Can Patient Cooperation During Biometry Be A Predictor of The Type of Anesthesia For Phacoemulsification Cataract Surgery

Hussnain Abbas, Abdul Rauf, Shahid Hamid*, Shagufta Perveen, Irshad Hussain, Muhammad Shahid*****

Combined Military Hospital Multan/National University of Medical Sciences (NUMS) Pakistan, *Combined Military Hospital Panu Aqil/National University of Medical Sciences (NUMS) Pakistan, **Combined Military Hospital Panu Aqil/National University of Medical Sciences (NUMS) Pakistan, ***Armed Forces Institute of Opthamology/National University of Medical Sciences (NUMS) Rawalpindi Pakistan

ABSTRACT

Objective: To assess any association between the cooperation of patients during biometry and cataract surgery by phacoemulsification in order to predict the type of anesthesia for the subject surgery.
Study Design: Cross-sectional study.
Place and Duration of Study: Eye Department, Combined Military Hospital, Multan Pakistan, from Jan to Dec 2019.
Methodology: A total of 332 patients requiring cataract surgery by phacoemulsification were recruited from the Eye department of Combined Military Hospital Multan. Patient cooperation level was measured during A-scan biometry. The cooperation level of same patient, assessed during biometry was used to plan the type of anesthesia to be administered during cataract surgery by phacoemulsification.
Results: There were 209 male and 122 female patients with the mean age of 65.14 ± 0.57 years. A significant association was found between the cooperation of patient during biometry and cataract surgery by phacoemulsification appointments (p=0.02). A significant proportion of the patients 162 (81.4%) maintained their good cooperation during surgery. Out of the 133 patients, exhibiting poor cooperation during biometry procedure, 88 (66.3%) showed an improvement in their status by having good cooperation in surgery procedure.
Conclusion: In the light of favorable clinical observation, the cooperation of the patients at the biometry procedure may be considered as a significant predictor of the type of anesthesia to be administered during cataract surgery by phacoemulsification.

Keywords: Biometry, Cataract surgery, Patient cooperation, Phacoemulsification surgery.

How to Cite This Article: *Abbas H, Rauf A, Hamid S, Perveen S, Hussain I, Shahid M. Can Patient Cooperation during Biometry be a Predictor of the Type of Anesthesia for Phacoemulsification Cataract Surgery. Pak Armed Forces Med J 2022; 72(1): 119-122.*
Doi: https://doi.org/10.51253/pafmj.v72i1.5516

INTRODUCTION

Cataract surgery has become a common operative procedure since the emergence of the cataract as the major cause of blindness in the developing as well as in non-developing countries.[1,2] In the light of recent advancements, currently practiced methods to remove cataract such as phacoemulsification and intra-ocular lens (IOL) implantation, are found to be highly reliable and reproducible.[3,4]

Cataract surgeries are aimed to be pain-free operations. A study shows that pain perception during the surgery determines the level of patient cooperation.[5] Previous literature shows that female gender, young age, rural place residence and lower pre-operative visual acuity are the factors that reduce the levels of patient's compliance.[5,6] To achieve a painless experience and maximum patient compliance, the phacoemulsification and IOL implantation procedures are attempted under topical or local anesthesia.[7,8] The topical anesthesia is preferred with regards to its minimal side effects, easy administration and earlier post-operative recovery, but its optimal output depends on patient's cooperation during surgery.[9]

The efficiency of the surgeon and patient's experience can be improved if the compliance of the patient can be predicted before the surgical procedure.[8] The level of anxiety during the biometry can dictate the mode of anesthesia suitable for that patient. The best method of the anesthesia for a particular patient undergoing cataract surgery by phacoemulsification is still under question and lacks evidence.[1,5] Since patient's response towards cataract surgery by phacoemulsification under topical anesthesia is highly unpredictable, so meticulous planning of appropriate anesthesia for a particular patient beforehand is very significant for successful surgery and optimal visual restoration.[2] Good cooperation level during biometry may suggest that the patient would have good cooperation at the

Correspondence: Dr Hussnain Abbas, Eye Department, Combined Military Hospital, Multan Pakistan
Received: 23 Oct 2020; revision received: 31 Dec 2021; accepted: 15 Jan 2021

time of the surgery and would require topical anesthesia only.[5]

Although a previous study by Fraser *et al*, was done to establish a relation between patient's cooperation and ultra sound A scan, however the evidence remain inconclusive.[10] Since 1990s the techniques and equipment used for phacoemulsification have changed and also the clinical competency of the ophthalmologists has been improved. This study was aimed to fill the knowledge gap and assess the association between the cooperation levels of patient during the biometry and the phacoemulsification cataract surgery in modern times in local Pakistani population. The study also assessed the validity of predicting the patient cooperation level during biometry to plan the type of anesthesia beforehand for phacoemulsification cataract surgery for the benefit of both the patient and surgeon.

