

# Critical Oculocardiac Reflex In Phacoemulsification: A Case Report

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## Abstract

Critical Oculocardiac reflex (OCR) is very rare, especially during phacoemulsification, and we report one such case from our hospital. A 56-year-old male patient developed sudden bradycardia (pulse:38/min) and hypotension (BP:60/40mmHg) during phacoemulsification under topical anaesthesia. We terminated the surgery and managed the patient as a case of critical OCR with injection Atropine, IV fluids and inotropic drugs. Once the patient stabilised, we completed the remaining steps of the surgery successfully. Thus, life-threatening OCR can occur even in phacoemulsification and adhering to strict protocols with timely management can save a life.

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**Keywords:** Oculocardiac Reflex, Phacoemulsification, Atropine

## Introduction

Oculocardiac reflex (OCR) is defined clinically as a decrease in heart rate by 10-20% following pressure to the globe or traction of the ocular muscles.<sup>1</sup> It is more common in strabismus surgeries than phacoemulsification. It manifests as sudden onset of parasympathetic dysrhythmia, sympathetic hypotension, apnea, or gastric hypermotility on stimulation of trigeminal nerve.<sup>2</sup> We report such a case which was well managed by our hospital team.

## Case report

A fifty-six-year-old male patient complained of gradual, progressive and painless diminution of vision in the left eye for one year. The patient had h/o taking an Angiotensin-converting enzyme inhibitor (ACEI), tablet Perindopril 5 mg once a day for hypertension (HTN) for the last seven years. His general and systemic examination was normal.

On ocular examination, his best-corrected vision (Snellen's chart) in the right eye was 6/6 and in the left eye, 6/24 not improving with glasses. The intraocular pressure in both eyes was 12 mmHg by non-contact tonometry. The anterior segment examination revealed nuclear sclerosis grade II in the left eye. Posterior segment examination was normal, and the patient was planned for phacoemulsification with posterior chamber intraocular lens (PCIOL) implantation in the left eye under topical anaesthesia (TA). We did an IOL power calculation. Then the patient underwent preoperative investigations and was found fit for surgery during the pre-anaesthetic checkup. Written and informed consent was taken. On the day of surgery, the patient continued with his routine antihypertensive, tablet Perindopril, (Table 1).

Eyedrops (E/D) Tropicamide 0.8% & Phenylephrine 2.5% combination was used for mydriasis and E/D Proparacaine 0.5% for TA. The multiparameter monitor measured blood pressure (BP):110/80 mmHg, the pulse rate: 76/minute, oxygen saturation (SpO<sub>2</sub>):98% and normal sinus rhythm. Intravenous access was established. The initial steps of surgery were the same. A temporal corneal incision of 2.8

**Table 1: Routine Investigations done for Phacoemulsification**

Sr.no.	Investigations	Reports
1	Complete blood count	Hb 13 2gm/dl, TLC -6500, DLC -N68 L32,M0, E0, platelets- 250000/mcL, RBC- 5 million cells/mcL
2	Urine Routine & Microscopic Exammatlon	Within normal limits
3	Blood sugar levels	Fasting - 80mg/dL, Postprandial- 130mg/dL
4	Blood Urea Nitrogen (BUN), Serum (Sr) Creatinine 20mg/dL, 0.8mg/dL	20mg/dL, O. 8mg/dL
5	Liver function test	Liver function test Sr. Bilirubin : 0.6mg/dL, SGOT 30 IU/L, SGPT 35 IU/L
6	Lipid profile	Within normal limits
7	Chest X-ray PA view	No abnormality detected
8.	Viral markers	Viral markers HIV I and II, anti HCV , HBsAg are negative
9.	12 Lead ECG	Within normal limits

mm was made along with two side port incisions at 12 and 5 O'clock. One drop of TA was administered in the conjunctival cul de sac before every step of surgery.

