JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

Comparison of visual outcomes between phacoemulsification and small incision cataract surgery in University Eye Hospital

Amirzada Shir Mohammad 1st, Hamid Mohammad Naim 2nd, Mushkani Twafiq Ahmad 3rd
Department of Ophthalmology University Eye Hospital, Kabul University of Medical Sciences
Kabul - Afghanistan

Corresponding author: Amirzada Shir Mohammad, Department of Ophthalmology, University Eye Hospital, Kabul University of Medical Sciences, Kabul, Afghanistan.

Abstract

Introduction: Cataract is a clouding of the lens of the eye. The most frequent causes of blindness are cataract diseases, surgery is only way for treatment of cataract, different surgical methods are providing for cataract surgery.

Objective: The aim of the study was to compare the visual outcomes of phacoemulsification (Phaco) and Small Incision Cataract Surgery (SICS) at University Eye Hospital.

Methods: A retrospective analysis was done from the medical records of the patients who underwent Phaco and SICS in UEH between April 2022 and September 2022. The age, gender and ethnicity of the patients, intraoperative and postoperative complications, and the best corrected visual acuity at the last follow-up visit were noted. Statistical analysis was done using Stata Software Version Spss 16. The results of the two procedures were compared.

Results: Out of the 498 cataract surgeries performed, 235 cases were Phaco and 263 were SICS. In our study, 242 were men and 256 were women. The age of patients ranged from 21 to 87 years; majority of surgery and outcome of visual acuity ($p = 0.001$). There was no significant association between intraoperative complication and type of surgery ($p = 0.166$). Postoperative complications of the surgeries were not significantly different. Good visual outcome was noted in 46.9 % of eyes operated by Phaco compared to 53.1% of eyes operated by SICS procedure.

Conclusion: We concluded that phaco is better than SICS, the visual outcome was significantly better in Phaco compared to SICS procedure we recommend that Phaco equipment's should be supplied in hospitals with adequate facilities for performing intraocular surgery.

Keyword: Cataract, Phacoemulsification, Small Incision Cataract Surgery, Visual Acuity

Introduction

Cataract is the leading cause of blindness in the world and Small incision cataract surgery is the most common type of intraocular surgery performed all over the world.[1] Cataract surgery has evolved from intra capsular cataract extraction (ICCE), extracapsular cataract extraction (ECCE) to small Incision Cataract Surgery (SICS) and today to phacoemulsification (Phaco) that uses modern technology. Standard SICS involves the removal of a part of anterior capsule, manual expression of the nucleus through a large corneoscleral tunnel incision (7–9 mm) and aspiration of cortex, leaving behind the intact posterior capsule. The intraocular lens (usually rigid made up of

polymethyl methacrylate) is inserted capsular bag. This surgery requires local anesthesia (perebulbare injection). Since the wound is large and without put sutures close it, after healing and thus, visual improvement takes longer time following operation.[3]

Phaco is the most common technique of cataract operation performed under local anesthesia (perebulbare with lignocaine). It involves the use of a machine with an ultrasonic hand piece equipped with a steel tip. The tip vibrates at ultrasonic the lens material is emulsified. A second fine instrument (chopper) may be used from a side port to facilitate cracking or chopping of the nucleus into smaller pieces. Fragmentation into smaller pieces makes emulsification easier as well as the aspiration of cortical material. After the phacoemulsification of the lens nucleus, a dual irrigation-aspiration probe is used to aspirate out the remaining peripheral cortical materials.[3] The surgery is performed through a small corneoscleral/clear corneal wound (3.2 mm). The intraocular lens (acrylic or silicon) is folded and inserted using a lens injector through the small wound. The healing process of wound is fast and the rehabilitation time is less. There is no/very little astigmatism and thus, visual improvement is faster allowing the patient to return to work within few days. However, this procedure requires sophisticated and more expensive equipment and the learning curve to convert from the standard SICS phaco procedure is long.[1] The patients suffering from cataract have diminution of vision in early stages but they remain independent in their daily activities. However, when the cataract progresses and becomes mature, the vision further diminishes incapacitating them for driving and going out to get anything from the shops. Cataract is the most common cause of diminution of vision in elderly patients. Surgery being the only treatment to improve the vision in patients with cataract; the knowledge about phaco and SICS procedure, their complications and visual outcome will help doctors to convince their patients in a better way for acceptance of surgical treatment. This study was done to compare the visual outcome and of phaco and SICS performed in a University Eye hospital in Kabul.