METHODOLOGY

A cross-sectional study was conducted at the Combined Military Hospital, Multan from January till December 2019. A total of 332 patients were recruited by non-probability, consecutive sampling technique.

Inclusion Criteria: Patients who were diagnosed with cataract and requiring phacoemulsification surgery were included in the study.

Exclusion Criteria: Patients with mature/hyper mature cataract, having a language barrier (were not able to speak in Urdu, English and Punjabi), having hearing problems, younger than 20 years and older than 70 years of age were excluded from the study.

Patients were recruited after the informed consent. Ethical approval for this study was taken from the CMH Ethical Review Committee. The sample size was calculated using the WHO sample size calculator. The 'cooperation of patients during tonometry' proportion values were taken from a study by Abdolreza *et al*, for the sample size calculation.[11] Using a 0.05 level of significance with a 90% power, anticipated proportion values of 0.35 for population 1 and 0.621 for population 2, a sample size of 70 was estimated. For this study, we recruited 332 patients.

A detailed medical history, including age and gender was recorded from all the potential participants. IOL master and ultra sound A scan contact biometry were used.[12] IOL Master is costly method and not used commonly in resource limited centers. Therefore, a traditional ultrasound-based A scan biometer was attempted. The patients were assessed placing the probe on the cornea. Therefore, the patient can feel the probe near the eye and the contact sensations. Biometry and phacoemulsification were carried out in the supine position. Traditional phacoemulsification surgery was done using 2.75 keratome ophthalmic knife with the 'divide and chop' rule.[13]

At the phacoemulsification surgery appointment, patients were either administered topical or local anesthesia. This decision was taken based on the cooperation status of patients from their biometry appointment. For local anesthesia, peribulbar anesthesia was used where indicated. Peribulbar anesthesia is reported to have good anesthesia but incomplete akinesia.[14] Therefore, in peribulbar anesthesia the cooperation of patients can be recorded based on eye movement, eye squeezing and head movement.[15] All these factors were kept in consideration while recording the cooperation levels of patients during the surgery.

Co-operation of patients was observed during the biometry procedure, and response was recorded. The type of anesthesia to be given to the patients for phacoemulsification cataract surgery of the second eye was planned in the light of cooperation level of the patients during biometry.

Statistical Package for Social Sciences (SPSS) version 25.0 was used for the data analysis. Frequencies and percentages were calculated for gender, biometry cooperation and surgery cooperation. Mean and standard deviation was calculated for the age. Cooperation levels for both biometry and surgery were dichotomized. 'un-cooperative' to 'minimally cooperative' response was categorized as 'poor cooperation', while 'moderately cooperative' to 'fully cooperative response was categorized as 'good cooperation'. Pearson's chi square test was applied to assess any differences in the cooperation level recorded during the biometry and surgery procedures. The p-value of ≤ 0.05 was considered to be significant.

RESULTS

A total of 509 patients were initially screened. Patient cooperation levels were not properly recorded for 179 patients. Therefore, we achieved a sample size of 332 patients. The mean age of the participants was 65.14 ± 0.57 years. Out of the 332 patients, there were 209 (63.0%) males and 122 (36.9%) females.

At the biometry procedure, 133 (40.1%) patients had poor cooperation, while 199 (59.9%) patients had good cooperation. In comparison, only 82 (24.7%) patients had poor cooperation at the biometry procedure, while 250 (75.3%) patients had good cooperation at the

surgery procedure. The cooperation status between the biometry and surgery procedures was found to be significant (p=0.002; Table-II).

Table-I: Criteria for determining cooperation levels for biometry and phacoemulsification surgery.

