

Original Article

Assessment of Propofol and Etomidate for General Anaesthesia-Hemodynamic Changes and Complications

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ABSTRACT

Background: Inducing agents are drugs when given intravenously cause rapid loss of consciousness. Etomidate and propofol are ultra-short-acting tranquillizing agents that provide these characteristics. Few of the side effects that occur with Propofol are blood pressure drop, ventilation depression in a dose dependent manner and pain during injection. The present study was done to assess the hemodynamic changes and complication occurring with Propofol and etomidate during general anaesthesia. **Materials & Methods:** The present study enrolled 60 subjects that belonged to ASA grade I and II. The subjects undergoing surgical treatment under general anaesthesia were enrolled in the study. Group I subject received 1% Propofol injection and Group II subjects received 0.3mg/kg of etomidate. Pre-medication was given with 0.25 mg alprazolam tablets and 150 mg ranitidine tablets. Patient's myoclonic activity and pain during injection were recorded at the time of induction. All the data was arranged in a tabulated form and analyzed using SPSS software. Student t test was used for analysis and probability value of less than 0.05 was considered as significant. **Results:** Table I shows that out of 60 patients, 30 were in group I and 30 in group II. The male to female ratio in Group I was 2:1 and in Group II was 1:1. In group I, a significant decrease in MAP from baseline at induction with Propofol was seen compared to etomidate. The mean arterial pressure of both the groups was comparable ($p > 0.05$). In group II, number of patients with grade I, grade II and grade III pain were 25 (83.3%), 3 (10%) and 2 (6.7%) respectively. The difference was statistical significant ($p = 0.02$). **Conclusion:** From the present study we can conclude that etomidate is a improved option amongst patients especially those who are prone to hemodynamic changes

Key words: Induction agents, Etomidate, mean arterial pressure, propofol.

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INTRODUCTION

Inducing agents are drugs when given intravenously cause rapid loss of consciousness. These are given before the drugs that are used for maintenance of anaesthesia or as a solitary drug for shorter duration procedures or as agents for providing conscious sedation for the procedures to be undertaken under local anaesthesia.¹ Etomidate and propofol are ultra-short-acting tranquillizing agents that provide these characteristics. Even with their frequent use during the routine surgical treatments, their safety is yet to be compared in a randomized controlled fashion.² Propofol offers rapid and smooth anaesthesia with speedy recovery. The incidence of nausea and vomiting are also low.³ It

offers an onset of action of 45 seconds and within 3-5 minutes redistribution begins in fat and muscles. Few of the side effects that occur with Propofol are blood pressure drop, ventilation depression in a dose dependent manner and pain during injection.⁴ Etomidate has a special property of its hemodynamic stability. It causes minimal respiratory depression and has cerebral protective actions. It is especially used as an inducing agent amongst cardiac patients as it has no effect on sympathetic nervous system and upsurges coronary perfusion. Its onset time is 1 minute with 5 to 15 minutes of total period of action. It is regarded to have the least homodynamic effect compared to any other inducing agent. Different studies have considered etomidate

as an efficient and reliable option for sedation with minimal side effects.⁵The present study was done to assess the hemodynamic changes and complication occurring with Propofol and etomidate during general anesthesia.

MATERIALS & METHODS

The present study enrolled 60 subjects that belonged to ASA grade I and II. The subjects undergoing surgical treatment under general anesthesia were enrolled in the study. The study was approved by the ethical committee of the institute and all the subjects were informed about the study and a written consent was obtained from all in their vernacular language. Subjects between 18-60 years were enrolled in the study. All the patients allergic to study drugs, having hypertension, seizures of steroid deficiency were excluded from the study. The study was divided into two groups. Group I subject received 1% Propofol injection and Group II subjects received 0.3mg/kg of etomidate. Pre-medication was given with 0.25 mg alprazolam tablets and 150 mg ranitidine tablets. Patients were kept 8 hours fasting before surgery. On entering the OT, all the monitors were fitted, and baseline hemodynamic values were noted.

Patient’s myoclonic activity and pain during injection were recorded at the time of induction. Appropriate sized endotracheal tube was used to intubate trachea approximately 3 minutes after 0.1 mg/kg intravenous dose of vecuronium was given. The position of endotracheal tube was confirmed and positive pressure ventilation was initiated. Anaesthesia was maintained with 70:30 ratio of oxygen and nitrous oxide in isoflurane and intermittent doses of vecuronium was given throughout the surgery as required. The reversal of the residual neuromuscular block was done by 0.05 mg/kg neostigmine and 0.01 mg/kg glycopyrrolate intravenously and the patient was extubated after adequate respiration and patient was able to follow verbal commands. Intravenous inducing agents were injected. The blood pressure, mean arterial pressure and heart rate were monitored throughout the surgery and until

10 minutes after induction. Pain during injection was measured on the scale of 4 with 0 meaning no pain 4 meaning maximum pain. Myoclonic activity was also recorded from a scale of 0 to 3 with 3 meaning major myoclonic movements. All the data was arranged in a tabulated form and analyzed using SPSS software. Student t test was used for analysis and probability value of less than 0.05 was considered as significant.

