

# Efficacy of Propofol and Etomidate for General Anaesthesia: A Comparative Study

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## ABSTRACT

**Background:** Induction agents are given to induce anesthesia prior to the drugs given for maintenance of anesthesia, which are also used as the sole drug for short treatment procedures, to give conscious sedation while undergoing procedures under local anesthesia and intensive care unit. The present study was conducted with the aim to determine the compare the efficacy of propofol versus etomidate.

**Materials and Methods:** This prospective randomized study was conducted amongst 200 patients belonging to (ASA) grade I and II between the age of 18 and 60 years irrespective of the gender who were scheduled for surgical procedure under the general anesthesia. Pain on injection was graded On a 4 graded scale with 0 meaning no Pain and 3 meaning both verbal complaint and withdrawal of arm. All the data thus obtained was recorded in a tabulated form and analyzed using SPSS software.

**Results:** The study enrolled a total of 200 subjects with the mean age of 41.78+/-3.94 years. There were 120 males and 80 females in the study. There were 100 patients in each group. All the subjects in Group I had grade 0 myoclonus. There were 65 patients in Group II with Grade 0 myoclonus, 15

with grade 1 and grade 2 myoclonus respectively and 5 with Grade 3 myoclonus.

**Conclusion:** Etomidate is a better anesthetic compared to propofol. It offers great hemodynamic stability with better pain control.

**Keywords:** Anesthetic, Hemodynamic, Pain, Myoclonus.


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## INTRODUCTION

Inducing agents are medicaments that, when administered intravenously in a suitable dose, lead to a quick loss of consciousness. Induction agents are given to induce anesthesia prior to the drugs given for maintenance of anesthesia, which are also used as the sole drug for short treatment procedures, to give conscious sedation while undergoing procedures under local anesthesia and intensive care unit. Propofol, 2,6-diisopropylphenol is the widely popular inducing agent that has favorable features of rapid and rapid induction and recovery, reduced incidence of nausea and vomiting.<sup>1,2</sup> But it is also accompanied by few drawbacks like decrease blood pressure, dose related depression of ventilation, pain while injection.<sup>3-5</sup> Etomidate is a carboxylated imidazole is categorized by hemodynamic stability, least respiratory depression and has cerebral protective effects. Its lacks effect on the sympathetic nervous system, baroreceptor regulatory system and enhances coronary perfusion amongst patients with moderate cardiac dysfunction makes it a favorable inducing agent amongst cardiac patients.<sup>6-9</sup>

However, the hostile effects like pain on injection, thrombophlebitis and myoclonus are few of undesirable effects.<sup>10,11</sup> The present study was conducted with the aim to determine the compare the efficacy of propofol versus etomidate.

## MATERIALS AND METHODS

This prospective randomized study was conducted amongst 200 patients belonging to (ASA) grade I and II between the age of 18 and 60 years irrespective of the gender who were scheduled for surgical procedure under the general anesthesia. The study was approved by the institutional ethical board and all the subjects were informed about the study and a written consent was obtained from them in their vernacular language. The subjects were randomly divided into 2 groups- Group I received Propofol 1% injection and Group II received Etomidate injection. Subjects with known allergies to drugs, seizure disorder, steroid deficiency or on steroid medicaments were not included in the study. Subjects were administered alprazolam and ranitidine night before surgery and were fasting 8 hourly. All the vital parameters were noted

amongst all patients and RL was initiated. Glycopyrrolate, midazolam and fentanyl were administered I.V. followed by an inducing dose of propofol or etomidate. Pain and myoclonus at induction were noted. Tracheal intubation was performed and the endotracheal tube was secured. Blood pressure- both systolic and diastolic, mean arterial pressure, heart rate were uninterruptedly

monitored and recorded before the beginning of induction, at induction and 1, 3, 5 and 10 minutes after intubation. Pain on injection was graded on a 4 graded scale with 0 meaning no Pain and 3 meaning both verbal complaint and withdrawal of arm. All the data thus obtained was recorded in a tabulated form and analyzed using SPSS software.

**Table 1: Incidence and grade of pain**

	Grade 0 pain	Grade 1 pain	Grade 2 pain	P value
Group I	50	32	18	<0.05
Group II	94	5	1	

**Table 2: Incidence of myoclonus amongst groups**

Myoclonic movements	Group I	Group II	P value
Grade 0	100	65	0
Grade 1	0	15	
Grade 2	0	15	
Grade 3	0	5	

## RESULTS

The study enrolled a total of 200 subjects with the mean age of 41.78±3.94 years. There were 120 males and 80 females in the study. There were 100 patients in each group.

Table I illustrates the incidence and grade of pain amongst both the groups. In Group I, there were 50 subjects with Grade 0 pain, 32 with Grade 1 pain and 18 with Grade 2 pain. In Group II, there were 94 subjects with Grade 0 pain, 5 with Grade 1 pain and 1 with Grade 2 pain.

Table 2 shows the incidence of myoclonus amongst the groups. All the subjects in Group I had grade 0 myoclonus. There were 65 patients in Group II with Grade 0 myoclonus, 15 with grade 1 and grade 2 myoclonus respectively and 5 with Grade 3 myoclonus.

## DISCUSSION

Anesthesia induction is related with hemodynamic changes of mild to moderate percentage that depends upon many factors. In the present study, we see that propofol leads to significant hypotension and tachycardia at the time of induction in compared to etomidate. Hypotension that is seen with propofol is primarily due to decrease of sympathetic activity leading to vasodilation or its direct action on vascular smooth muscles.<sup>12,13</sup> Sudden hypotension and tachycardia has dangerous consequences on maintaining the circulation to the vital organs amongst patients of coronary artery disorder, valvular stenosis, hypertension and shock. The hemodynamic stability seen with etomidate can be because of its unique lack of action on the sympathetic nervous system and on baroreceptor actions.<sup>14,15</sup>

In a study by Mayer et al.<sup>16</sup> and Wu et al.<sup>17</sup> they observed that etomidate preserves the hemodynamic stability during anesthesia. In a large number of studies, etomidate had been found to cause less cardiovascular depression and therefore, minimize use of vasopressor substances than other inducing agents in patients with sepsis and critically illness. Although etomidate can lead to adrenal insufficiency amongst these subjects during the postoperative period, clinical significance of that is still not clear over the advantage in prevention of hypotension at induction.<sup>18-21</sup>

Pain during injection of anesthetic drug is a bad practice for patient as well as doctor as well as quite embarrassing for an anesthesiologist. Etomidate has shown a favorable result and is shown by studies conducted by Saricaoglu et al.<sup>22</sup> and Wu et al.<sup>17</sup> Both agents lead to a similar type of respiratory depressant. They were also associated with episodes of apnea that were transient and not related with fall in the oxygen saturation.

In the study by Boysen et al.<sup>23</sup> there was no significant difference between the two groups about apnea after induction. The only negative feature seen with etomidate was elevated incidence of myoclonic actions. As per a study by Miner et al.<sup>24</sup> a high incidence of myoclonus was observed in etomidate group compared to propofol group.

## CONCLUSION

Etomidate is a better anesthetic compared to propofol. It offers great hemodynamic stability with better pain control. The only drawback that is observed with etomidate is the incidence of myoclonus that is related with it. It has shown better patients acceptability compared to propofol.

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