

Original Research

Evaluation of changes occurring with Propofol and Etomidate during general anesthesia: An observational study

¹Ganesh Raghunath Khade, ²Vinay Kumar Singh

¹Assistant Professor, Department of Anaesthesia, Gouri Devi Institute of Medical Sciences & Hospital, Durgapur, West Bengal, India

²Assistant Professor, Department of General Medicine, Narayan Medical College & Hospital, Sasaram, Bihar, India

ABSTRACT:

Background: The present study was conducted occurring with Propofol and Etomidate during general anesthesia. **Materials & methods:** 200 participants in all were enrolled in the current investigation. The 200 subjects who met the inclusion requirements were split into two study groups of 100 each after being broadly and randomly assigned: Group A included subjects who received an injection of 1% propofol, while Group B included subjects who received an injection of 0.3 mg/kg etomidate. All of the patients' comprehensive demographic information was gathered. The pain experienced during injection was recorded on a scale of 0 to 10, with 0 denoting no discomfort and 10 denoting the most intense pain. All of the results were entered into a Microsoft Excel spreadsheet, and then SPSS software was used to analyses them. **Results:** While comparing the mean arterial pressure and heart rate among the subjects of both the study groups at different time intervals, no significant difference was observed. However; while comparing the mean arterial pressure and heart rate among subjects of both the study groups at the time of induction. Mean pain score was found to be significantly higher in group A in comparison to group B. **Conclusion:** Among patients with associated altered hemodynamic status, etomidate is an improved option.

Key words: Etomidate, Hemodynamic, Propofol

Received: 18-11- 2018

Accepted: 24-12-2018

Corresponding author: Vinay Kumar Singh, Assistant Professor, Department of General Medicine, Narayan Medical College & Hospital, Sasaram, Bihar, India

This article may be cited as: Khade GR, Singh VK. Evaluation of changes occurring with Propofol and Etomidate during general anesthesia: An observational study. J Adv Med Dent Scie Res 2019;7(1):234-236.

INTRODUCTION

Drugs known as induction agents produce a quick loss of consciousness when administered intravenously in the correct dosage. Induction agents are used to start anaesthesia before other medications are administered to keep it going, as the only medication for quick procedures, to keep anaesthesia going for longer procedures by intravenous infusion, and to provide conscious sedation during procedures done under local anaesthesia and in the intensive care unit.¹⁻³

The most common induction agent is propofol, 2,6-diisopropylphenol, which has the advantages of a quick induction and recovery, a reduced incidence of nausea and vomiting, etc. On the other hand, the main downsides are a reduction in blood pressure, dose-dependent ventilation depression, and injection pain.^{4,5}

Hemodynamic stability, little respiratory depression, and brain protective effects define etomidate, carboxylated imidazole. It is the preferred induction agent in patients with cardiac disease because to its lack of effects on the sympathetic nervous system, baroreceptor reflex regulation system, and effect of increased coronary perfusion even in individuals with mild cardiac dysfunction. However, unwanted adverse effects include thrombophlebitis, myoclonus, and discomfort during injection.^{6,7} Hence; under the light of above-mentioned data, we planned the present study to assess hemodynamic changes and complications occurring with Propofol and Etomidate during general anesthesia.

MATERIALS & METHODS

200 participants in all were enrolled in the current investigation. The 200 subjects who met the inclusion

requirements were split into two study groups of 100 each after being broadly and randomly assigned: Group A included subjects who received an injection of 1% propofol, while Group B included subjects who received an injection of 0.3 mg/kg etomidate. All of the patients' comprehensive demographic information was gathered. All patients had thorough hematological and biochemical investigations. Alprazolam and ranitidine tablets were used to premedicate all the individuals. Upon their entrance into the operating room, all patients had their baseline hemodynamic values recorded. It was done to record the patient's myoclonic activity and the time of induction. Throughout the procedure and for the first 10 minutes following induction, the patient's blood pressure, mean arterial pressure, and heart rate were monitored. The pain experienced during injection was recorded on a scale of 0 to 10, with 0 denoting no discomfort

and 10 denoting the most intense pain. All of the results were entered into a Microsoft Excel spreadsheet, and then SPSS software was used to analyses them.