RESULTS

Table I shows that out of 60 patients, 30 were in group I and 30 in group II. The male to female ratio in Group I was 2:1 and in Group II was 1:1. Mean age was 27.24±13.08 in group I and 28.86±12.12 in group II. Mean weight was 58.21±10.05 in group I and 57.66±12.14 in group II. The difference was statistical non-significant.

Table II Shows hemodynamic parameters at different time intervals in both groups. In group I, a significant decrease in MAP from baseline at induction with Propofol was seen compared to etomidate. The mean arterial pressure of both the groups was comparable (p> 0.05). The MAP at baseline was 88 in Group I and 90 in Group II. It reduced to 78 in Group I at the time of induction and to 88 in Group II at the time of induction. In group I, there was significant increase in heart rate from baseline to induction as compared to group II (p- 0.01).

Graph I shows that in group I, number of patients with grade I, grade II and grade III pain was 16(53.3%), 8 (26.7%) and 6 (20%) respectively. In group II, number of patients with grade I, grade II and grade III pain were 25 (83.3%), 3 (10%) and 2(6.7%) respectively. The chi square test was applied which showed highly significant value of 0.001.

Graph II shows that 28 patients showed grade 0 myclonic movements in group I while 17 patients showed grade 0, 7 patients showed grade 1, 3 patients showed grade 2 and 3 patients showed grade 3 movements in group II. The difference was statistical significant (p- 0.02).

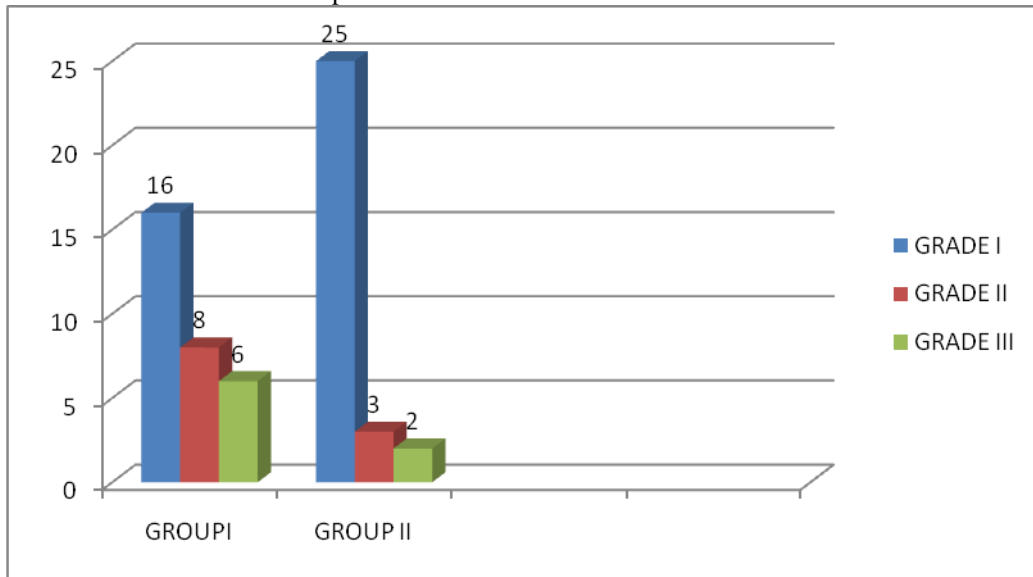
TABLE I :Demographic data of patients

| | TOTAL- 60 | | |
|-----------------------------|-------------|-------------|---------|
| | GROUP I | GROUP II | P VALUE |
| SEX (F:M) | 2:1 | 1:1 | >0.05 |
| AGE (YRS) MEAN±S.D | 27.24±13.08 | 28.86±12.12 | >0.05 |
| WEIGHT (KG) MEAN±S.D | 58.21±10.05 | 57.66±12.14 | >0.05 |

