Comparative Evaluation of Propofol and Etomidate in Patients under General Anaesthesia: A Clinical Study

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ABSTRACT
Background: Induction agents are the agents that cause a rapid loss of consciousness when given intravenously. This study was conducted to compare the effects of etomidate & propofol as an induction agent.

Materials & Methods: This study was conducted on 40 patients of both genders with ASA grade I and II. These were selected for elective surgical procedure with endotracheal intubation under general anesthesia. The patients were divided into 2 groups. Group I consisted of 20 patients who received Inj. Propofol 1% (2 mg/kg of bodyweight) and group II consisted of 20 patients who received Inj. Etomidate (0.3 mg/kg of body weight).

Results: Mean age was 30±8.12 in group I and 34±11.18 in group II. Mean weight was 68±10.24 in group I and 63±12.10 in group II. Number of patients with ASA grade I was 12 in group I and 9 in group II while grade II was 8 and 11 in group I and group II respectively. The difference was statistical non-significant (P> 0.05).

In group I, number of patients with grade I, grade II and grade III pain was 10, 6 and 4 respectively. In group II, number of patients with grade I, grade II and grade III pain was 9, 5 and 6 respectively. The difference was non-significant (P> 0.05).

The number of patients with apnea in both the groups. The number of patients with apnea was 13 in group I and 8 in group II while with no apnea, 7 in group I and 12 in group II. The difference was non-significant (P> 0.05).

Conclusion: Etomidate and Propofol found to be equally effective in managing patients. Apnea and pain in both groups was comparable.

KEYWORDS: Etomidate, Propofol, Mean Arterial Pressure.

INTRODUCTION
Induction agents are the agents that cause a rapid loss of consciousness when given intravenously. Induction agents are used to maintain anesthesia and is given before other drugs. It is given intravenously to maintain anesthesia for longer procedures. It also provides conscious sedation during procedures undergoing in local anesthesia.1

Propofol, marketed as Diprivan among others, is a short-acting medication that results in a decreased level of consciousness and lack of memory for events. Its uses include the starting and maintenance of general anesthesia, sedation for mechanically ventilated adults, and procedural sedation. It is also used for status epilepticus if other medications have not worked. It is given by injection into a vein. Maximum effect takes about two minutes to occur and it typically lasts five to ten minutes.2

Etomidate and propofol are 2 ultra-short-acting sedative agents thought to provide these characteristics. Etomidate is a short-acting intravenous anaesthetic agent used for the induction of general anaesthesia and sedation for short procedures such as reduction of dislocated joints, tracheal intubation, and cardioversion. It was developed at Janssen Pharmaceutica in 1964 and was introduced as an intravenous agent in 1972 in Europe and in 1983 in the United States.3

The performance and safety of these 2 agents have not been compared inspite of their common use in procedural sedation. Propofol, 2, 6-diisopropylphenol is most popular induction agent with its ability of smooth
and rapid and induction and recovery. The incidence of nausea and vomiting etc is less with it. The onset of action of propofol is approximately 45 seconds. It takes approximately 3 to 5 minutes to redistribute from the blood to fat and in muscle. It provides reliable amnesia and rapid recovery when used for procedural sedation. It has got some side effects like blood pressure, dose dependent depression of ventilation, pain on injection. This study was conducted to compare the effects of etomidate & propofol as an induction agent.

MATERIALS & METHODS
This study was conducted at Department of Anaesthesia, Dhanalakshmi Srinivasan Medical College & Hospital, Perambalur, Tamilnadu (India) on 40 patients of both genders with ASA grade I and II. These were selected for elective surgical procedure with endotracheal intubation under general anesthesia. All were informed regarding the study and written consent was obtained. The patients were divided into 2 groups. Group I consisted of 20 patients who received Inj. Propofol 1% (2 mg/kg of bodyweight) and group II consisted of 20 patients who received Inj. Etomidate (0.3 mg/kg of body weight). On day of procedure, patients were attached with standard anesthesia. Their pulse oximeter, electrocardiogram (ECG), non-invasive blood pressure (NIBP), and baseline vital parameters were evaluated and recorded. Ringer lactate 10 mL/kg/h was started in patients. Induction dose of propofol was started after giving 0.2 mg glycopyrrolate, 0.02 mg/kg midazolam and 3 mg/kg I.V. fentanyl. Parameters such as mean arterial pressure, heart rate, apnea and pain on injection were recorded. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS
Table I shows that mean age was 30±8.12in group I and 34±11.18in group II. Mean weight was 68±10.24 in group I and 63±12.10 in group II. Number of patients with ASA grade I was 12 in group I and 9 in group II while grade II was 8 and 11 in group I and group II respectively. The difference was statistical non-significant (P> 0.05).

