reported corneal oedema comparatively higher in small incision group, and hyphemia in our study was 2 % while others have recorded between 1% to 9.4% in previous studies.[17]

Moreover, we reported the post-operative mean astigmatism in Group A was 1.17 D lower than small incision Group-B 1.25D. Simultaneously, a similar comparison was conducted by Golgaye et al.[18] in his study, too, while other studies reported a mean of 1.1D in Phaco vs. 1.2 in the small Incision surgery group.[19] Elsewhere the post-operative mean astigmatism was 0.792D and 0.8242D in the MISC group, respectively.[21]

Further to this multiple researches showed that there was no substantial difference in the post-operative visual acuity levels of the patients between the Phacoemulsification and Small Incision Group.

A study reported that although there was no significant difference in post-operative visual acuities of the patients that underwent either Phaco or SICS, post-operative astigmatism was substantially higher in the SICS group having rigid IOL implantation than in PHACO with rigid IOL implantation.

CONCLUSION

We conclude that phacoemulsification can be preferred due to lesser complications and astigmatism; however, both techniques give similar outcomes for the uncorrected visual acuity. However more work can be done considering the other types of lenses and less expensive toolsavailable.

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AUTHORSHIP AND CONTRIBUTION DECLARATION

No.	Author(s) Full Name	Contribution to the paper	Author(s) Signature
1	Noman Ahmed	Conception and design, Statistical analysis.	
2	Asadullah Jatoi	Critical revision of the article for important intellectual content.	
3	Mona Liza Mahesar	Critical revision of the article for important intellectual content.	
4	Ashok Kumar Narsani	Drafting of the article.