

# Assessment of Standard Techniques of General Anaesthesia for Cataract Surgery: A Comparative Study

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## ABSTRACT

**Introduction:** Rapid loss of consciousness is caused by induction agents, which are the drugs that, when given intravenously in an appropriate dose. One of the commonly used induction agent is Propofol, 2,6-diisopropylphenol which offers various advantages. Etomidate, carboxylated imidazole is characterized by hemodynamic stability, minimal respiratory depression and cerebral protective effects. Hence; we planned this study to assess the feasibility of general anaesthesia for cataract surgery with infusion of propofol or etomidate-vecuronium-isoflurane anaesthesia.

**Material and methods:** The present study included assessment of 80 patients undergoing cataract extraction and lens implantation under general anaesthesia. All the patients were divided randomly into two study groups; group 1 consisted of patients in which propofol was administered while group 2 included patients in which etomidate- vecuronium- isoflurane anaesthesia was administered. All the results were analyzed by SPSS software. Chi-square test and one way ANOVA was used for the assessment of level of significance.

**Results:** The mean age of the patients of the group 1 and group 2 was 66.5 and 68.1 years respectively. Mean weight of the patients in group 1 and group 2 was 68.1 and 69.8 Kg respectively. 169 and 161 cm was the mean height of the patients in group 1 and group 2 respectively. Mean intra-ocular pressure at the post-induction time in group 1 and group 2 patients 13.2 and 12.8 mm of Hg respectively.

**Conclusion:** Safety and feasibility general anaesthesia for cataract surgery can be increased by avoiding long-acting sedative drugs and narcotic analgesics.

**Key words:** Anaesthesia, Cataract, Propofol

## INTRODUCTION

Rapid loss of consciousness is caused by induction agents, which are the drugs that, when given intravenously in an appropriate dose.<sup>1</sup> One of the commonly used induction agent is Propofol, 2,6-diisopropylphenol which offers various advantages including offering of rapid and smooth induction and recovery along with decrease in frequency of occurrence of various drug induced adverse effects. Etomidate, carboxylated imidazole is characterized by hemodynamic stability, minimal respiratory depression and cerebral protective effects.<sup>3</sup> Because of numerous advantages it offers in cardiac patients including minimal effect of sympathetic nervous system makes its selection more common in patients suffering from various cardiovascular pathologies.<sup>4,6</sup> Hence; we planned this study to assess the feasibility of general anaesthesia for cataract surgery with infusion of propofol or etomidate-vecuronium-isoflurane anaesthesia.

## MATERIAL AND METHODS

The present study was conducted in the ophthalmology wing

and included assessment of 80 patients undergoing various cataract surgeries under general anaesthesia. All the patients were divided randomly into two study groups; group 1 consisted of patients in which propofol was administered while group 2 included patients in which etomidate- vecuronium-isoflurane anaesthesia was administered. Ethical approval was taken from institutional ethical committee and written consent was obtained after explaining in detail the entire research protocol. Metoclopramide was given pre-operatively to reduce the incidence of post-operative nausea and vomiting. Use of sedating agents was avoided. Patients were carried to the operation theatre where randomization was done while selecting the patients for the two study groups. i.e. whether the patients will receive the propofol infusion or they will receive etomidatevecuronium- isoflurane anaesthesia. Application of solution of topical anaesthetic agent was done on the non-surgical eye which was achieved through 1 percent lidocaine solution followed by estimation of intra-ocular pressure (IOP) through Perkins tonometer. Various cardio-vascular and hemodynamic parameters were measured with the help of routinely used hemodynamic monitoring systems which included ECG, non-invasive automatic arterial pressure monitor and pulse oximeter. An i.v. cannula was inserted under local anaesthesia. Recovery times were recorded from discontinuation of anaesthesia to the point of time when the movement of the eye was achieved. All the results were analyzed by SPSS software. Chi-square test and one way ANOVA was used for the assessment of level of significance.

## RESULTS

Table 1 shows the demographic characteristics of the patients. The mean age of the patients of the group 1 and group 2 was 66.5 and 68.1 years respectively. Mean weight of the patients in group 1 and group 2 was 68.1 and 69.8 Kg respectively. 169 and 161 cm was the mean height of the patients in group 1 and group 2 respectively. Figure 1 shows the demographic details of the patients. Table 2 shows mean intra-ocular pressure (mm of Hg) in each group. Mean intra-ocular pressure at the pre-induction time in group 1 and group 2 patients 16.2 and 15.1 mm of Hg respectively. Mean intra-ocular pressure at the post-induction time in group 1 and group 2 patients 13.2 and 12.8 mm of Hg

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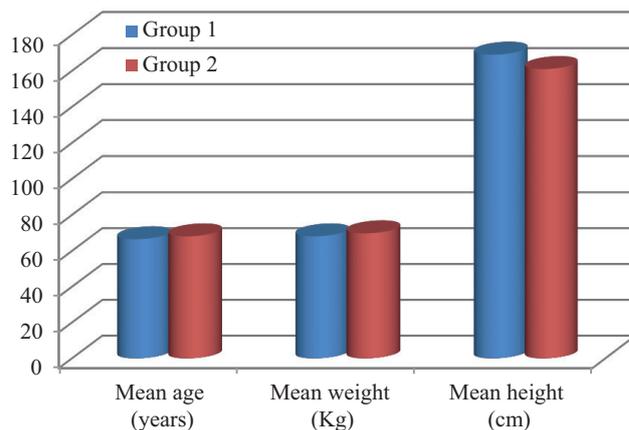
respectively. Mean intra-ocular pressure at the time of end of surgery in group 1 and group 2 patients 11.2 and 9.6 mm of Hg respectively. Figure 2 shows the mean intra-ocular pressure (mm of Hg) in each group.