Patient Co-operation Level		Biometry Criteria	Surgery Criteria
Poor Cooperation	Uncooperative To Minimally Cooperative	Biometry done under eye speculum Pre-biometry instructions as well as constant guidance and instructions required during biometry	Surgery done under local anesthesia as patient was totally uncooperative for topical anesthesia, Preoperative instructions were also given.
Good Cooperation	Moderately Cooperative To Fully Cooperative	Pre-biometry instructions given. A few instructions had to be given during the biometry as well.	Preoperative instructions given. A few instructions had to be given during the surgery as well.

Table-II: Cooperation status during biometry and surgery procedures (n=332).

Biometry	Surgery		*p*-value
	Poor Cooperation	Good Cooperation	
Poor Cooperation	45 (33.8%)	88 (66.2%)	0.02
Good Cooperation	37 (18.6%)	162 (81.4%)	

DISCUSSION

This study assessed the cooperation levels of 332 patients during the biometry and phacoemulsification surgery procedures. The whole purpose of this study was to determine whether the cooperation level of the patients at the biometry procedure could possibly predict the cooperation level of the same patient at the surgery procedure. This could be helpful in selecting the choice of anesthesia for the surgery.

Our results revealed that that the cooperation levels during the two procedures were statistically significant. A closer analysis suggested that out of the 199 patients who had good cooperation during biometry, a significantly large majority 162 (81.4%) had good cooperation at the surgery procedure as well. Thus, the good cooperation level during the biometry stage was maintained for more than 80% of the patients for the surgery. Kang *et al,* mentioned that prior knowledge about the perceived pain pre-operatively and experience of the procedure to be carried out can relieve patient's discomfort and improve cooperation.[3]

Pre-operative evaluations of the patients were seen to reduce the rate of procedure cancellations on the day of the surgery.[16,17]

In our knowledge, there are only a few studies showing the patient cooperation during biometry and surgery procedures. However, Abdolreza *et al*, suggested that patient compliance during phacoemulsification depends on other factors such as visual acuity, reaction to eye drop, cooperation during tonometry, and reaction to press on the lacrimal sac before surgery.[11]

In our study, out of the 133 patients who cooperated poorly during the biometry stage, only 45 (33.8%) had poor cooperation at the time of the surgery. This showed that the cooperation of 88 patients (66.3%) out of 133 patients improved at the time of the surgery. From a clinical standpoint, if a surgeon were expecting poor cooperation from a patient at the time of the surgery and that patient cooperates fully, that would actually be a positive transition for the surgeon and he would easily shift from local infiltration anesthesia to administering topical anesthesia in the other eye surgery.[18,19]

According to Fraser *et al*, cooperation of patients before the cataract surgery by phacoemulsification is a good predictor for the topical anesthesia tolerance.[10] Similarly the study of Omulecki *et al*, observed that a good mood before the surgery was related to better cooperation during the surgery. The findings of the current study were in accordance to these findings.[5]

In a previous study by Patel *et al*, it was observed that patients having treated under topical and local anesthesia had no difference in cooperation levels. Patients under both the categories had excellent compliance. According to that study, the patient cooperation is also influenced by other factors like gender, pain perception and visual acuity levels pre-operatively.[18]

Patient cooperation and anxiety due to poor cooperation during the biometry can be a pointer for the mode of anesthesia to be used during the cataract surgery by phacoemulsification. However, other factors such as demographics of the patients, cooperation during applanation tonometery and visual acuity levels should also be considered in future studies.

LIMITATIONS OF STUDY

This study had a few limitations. In order to determine the cooperation level at the cataract surgery by phacoemulsification procedure, the cooperation level during biometry

was the only predictor variable that was considered in this study. Other variables were not considered in this study. Future studies should focus on other factors, such as the socioeconomic status, education level and tonometry. These factors, in addition to other factors may help in determining the type of anesthesia to be administered during the cataract surgery by phacoemulsification. In addition, data should be collected from more than one center to minimize bias.

CONCLUSION

In the light of favorable clinical observation, the cooperation of the patients at the biometry procedure may be considered as a significant predictor of the type of anesthesia to be administered during cataract surgery by phacoemulsification.

Conflict of Interest: None.