Methods

A retrospective study was done to compare the visual outcome phaco and SICS in the UEH. It is one of the one Ministry of higher Education from eye hospitals located in Shah ra ra district of Kabul, providing eye health care comprehensive ophthalmology to a population of 20000 in 2022, The data like age, gender and ethnicity of the patients, intraoperative and postoperative complications were obtained from the case folders of the patients and the hospital Database. All patients who underwent Phaco and SICS procedures from April 2022 to end of September 2022were included in this retrospective study. The best corrected visual acuity obtained after Phaco and SICS (after refraction and subjective correction with glasses) were compared. Considering the WHO categorization of vision figures, the best corrected visual acuity is divided into good vision (6/6 to 6/12), moderate vision (6/18 to 3/60) and poor vision (worse than 3/60). [5] Refractions were performed by hospital refractions at 6 weeks or later within 3 months if there was a need. The outcomes were compared to see whether the type of surgery affected the complications and the final visual outcome. Database. The Cataract Registry was initiated in 2022 and has the data pertaining to patients' characteristics, intraoperative and postoperative events and the preoperative as well as postoperative visual acuities. It is used to determine the practice pattern of cataract surgery.

Statistical analysis

The numerical data values were expressed as mean and standard deviation. Categorical variables were stated as frequency (n) and percentage (%). Tables and Chi-square tests were used to determine the associations between types of surgery and outcome of visual acuity and types of surgery and intraoperative postoperative complication.

Result

Out of the 498 cataract surgeries performed during the study period, 235 surgeries were phacoemulsification (Phaco) and 263 cases were Small incision cataract surgery (SICS). In our study, majority of the patient were in the age group of 61–70 years (135(25.1%) (Table 2). The mean age of patients who underwent Phaco and SICS were 65.6 and 64.4 years respectively. There were more women (55.5%, 277/498) in the while men (44.5%, 221/498) (Chart 1). Majority of the patients in our study were Female (55.5%, 277/498). There was a significant association between type of surgery and outcome of visual acuity ($p = 0.001$). Majority of the patients who underwent phaco had good visual outcome (80.1%, 188/235) compared to SICS (78.7 %, 207/263) (Table 2).

Chart 1. Characteristic of percentage patients who underwent sex.

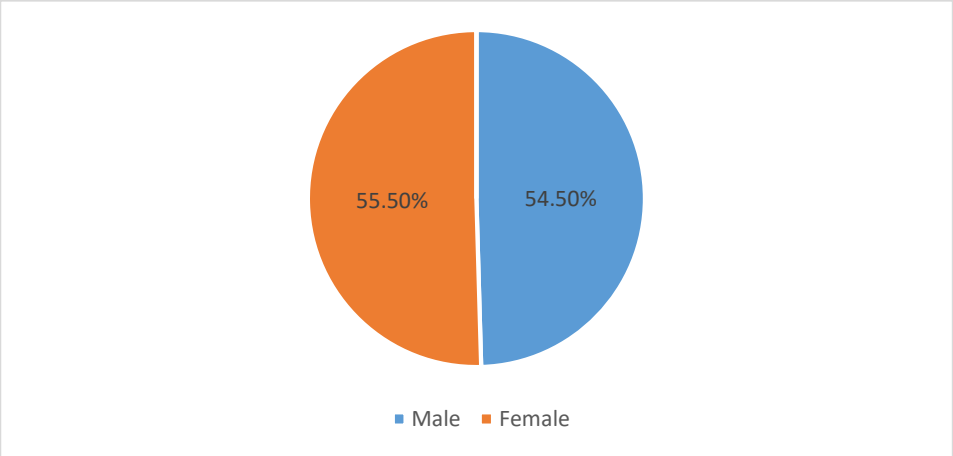

Chart 1:

Table 1. Characteristic of patients who underwent phacoemulsification (Phaco) and Small incision

cataract Surgery (Phaco) Operation (SICS) operation (n= 498)			
Characteristics Age group (years)	**Phaco** n(%)	**SICS** n(%)	**Total** n(%)
20-40	30 (12.7%)	34(12.9%)	64(12.8%)
41-50	42(17.8%)	53(20.15%)	95(19.0%)
51-60	50(21.2%)	55(20.9 %)	105(23.09%)
61-70	60(25.5%)	75(28.5%)	135(25.1%)
71-80	42(17.8%)	34(12.9%)	76(15.2%)
81-90	10(4.2%)	13(4.9%)	23(4.6%)
Grand Total	234	264	498

Table 1: The majority of cataract patients are between the ages of 61 and 70 (27 %).