**DISCUSSION**

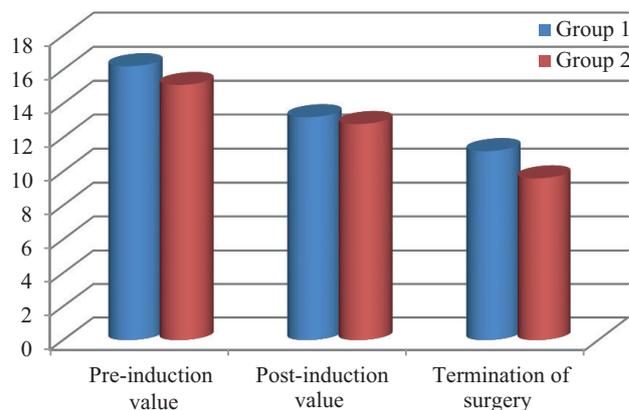
By causing depression of the myocardial system and vasodilatation, arterial blood pressure is decreased by various general anaesthetic agents.<sup>8,9</sup> Conversely, laryngoscopy and endotracheal intubation elicit unwanted cardiovascular responses such as hypertension, tachycardia and dysrhythmias. The exact induction dose for maintaining hemodynamic stability has not been zeroed upon.<sup>10</sup> Hence; we planned this study to assess the feasibility of general anaesthesia for cataract surgery with infusion of propofol or etomidate-vecuronium-isoflurane anaesthesia.

In the present study we observed a decrease in 21 percent of the mean arterial pressure followed by a fall in 25 percent of the pressure during the maintenance phase of the anaesthesia. However, no significant changes were detected in the heart rate. Both reductions in cardiac output and systemic vascular resistance results in these changes. General anaesthesia in patients undergoing day-case cataract surgery was assessed by Moffat et al. they analyzed 40 patients all of which were more than 60 years of age. All the patients in their study were randomly divided into two study groups. One study group included patients that received propofol while the other group included patients who received etomidate-vecuronium-isoflurane anaesthesia. A significant reduction in the mean arterial pressure upto 42 percent was observed in the patients receiving propofol in comparison to the other group patients. A significant elevation of the mean heart rate upto 20 percent approximately was seen in patients belonging to the etomidate-vecuronium-isoflurane group. However, no significant difference was observed in between the patients of the two study groups when compared for the various mental functional tests. After approximately two hours of the surgery in their study groups, the patients were declared fit for discharge after complete examination. From the results, they concluded that providing of the general anaesthesia for the day case cataract surgery was practically feasible. They also concluded that in comparison with propofol, Etomidate-vecuronium-isoflurane anaesthesia appeared to be superior in this particular age group.<sup>11</sup>

50 healthy patients undergoing arthroscopy were analyzed by Gupta et al. All the patients assessed by them were in between of 15 to 45 years of age. They analyzed various recovery and mood aspects of the patients. They performed various psychomotor tests which included assessment through p-deletion test and the Trieger dot test pre-operatively. From the results, they concluded that when isoflurane-based anaesthesia was used for arthroscopic procedure, psychomotor recovery is somewhat quicker.<sup>12</sup> Schäffer et al made comparative evaluation of the various techniques used for delivering anaesthesia in geriatric patients undergoing various ophthalmic surgeries. They compared in between propofol/fentanyl anaesthesia, isoflurane anaesthesia or neuroleptanaesthesia by analyzing a total of 60 patients of age more than 60 years. all the patients were randomly divided into various study groups on the basis of toe of anaesthesia received by the patients. i.e. either



**Figure-1:** Demographic details of the patients



**Figure-2:** Mean intra-ocular pressure (mm of Hg) in each group

Parameter	Group 1	Group 2	p-value
Mean age (years)	66.5	68.1	0.51
Mean weight (Kg)	68.1	69.8	0.87
Mean height (cm)	169	161	0.94

**Table-1:** Demographic characteristics of the patients

Parameter	Group 1	Group 2	p-value
Pre-induction value	16.2	15.1	0.87
Post-induction value	13.2	12.8	0.51
Termination of surgery	11.2	9.6	0.02*

\*: Significant

**Table-2:** Mean intra-ocular pressure (mm of Hg) in each group

propofol/fentanyl (continuous propofol infusion), isoflurane or neuroleptanaesthesia. After administration of the anaesthesia, the patients underwent ophthalmic surgeries. Recording of all the intra-surgical and post-surgical complications and adverse effects was done followed by their assessment on the basis of Juhl index. Documentation of the cardiac parameters was also done 2 hours after the surgery followed by the assessment of mean arterial blood pressure. No post-surgical significant difference was observed in between the patients of the two study groups in relation to various cardio circulatory parameters. From the results, they concluded that propofol-fentanyl anaesthesia has certain benefits because of the fact that in comparison with the rather techniques, elderly patients recover more quickly.<sup>13</sup>

**CONCLUSION**

From the above results, the authors concluded that safety and

feasibility general anaesthesia for cataract surgery can be increased by avoiding long-acting sedative drugs and narcotic analgesics.

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