



ORIGINAL RESEARCH PAPER

Anaesthesiology

EVALUATION OF OCULOCARDIAC REFLEX AND REQUIREMENT OF ATROPINE USAGE DURING CATARACT SURGERY UNDER LOCAL ANAESTHESIA

KEY WORDS: Oculocardiac Reflex, Heart rate, Atropine, Prevalence, Cataract surgery.

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ABSTRACT

Background And Aims: This study was to estimate the prevalence of the Oculocardiac reflex during cataract surgery under local anesthesia and to assess the requirement for atropine to prevent this reflex.

Methods: A prospective observational study was done on 75 cataract patients who were between 40-80years of age group undergoing cataract surgery with intraocular lens implantation under local anaesthesia were observed for oculocardiac reflex at different stages of surgery after fulfilling the inclusion and exclusion criteria. Heart rate monitoring was recorded. An intravenous line was positioned for administration of fluid, sedation and analgesia, and for resuscitation in critical situations.

Results: A total of 75 patients were involved in this study and their mean age was 59.42±10.29 in which 43(57.3%) were male patients and 32(42.6%) were female patients. The mean baseline pulse rate was 83.20±10.79. After LA infiltration, it was 81.22±9.98. Intraoperatively the figures fluctuate as following: 63.78±7.84, 74.37±8.89 at superior rectus muscle stitch, at removal of the stitch. Hence the heart rate did not drop to less than 10% of baseline, hence use of atropine was not needed as OCR was not noted.

Conclusions: As there were no case of OCR were noted. Atropine is neither given routinely as premedication nor intraoperatively to avoid the side effects such as extreme dryness of mouth and airways, worrying tachycardia and raised intraocular pressure.

INTRODUCTION:

The Oculocardiac reflex (OCR) is defined as reduction in heart rate or the appearance of brady-arrhythmia due to pressure over the eyeball placed during surgery or any surgical manipulation. It is also known as Ascher reflex or Trigemino-vagal reflex, which was first described during 1908. Main cause may be due to globe pressure applied during surgery or due to traction over the extra ocular muscles. Oculocardiac reflex has reported not only as sinus bradycardia but even reduced arterial pressure, arrhythmia, asystole and even cardiac arrest. But Bradycardia is most common event seen in association with ocular manipulation 1-3. This reflex has most notably been depicted during ophthalmologic procedures, more specifically during strabismus surgery; however, it also may be activated by facial trauma, regional anesthetic nerve blocks and mechanical stimulation during cataract surgery. 4-6

The OCR is ascertained when at least a 20% decrease in heart rate below the baseline. Critical OCR was defined as reduction of HR to 40beats per minute or less at any time during surgery. The reflex usually resolves spontaneously because of it's fatigability, however the anesthesiologists can overcome this response by avoiding the predisposing factors, administering preoperative anticholinergic agent or by retrobulbar anesthesia 7-8

Hence the modification of surgical stimulus and minimal traction over the extra ocular muscles under Peribulbar block or retro bulbar block or topical anaesthesia have practiced for all ocular surgeries to prevent in the occurrence of oculocardiac reflex. And the use of modern long-acting local anesthetic agents with administration of intravenous sedation became a known practice for most ocular procedures 9. Local anaesthesia remains safe with many advantages such as reduced incidence of postoperative nausea & vomiting, hemodynamic stability, early mobilization & discharge, and longer postoperative analgesia 10-13.

Hence this study is aimed to estimate the prevalence of the OCR during cataract extraction under local anesthesia and to assess the requirement for atropine to prevent this reflex.

METHODS

Study Design: Prospective Cross sectional study

Statistical Analysis: Statistical analysis was done using chi square test.

Duration Of The Study: Three months from Dec 2019 to Feb 2020

A prospective study was conducted by selecting cataract patients who were aged between 40-80years of age group who were admitted in ophthalmic ward for cataract surgery and intra ocular lens implantation under local anaesthesia. Total of 75 patients were involved in this study. After obtaining the informed written consent, study was carried out.

The study was done by anaesthesiologist before the surgery and intra operatively. Patients demographic data such as age, sex, education, place was noted, followed by ASA classification class I and class II was used in the study for inclusion criteria. The exclusion criteria include patients with any co-morbidities like uncontrolled hypertension, uncontrolled diabetes mellitus, heart diseases and patients under class 3 and 4 ASA classification and patients with postural hypotension and any conduction block and also patients with allergic to local anaesthesia were excluded.

An intravenous line was positioned for administration of fluid, sedation and analgesia, and for resuscitation in critical situations. Oxygen was given for all patients through nasal cannula with spontaneous breathing.

Cases were monitored using a pulse oximeter (BPL). Data recorded by the anesthesiologist in this sequence: Preoperative, 2min after local anesthesia infiltration, at the superior rectus muscle stitch, and at removing of the stitch.