Table 2. Association between the type of surgery and the outcome of visual acuity (n = 498)

Visual acuity	Phaco (n = 235)	SICS (n = 263)	Total N= 498	P value
Good vision	188(80.%)	207(78.7%)	395(79.3%)	
Moderate Vision	41(17.4 %)	49(18.6%)	90 (18.07%)	
Poor Vision	6(2.5 %)	7(2.6%)	13(2.6%)	

Table 2 :This table shows that the phaco method has the best vision (80 percent) more than the SICS

Table 3. Comparison between intraoperative complication and type cataract surgery

Intraoperative complication	Phaco	SICS	P Value
At least one complication	17(7.2%)	29(11. 0%)	
No Complication	218(92.7%)	234(88.9 %)	

Table 3: Complications between the two groups were lower in phaco than in SICS

Table 4. Association between type of surgery and type of complication

Complication	phaco	SICS	P Value
Posterior capsule rupture	3 (0.8%)	5 (1.9%)	
Vitreous Loss	3 (0.8%)	4 (1.5%)	
Corneal edema	2 (0.4%)	3 (1.1%)	

Table 5. Comparison between postoperative complication and type of surgery

Postoperative complication	Phaco	SICS	P Value
high astigmatism	*4*(1.7%)	9(3.4%)	
Posterior capsule Opacity	5(1.9%)	8(3.0%)	

Table 5: This table shows that the phaco method has complication than the SICS.

Discussion

Cataract is the main cause of blindness in the world. We can cure through with surgery. In the current study the 498 cataract surgeries performed during the study period, 235 (47.1%) surgeries were Phaco and 263 (52.8%) cases were SICS. In this study, majority of the patient were in the age group of 61–70 years 135(25.1%). The mean age of patients who underwent Phaco and SICS were 65.6 and 64.4 years respectively. There were more women 277 (55.5%) in the while men 221 (44.5%,). There was a significant association between type of surgery and outcome of visual acuity (p = 0.001). Majority of the patients who underwent phaco had good visual outcome 188 (80.1%) compared to SICS 207 (78.7 %).This was comparable to the NED data from 2002 to 2011, where 91.5% of patients who underwent phaco had good vision of 6/12 or better as compared to 83% of patients who underwent SICS.[2] This was similar to the findings in Ampang Hospital where 91.7% of their patients had a good visual outcome in Phaco compared to SICS.[3] In the two randomized trials conducted at Moor fields and Oxford Eye Hospitals, it has been found that the proportions of patients achieving 6/9 or better with spectacle correction was significantly higher in the Phaco group (69%) compared to SICS group (57%).[4] Better visual outcome with Phaco (80%) compared to SICS (54%) has been reported by Khan et al.[5] where three ophthalmology departments of Ministry of Health Malaysia hospitals participated, it was also found that at 3 months postoperatively, the best corrected visual acuity was better in the Phaco group (94%) compared to SICS group (81%). Posterior capsule rupture (PCR) is the commonest intraoperative complication that occurs during cataract surgery. found a similar higher incidence of PCR in SICS (17.0%) compared to Phaco (4.2%). On the other hand, there was a higher rate of PCR in Phaco (7.7%) compared to SICS (3.0%). Interestingly. In our study, the postoperative complications such as high astigmatism phaco (1.7%) and in SICS (3.4%), PCO, (1.9%) in phaco and SICS (3.0%) found that poorer results in the visual outcome of SICS were due to higher levels of astigmatism.

Limitations

There was no limitation in this retrospective study in hospital.

Conclusion

Phaco has been shown to have a better final visual outcome compared to SICS.

Conflict of interest

None. Source of funding: None.

Acknowledgement

We also thank the all doctors and allied health personnel of the hospital.

References

World Health organization (WHO). International statistics classification of diseases and health related problems. Tenth edition, Geneva; 1992:456–7.

1. Goh PP, Mohamad AS. The 5th report of the National Eye Database 2011 .acrm.org.my/ned/cataract Surgery Registry. html. Accessed August 10, 2014.
2. Ostia ME, Yuen SZ. The outcomes of extracapsular and phacoemulsification cataract extractions. J Biomed Sci. 2012;11(1):123–8.
3. Minassian DC, Rosen P, Dart JKG, et al. Extracapsular cataract extraction compared with small incision surgery by phacoemulsification: A randomized trial. BrJ Ophthalmol. 2001;85(7):822–9.
4. Khan MN, Amjad AS, Muhammad AP, et al. Visual outcome phacoemulsification versus extracapsular cataract extraction. J Medical and Dental Sciences. 2011;17(3):29–31.
5. Arriaga ME, Lozano J. A comparative study of visual acuity outcomes: Phacoemulsification vs extracapsular cataract extraction. Invest Ophthalmol Vis Sci. 2002;43: E-Abstract 360.c ARVO.
6. Haripriya A, Chang DF, Reena M. Complication rates of phacoemulsification and manual small incision cataract surgery at Arvind Eye Hospital. J Cataract Refract Surg. 2012;38(8):1360–9.