

# Effect of Thiopentone and Propofol on Intraocular Pressure

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## ABSTRACT

**Introduction:** The impact of anaesthetic drugs on intra-ocular pressure needs to be known when ophthalmic surgery is to be carried out, especially on patients with high intra-ocular pressure. This study was designed to evaluate and compare the intraocular pressure response by injecting thiopentone 2.5% Vs propofol 1% as induction agents in patients under going cataract surgery.

**Materials and methods:** Forty patients who were planned for cataract surgery were divided into two group. One group was given thiopentone and other propofol. Intra-ocular pressure was monitored

**Results:** The mean intra-ocular pressure in thiopentone group was 13.38 and 13.31 at 3 and 6 minutes. The mean intra-ocular pressure of propofol group was 11.46 and 11.45 at 3 and 6 minutes. Propofol treated group exhibited significant reduction in intra-ocular pressure compared to thiopentone group

**Conclusion:** Usage of propofol will be beneficial to patients who undergo cataract surgery with elevated intraocular pressure.

**Keywords:** Thiopentone and Propofol

## INTRODUCTION

Regulation of intraocular pressure and management of its consequences pose a unique challenge to the anesthesiologist during eye surgery. General anesthesia has been in use for ophthalmic surgery since 1847. The normal intra-ocular pressure varies from 10-20mmHg. Higher intra-ocular pressure is associated with risk of expulsion of intra-ocular contents on opening the eye.<sup>1</sup> The usual effect during maintenance of general anesthesia is to produce a fall in the intraocular pressure.<sup>2</sup> Local anaesthesia was first introduced in the year 1884 by Carl Koller.<sup>3</sup> Though local anesthesia for ophthalmic surgery has been accepted as a routine for more than a century,<sup>4</sup> precise control of intra-ocular pressure is an accepted advantage of general anesthesia. The impact of anaesthetic drugs on intra-ocular pressure needs to be known when ophthalmic surgery is to be carried out, especially on patients with high intra-ocular pressure. With the above in mind this study was designed to evaluate and compare the intraocular pressure response by injecting thiopentone 2.5% Vs propofol 1% as induction agents in patients undergoing cataract surgery.

## MATERIALS AND METHODS

After getting institutional ethical clearance forty patients with informed consent were included in the study. Healthy patients of either sex and aged between 50-65 years undergoing cataract surgery at Saveetha Medical College, were included for this study. Inclusion criteria are patient un-

dergoing cataract surgery. Exclusion criteria are associated systemic diseases, glaucoma and patients on drugs which reduce intra-ocular pressure. All the patients were premeditated with Injection Diazepam 0.2mg/kg, 45 minutes before surgery. Intraocular pressure in normal eye was measured for all the patients using schiotz tonometer. Intra-ocular pressure was measured in supine position only. Patients were randomly divided into two groups of twenty each. Group I received injection Thiopentone 2.5% at 5 mg/kg body weight intravenously and Group II received injection Propofol 1% at 2mg/kg body weight intravenously for sedation before administering local anaesthetic for cataract surgery. After injection, intraocular pressure was measured at 3 minutes and 6 minutes in non-surgery eye in both the groups. Three values of intra-ocular pressure were recorded. Two way ANOVA analysis of variance was done to measure the difference from baseline value in each group and between groups. Bonferroni multiple comparison method used to compare P-value.

## RESULTS

The mean intra-ocular pressure in group I was found to be 16.55 and in group II it was 16.37, before administration of thiopentone or propofol respectively. Table 1 shows the observations recorded in both the groups at 3 minutes and 6 minutes after administration of drug. The mean intra-ocular pressure in group I was 13.38 and 13.31 at 3 and 6 minutes. The mean intra-ocular pressure of group II was 11.46 and 11.45 at 3 and 6 minutes. The P-value for intra-ocular pressure reduction within group and between group was <0.001 (highly significant). Hence within group, significant reduction in intra-ocular pressure was observed between 0 and 3 minute observation in both groups. Significant variations in intra-ocular pressure measurement were observed

Time	Group I (thiopentone)		Group II (Propofol)	
	Mean	SD	Mean	SD
0 minutes	16.55	0.59	16.37	0.47
3 minutes	13.38	0.5	11.46	0.46
6 minutes	13.31	0.52	11.45	0.41

**Table-1:** Comparison of intra-ocular pressure before and after administering thiopentone and propofol

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**How to cite this article:** C. B. Sridhar, M. Dinesh Kumar. Effect of thiopentone and propofol on intraocular pressure. International Journal of Contemporary Medical Research 2016;3(2):487-488.

source	'F' value	'P' value	Bonferroni multiple comparison test results
Intra-ocular pressure	1480.61	<0.001	0 min Vs 3, 6min
Intra-ocular pressure and drugs	65.41	<0.001	

**Table-2:** Two way ANOVA test

between groups at 3 minute, and 6 minutes. Propofol treated group exhibited significant reduction in intra-ocular pressure compared to thiopentone group. (Group I). Two way ANOVA analysis of variance (Table 2) reveal significant difference in reduction of intraocular pressure within group and between groups. Bonferroni multiple comparisons showed that significant reduction of intra-ocular pressure occurs at 3min and 6min. However there was no difference between 3min and 6 min recording.

## DISCUSSION

Intra-ocular pressure is a measurement of the fluid pressure inside the eye. Normal eye pressure usually ranges from 10 to 21 mm Hg with an average of 16 mm Hg. Pressure that is consistently above 21 mm Hg indicates ocular hypertension. If the intra-ocular pressure is elevated, it can cause pressure within the eye to increase and damage the optic nerve. Temporary variation in pressure is usually well tolerated in the normal eyes. However, transient episodes of increased intraocular pressure in patients with low ophthalmic artery pressure may jeopardize retinal perfusion and cause retinal ischemia.

The results in our study clearly show that propofol reduces intraocular pressure significantly more than thiopentone. This is in agreement with the study made by Guedes (1988).<sup>5</sup> He observed significant decrease in intra-ocular pressure in patients treated with propofol compared to those who received thiopentone. Neel (1995) also observed significant reduction in intra-ocular pressure after administering propofol even in smaller dose.<sup>6</sup> He also observed significant reduction of intra-ocular pressure up to 7 minutes. Our study also showed a significant reduction upto 6 minutes. Mirakur (1988) used thiopentone and propofol with vecuronium of 0.15 mg / kg for neuromuscular block.<sup>7</sup> He too observed significant reduction in intra-ocular pressure in patients treated with propofol. Mirakur(1987) recorded that propofol controls the raise in intra-ocular pressure caused by giving succinylcholine and tracheal intubation.<sup>8</sup> The study done by Zimmerman showed that combination of propofol and alfentanil prevents the increase of intra-ocular pressure associated with succinyl choline and endotracheal intubation.<sup>9</sup> In Study done by Katzenschlager in 2002 there was equal reduction of intra-ocular pressure by both sevoflurane and propofol.<sup>2</sup> Laryngoscopy cause significant increase in intra-ocular pressure.<sup>10</sup> Hence just sedation with propofol would be a better alternative to general anaesthesia.

## CONCLUSION

Comparative performance of thiopentone and propofol as inducing agents on intraocular pressure during ophthalmic surgery was investigated. It was observed that propofol reduces intraocular pressure significantly more than thiopentone. Usage of propofol will be beneficial to patients who undergo cataract surgery with elevated intraocular pressure.

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**Source of Support:** Nil; **Conflict of Interest:** None

**Submitted:** 26-12-2015; **Published online:** 16-01-2016