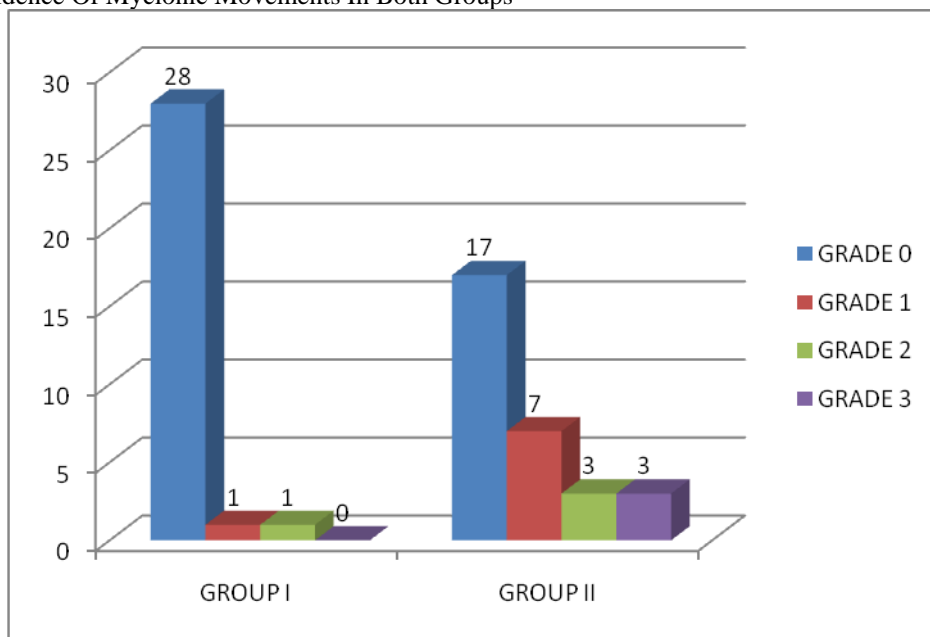
TABLE II: Mean Hemodynamic Parameters Amongst the Study Subjects

| | Group 1 (MAP) | Group 2 (MAP) | Group 1 (HR) | Group 2 (HR) |
|------------------------|---------------|---------------|--------------|--------------|
| BASELINE | 88 | 90 | 82 | 80 |
| AT INDUCTION | 78 | 88 | 98 | 82 |
| At laryngoscopy | 100 | 110 | 100 | 98 |
| At 10 mins | 92 | 94 | 82 | 80 |

GRAPH I: Incidence Of Pain In Both Groups



GRAPH III: Incidence Of Myclonic Movements In Both Groups



DISCUSSION

Milder hemodynamic variations are allied with induction of anesthesia which are dependant on different factors. In the present study, we included 60 patients divided into 2 groups. The male to female ratio in Group I was 2:1 and in Group II was 1:1. Mean age was 27.24±13.08 in group I and 28.86±12.12 in group II. Mean weight was 58.21±10.05 in group I and 57.66±12.14 in group II. The difference was statistical non-significant. In this study, hemodynamic parameters were assessed and compared between the two group. In group I, a significant decrease in MAP from baseline at induction with Propofol was seen compared to

etomidate. The mean arterial pressure of both the groups was comparable (p> 0.05). The MAP at baseline was 88 in Group I and 90 in Group II. It reduced to 78 in Group I at the time of induction and to 88 in Group II at the time of induction. In group I, there was significant increase in heart rate from baseline to induction as compared to group II (p=0.01). Hypotension that occurs with the use of propofol is basically due to drop of sympathetic activity leading to vasodilation or its direct action on vascular smoothmuscles.⁶ In subjects with coronary artery disorder, valvular stenosis, and shock; sudden existence of hypotension and tachycardia can have harmful effects in maintenance of circulation to

the organs.⁷ On another side etomidate does not have any such actions on the nervous system and function of baroreceptor due to which it exhibits hemodynamic stability. According to the studies by Mayer et al.⁸ and Wu et al.⁹ also etomidate exhibits exceptional hemodynamic stability during anesthesia. In group I, number of patients with grade I, grade II and grade III pain was 16(53.3%), 8 (26.7%) and 6 (20%) respectively. In group II, number of patients with grade I, grade II and grade III pain were 25 (83.3%), 3 (10%) and 2(6.7%) respectively. The chi square test was applied which showed highly significant value of 0.001. The results of the study were consistent with the studies by Saricaoglu et al.¹⁰ Research done by Boysen et al¹¹ showed that there is no significant difference in apnea levels between both the groups. As per our study, group I patients showed fewer myoclonic jerks but group II had high percentage of myoclonic jerks. According to a study by, Mineret al¹². high incidence of myoclonus was seen with propofol.

CONCLUSION

From the present study we can conclude that etomidate is a improved option amongst patients especially those who are prone to hemodynamic changes at the time induction like uncontrolled hypertension and cardiac patients. Etomidate proved to be a better option for induction compared to Propofol.

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