Continuous curvilinear capsulorhexis was completed through the side port at 12 O'clock. The patient, all of a sudden, became restless and complained of an urge to pass stools. The monitor started to beep, and we noticed his pulse rate recorded 38/minute, BP=60/40 mm Hg, SpO<sub>2</sub>=98% and ECG revealed sinus bradycardia. We stopped the surgery and immediately administered IV Atropine 0.6 mg and started IV 5 % Dextrose at 30ml/kg/hr. Oxygen supplementation started. Even after three minutes, the patient's vitals did not stabilise; hence we repeated IV Atropine 0.6 mg. The patient's pulse rate began to rise, but BP was still the same. To shift the patient in an Intensive care unit (ICU), we attempted



Figure 2: Noradrenaline And Atropine Vials With Inj Noradrenaline At 5Mcg/Kg/Min

to wash the viscoelastic substance with a balanced salt solution in a 5 mm syringe and cannula to avoid an increase in intraocular pressure and damage to the optic nerve. In the ICU, we started him on Injection Noradrenaline (NA) 5 mcg/kg/m to maintain a mean arterial pressure (MAP) of 65 mmHg. (Figure 1) We investigated the patient for acute coronary event, sepsis and other causes of hypotension with no evidence of any of these.

The patient was stabilised within 15-20 minutes on NA infusion drip and kept under observation. After about three hours, the patient started complaining of pain in the left eye, probably due to incomplete irrigation of viscoelastic and the exposed nucleus. Hence, we again took the patient to the operation theatre and completed the remaining steps of the surgery under cover of NA. The parameters used for phacoemulsification were the same as routine. In the chop mode, power: 0-55, pulse: 12 PPS with 50% phaco on time, aspiration flow rate: 35 fixed, vacuum: 350 mmHg, fixed ; with a bottle height of 90 cm. In Quad mode : power :0-60, pulse: 12 PPS with 50% phaco on time, aspiration flow rate : 35 fixed, vacuum : 350 mmHg, linear; with a bottle height of 90 cm. Modified phaco-chop technique was used to divide nucleus in two pieces then by vertical chop it was divided into six pieces in the capsular bag. Each nuclear piece was then emulsified in the pupillary plane taking utmost care to avoid any PC rent or endothelial damage. The patient was detained in the ICU for another two days, and NA tapered off over 48 hrs. Patient on the first day had mild corneal oedema which settled over a week.

### Discussion

Reflex bradycardia during any surgical procedure can be due to OCR, anaphylaxis and vagal stimulation related to increased BP.<sup>3,4</sup> The causes of sudden hypotension in any surgical procedure can be acute coronary event, severe losses of sodium, metabolic/respiratory acidosis, loss of blood volume and adrenocortical insufficiency.<sup>5</sup> The most common

cause of sudden bradycardia and hypotension during any ocular surgery is OCR.<sup>6</sup>

The definitive treatment of OCR is the immediate cessation of the triggering stimulus and administration of IV atropine 0.6mg if bradycardia persists. Our patient did respond to atropine but manifested refractory hypotension requiring inotropic support.

Refractory hypotension is also known to occur as a side effect of ACEI administered on the day of surgery. Roshanov et al. recommends withholding of the ACEI on the day of non-cardiac surgery.<sup>7</sup> Most of the studies recommend stopping ACEI in surgery involving major body fluid shifts like massive bleeding or transfusions.<sup>8</sup> We did not find any case study or report on the use of ACEI as a cause of sudden hypotension in phacoemulsification done under TA and will require further evaluation.

Apil et al. reported incomplete abolition of pain by TA and Parish et al. mention conjunctival traction as one of the causes of OCR.<sup>9,10</sup> In our patient, we used Lim's forceps at the limbus to support the globe during corneal incisions and anterior capsulotomy with no traction on the conjunctiva. No forceps were used near muscle insertions anytime during the procedure.

Several other risk factors, such as age of the patient, use of premedication, anesthetic technique, type of surgery, and the sequence of the operated muscle, have been shown to influence the occurrence of OCR.<sup>11</sup> Nonetheless, Apt et al. and Espahbodi et al. reported the occurrence rate of OCR as 67.9% and 63% respectively, in strabismus, retinal, cataract surgeries and in eye procedure involving mechanical stimulation of the eye, most of which are asymptomatic.<sup>12</sup> Hence, the use of multiparameter monitor helps in immediate detection and in saving a life as in our case.

### Conclusion

Critical OCR in Phacoemulsification is rare but life-threatening. Hence, the use of a multiparameter monitor, crash cart and trained anaesthesia staff is a must for any ophthalmic surgery.

### Ethical approval

The surgical procedure involving human participant is following the ethical standards of the institutional/ national research committee, the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

### Consent

Written, informed consent was obtained from the patient for Cataract surgery.

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