The statistical analysis was achieved by applying paired sample T-test to compare between the variables considering a p-value less than 0.05 statistically significant. Sample size has taken conveniently.

RESULTS

In this study 75 patients were involved. Their mean age was 59.42±10.29. in which 43(57.3%) were male patients and 32(42.6%) were female patients as demonstrated in table I.

Table-I: Age Distribution According To Gender Of Patients Studied

Age in years	Gender		Total
	Male	Female	
Less than 60yrs	19(44.2%)	20(62.5%)	39(52%)
More than 60yrs	24(55.8%)	12(37.5%)	36(48%)
Total	43(100%)	32(100%)	75(100%)

The mean baseline pulse rate was 83.20±10.79. After LA infiltration, it was 81.22±9.98. Intraoperatively the figures fluctuate as follow: 63.78±7.84, 74.37±8.89 at superior rectus muscle stitch, at removal of the stitch respectively as shown in Table II.

Table -II: An Assessment Of Heart Rate (BPM) At Different Time Points

Variables	Mini mum	Maxi mum	Mean±SD	P Value
BASELINE HR	55	115	83.20±10.729	-
After LA	60	106	81.22±9.98	<0.001**
After SRM pinch and stitching	50	84	63.78±7.84	<0.001**
After stitch removal	56	93	74.37±8.89	<0.001**

Also, table III shows the degree of HR change after each step during the procedure. At superior rectus muscle pinch & stitching, there was a significant fall in heart rate.

TABLE-III: HR- An Assessment At Different Study Points Of Patients Studied

Variab les	BASELINE HR	After LA	After SRM pinch and stitching	After stitch removed
≤60	12(16%)	1(70%)	32(42.7%)	4(5.3%)
61-80	51(68%)	35(46.7%)	41(54.7%)	52(69.3%)
81-100	12(16%)	37(49.3%)	2(2.7%)	19(25.3%)
>100	0(0%)	2(2.7%)	0(0%)	0(0%)
Total	75(100%)	75(100%)	75(100%)	75(100%)

DISCUSSION

Cataract surgery is the most common surgery done by ophthalmologist using small incision or phacoemulsification technique with intra ocular lens implantation with retrobulbar or peribulbar block but recently, ophthalmologists do cataract surgery under LA or topical anesthesia and general anesthesia depending on the health status of patients and age in which local or topical anesthesia have been excluded 14-16. And during cataract surgery raise in intra ocular pressure or globe tension or traction over the extra ocular muscle leads to effect on heart rate such as sinus bradycardia or OCR.

The incidence of OCR was been estimated to be 32% to 90% in previous studies 17-19 and usage of anticholinergic is recommended and required only when OCR were noted and was not used as premedication.

However, atropine may cause bigeminy and increase ectopic beats and these arrhythmias are more persistent than the OCR. It is known that an intrinsic counter-regulatory process exists to restore the HR during the constant pressure on the eyeball or traction of the external eye muscles. This phenomenon is also named 'vagal escape' or 'OCR fatigue'. The use of atropine as the treatment of bradycardia is still controversial due to its latency.^{20,21}

Hence gentle surgical manipulations are most important for prophylaxis and once the severe bradycardia develops, it must be treated by releasing the traction. Most of our patients who developed drop in heart rate but not less than 10% of the baseline, underwent surgery without significant haemodynamic derangements without the use of atropine.

Mohmad et al., the study concluded the heart rate which did not reach the 10% of base line level hence no OCR was found but at removal of the superior rectus muscle stitch, HR was

78.83±12.68, with P-value(<0.003) suggests a drop in heart rate was noted.²²

This study reveals no statistically significant differences in regard to the relation of heart rate changes with age and gender variables (Table I). The use of peri-bulbar and topical anaesthesia in this study showed its own efficiency. Most manipulations that trigger the reflex occurred during superior rectus muscle pinching and stitching that lead to heart rate changes (63.78±7.84). At removal of the superior rectus muscle stitch, HR was 74.37±8.89, hence OCR was not noted and atropine was not administered.

The changes in heart rate in this work did not exceed 10% from the base line record as same as previous studies .23-26 Atropine is neither given routinely preoperatively as premedication nor intraoperatively to avoid extreme dryness of mouth and airways, worrying tachycardia and raised intraocular pressure due to pupillary dilation which may block the angle of anterior chamber of the eye in glaucoma prone patients.²⁷

CONCLUSIONS

In our study, there was no requirement of atropine pre or intraoperatively, as there was no case of OCR was noted. Hence the side effects of atropine was avoided. This suggests bradycardia does not occur less than 20% from the baseline during surgery. Hence further studies required on larger group of cases to access the changes of heart rate and OCR during ophthalmic surgeries.

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