Authors' Contribution

HA: Data Collection, AR: Design, SH: Interpretation of data, SP: Data analysis, IH: Drafting, MS: Proof reading.

REFERENCES

1. Day AC, Gore DM, Bunce C, Evans JR. Laser-assisted cataract surgery versus standard ultrasound phacoemulsification cataract surgery. Coch Data Syst Reviews 2016; 7(7): 1-62.
2. Liu Y-C, Wilkins M, Kim T, Malyugin B, Mehta JS. Cataracts. Lancet 2017; 390(10094): 600-612.
3. Kang YK, Kim MJ, Kim HK, Chun BY. Clinical analysis of ocular parameters contributing to intraoperative pain during standard phacoemulsification. J Ophthalmol 2017; 2017(1): 1-5.
4. Raczyńska D, Glasner L, Serkies-Minuth E, Wujtewicz MA, Mitrosz K. Eye surgery in the elderly. Clin Int Surg 2016; 11(1): 407.
5. Omulecki W. Factors affecting patient cooperation and level of pain perception during phacoemulsification in topical and intracameral anesthesia. Eur J Ophthalmol 2009; 19(6): 977-983.
6. Nijkamp MD, Kenens CA, Dijker AJM, Ruiter RAC, Hiddema F, Nuijts RMMA. Determinants of surgery related anxiety in cataract patients. Bri J Ophthalmol 2004; 88(10): 1310-1314.
7. Fichman RA. Use of topical anesthesia alone in cataract surgery. J Cat Ref Surg 1996; 22(5): 612-614.
8. Medghalchi A, Akbari M, Moghadam RS, Alizadeh Y, Heirati A. Can we predict patients' cooperation during phacoemulsification surgery under topical anesthesia? Act Med Iran 2019: 1(2): 412-415.
9. Reddy SC. TT. Local anaesthesia in cataract surgery. Int J Opth Surg 2017; 25(1): 2014-2010.
10. Fraser SG, Siriwadena D, Jamieson H, Girault J, Bryan SJ. Indicators of patient suitability for topical anesthesia. J Cat Ref Surg 1997; 23(5): 781-778.
11. Abdolreza M, Akbari M, Soltani MR. Predictors of patient cooperation during phacoemulsification surgery under topical anesthesia. Cas J Health Res 2019; 4(4): 90-93.
12. Messeha MM, Elhesy AE. Comparison of orbital muscle akinesia caused by rocuronium versus hyaluronidase mixed to the local anesthetic in single injection peribulbar block for cataract surgery. Anes Ess Res 2015; 9(3): 374-378.
13. Liu P, Zhang S, Geng Z, Yuan R, Ye J. Factors affecting pain in patients undergoing bilateral cataract surgery. Int Ophthalmol 2020; 40(2): 297-303.
14. Alboim C, Kliemann R, Soares L, Ferreira M, Polanczyk C, Biolo A. The impact of preoperative evaluation on perioperative events in patients undergoing cataract surgery: a cohort study. Eye 2016; 30(12): 1614-1622.
15. Yu JG, Ye T, Huang Q, Feng YF, Wang J, Fu XA, et al. Comparison between subjective sensations during first and second phacoemulsification eye surgeries in patients with bilateral cataract. J Ophthalmol 2016, Available from: https://doi.org/10.1155/2016/6521567 (Accessed on Dec 20, 2019)
16. Mylona I, Dermenoudi M, Glynatsis M, Ziakas N, Tsinopoulos I. Development of a reliable preoperative risk stratification system for phacoemulsification. J Catarat Ref Surg 2020; 46(8): 1132-1137.
17. Bhatia S, Siddiqui Z, Khan SA, Maheshwari R, Abedi AJ. Intra individual study of anxiety and pain in sequential cataract surgery. Ind J Clin Exp Opthalmol 2019; 5(4): 585-588.
18. Patel BC, Burns TA, Crandall A, Shomaker ST, Pace NL, van Eerd A, et al. A comparison of topical and retrobulbar anesthesia for cataract surgery. Ophthalmol 1996; 103(8): 1196-203.
19. Socea SD, Abualhasan H, Magen O, Zayit-Soudry S, Blumenthal EZ, Duvdevan N, et al. Preoperative anxiety levels and pain during cataract surgery. Curr Eye Res 2020; 45(4): 471-476.