Graph I shows that MAP in group I, showed a significant decrease in MAP from baseline at induction with propofol as compared to etomidate (p > 0.05), later on MAP became comparable to etomidate (p > 0.05).

Graph II shows that in group I, number of patients with grade I, grade II and grade III pain was 10, 6 and 4 respectively. In group II, number of patients with grade I, grade II and grade III pain was 9, 5 and 6 respectively. The difference was non-significant (P> 0.05).

Graph III shows the number of patients with apnea in both the groups. The number of patients with apnea was 13 in group I and 8 in group II while with no apnea, 7 in group I and 12 in group II. The difference was non-significant (P> 0.05).

Table I: Demographic records

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Group I</th>
<th>Group II</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age (yrs)</td>
<td>30±8.12</td>
<td>34±11.18</td>
<td>0.4</td>
</tr>
<tr>
<td>Mean weight (kg)</td>
<td>68±10.24</td>
<td>63±12.10</td>
<td>0.1</td>
</tr>
<tr>
<td>ASA grade I/II</td>
<td>12/8</td>
<td>9/11</td>
<td>0.5</td>
</tr>
</tbody>
</table>

Graph I: Mean arterial pressure (MAP) in both groups
RESULTS
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DISCUSSION
In emergency settings, etomidate was one of the most frequently used sedative hypnotic agents, however propofol is now usually the drug of choice due to its significantly better properties. It is used for conscious sedation and as a part of a rapid sequence induction to induce anaesthesia. It is used as an anaesthetic agent since it has a rapid onset of action and a safe cardiovascular risk profile, and therefore is less likely to cause a significant drop in blood pressure than other induction agents. In addition, etomidate is often used because of its easy dosing profile, limited suppression of ventilation, lack of histamine liberation and protection from myocardial and cerebral ischemia. Thus, etomidate is a good induction agent for people who are...
hemodynamically unstable. Etomidate also has interesting characteristics for people with traumatic brain injury because it is one of the only anesthetic agents able to decrease intracranial pressure and maintain a normal arterial pressure.6 Propofol is used for induction and maintenance of general anesthesia, having largely replaced sodium thiopental.7 It can also be administered as part of an anaesthesia maintenance technique called total intravenous anesthesia using either manually-programmed infusion pumps or computer-controlled infusion pumps in a process called target controlled infusion or TCI. Propofol is also used to sedate individuals who are receiving mechanical ventilation but are not undergoing surgery, such as patients in the intensive care unit. In critically ill patients, propofol has been found to be superior to lorazepam both in effectiveness and overall cost.7

In present study, mean age was 30±8.12 in group I and 34±11.18 in group II. Mean weight was 68±10.24 in group I and 63±12.10 in group II. Number of patients with ASA grade I was 12 in group I and 9 in group II while grade II was 8 and 11 in group I and group II respectively. Etomidate, carboxylated imidazole has got hemodynamic stability. It has minimal respiratory depression and cerebral protective effects. Because of its effect of increased coronary perfusion in patients with moderate cardiac dysfunction and lack of its effect on sympathetic nervous system, baroreceptor reflex regulatory system makes it favourable and treatment of choice in patients with cardiac disease.8

We found that MAP in group I, showed a significant decrease in MAP from baseline at induction with propofolin as compared to etomidate (p > 0.05), later on MAP became comparable to etomidate (p > 0.05). Mayer et al.9 concluded that etomidate preserve hemodynamic stability during anesthesia. The onset of action is approximately 1 minute and duration of action of 5 to 15 minutes. It has least homodynamic effect for procedural sedation. A number of studies have found that etomidate provides effective, reliable sedation with minimal adverse effects. But pain on injection, thrombophlebitis and myoclonus are some undesirable adverse effects associated with it.

In group I, number of patients with grade I, grade II and grade III pain was 10, 6 and 4 respectively. In group II, number of patients with grade I, grade II and grade III pain was 9, 5 and 6 respectively. The number of patients with apnea was 13 in group I and 8 in group II while with no apnea, 7 in group I and 12 in group II. Our results are in agreement with results of Boysen et al.10

**CONCLUSION**

Etomidate and Propofol found to be equally effective in managing patients. Apnea and pain in both groups was comparable.

**REFERENCES**


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**Conflict of Interest:** None Declared.

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