RESULTS

Mean age of the patients of the group A and group B was 31.2 years and 32.4 years respectively. Mean weight of the patients of the group A and group B was 66.7 and 68.3 Kg respectively. While comparing the mean arterial pressure and heart rate among the subjects of both the study groups at different time intervals, no significant difference was observed. However; while comparing the mean arterial pressure and heart rate among subjects of both the study groups at the time of induction. Mean pain score was found to be significantly higher in group A in comparison to group B.

Table 1: Mean hemodynamic parameters

| Mean hemodynamic parameter | | Group A | Group B | p- value |
|----------------------------|---------------|---------|---------|--------------------|
| Mean arterial pressure | Baseline | 87.6 | 88.4 | 0.58 |
| | Induction | 78.1 | 88.9 | 0.00 (Significant) |
| | At 10 minutes | 94.9 | 95.4 | 0.44 |
| Heart rate | Baseline | 82.6 | 83.6 | 0.82 |
| | Induction | 98.1 | 96.8 | 0.46 |
| | At 10 minutes | 79.3 | 80.7 | 0.38 |

Table 2: Pain

| Parameter | Group A | Group B | p- value |
|-----------------|---------|---------|--------------------|
| Mean pain score | 1.67 | 0.91 | 0.00 (Significant) |

DISCUSSION

A quick-acting intravenous hypnotic, etomidate. When compared to propofol, it has advantages in terms of hemodynamics and respiration, including a rapid onset of action. It can be administered safely in patients at risk of acute cardiovascular instability because it has no impact on blood pressure and heart rate. Furthermore, etomidate is crucial in emergency medicine as a support for quick sequence intubation in patients with bronchospasms or cerebral diseases when hypotension must be avoided. Its quick onset, quick recovery, and consistent hemodynamic and respiratory effects might provide for the ideal and safest procedure sedation circumstances in emergency care. Etomidate had lower allergic responses and histamine release adverse effects as compared to propofol. However, etomidate can also have negative side effects include myoclonus, nausea, and vomiting following surgery. Interestingly, propofol prevents etomidate-induced myoclonus, nausea, and vomiting.^{7- 9}Hence; under the light of above-mentioned data, we planned the present study to assess hemodynamic changes and complications occurring with Propofol and Etomidate during general anesthesia.

arterial pressure and heart rate among subjects of both the study groups at the time of induction. Mean pain score was found to be significantly higher in group A in comparison to group B. Kaushal, R. P et al compared induction with these two agents in cardiac surgeries. Baseline categorical and continuous variables were compared using Fisher's exact test and student's t test respectively. Hemodynamic variables were compared using student's t test for independent samples. The primary outcome (serum cortisol and blood sugar) of the study was compared using Wilcoxon Rank Sum test. Etomidate provides more stable hemodynamic parameters as compared to Propofol. Propofol causes vasodilation and may result in drop of systematic BP. Etomidate can therefore be safely used for induction in patients with good LV function for CABG/MVR/AVR on CPB without serious cortisol suppression lasting more than twenty-four hours.¹⁰Mayer M, et al compared the haemodynamic effects, the patients' sensations, signs of thrombophlebitis and postoperative nausea and vomiting (PONV) following injection of both drugs. Following premedication with 2 mg Lormetazepam p.o. in 50 patients per group, anaesthesia was induced with either 0.51 mg etomidate in lipid emulsion or 3.04 mg propofol per kg bw. No opioid or benzodiazepine was given i.v. before induction. After injection of the tested drug, the cannula was removed. Changes in blood pressure

While comparing the mean arterial pressure and heart rate among the subjects of both the study groups at different time intervals, no significant difference was observed. However; while comparing the mean

and heart rate were recorded as well as signs of discomfort during and after injection (pain, burning, tension, cold). Demographic data showed no difference between the two groups. After propofol more often a fall in blood pressure was seen. Pain (25 vs 1 pt), burning 19 vs 1), tension 15 vs 3), cold (35 vs 17) after injection was registered significantly more often in the propofol group, whereas myocloni predominated in the etomidate group (13 vs 6) $P < 0.05$, chi-squared-test). No difference was seen in PONV in either groups. Etomidate formulated in a medium chain lipid emulsion causes significant less discomfort for the patients than propofol, which is solved in a long chain formulation.¹¹

CONCLUSION

Among patients with associated altered hemodynamic status, etomidate is an improved option.

REFERENCES

1. Fatma S, Sennur U, Oguzhan A, Funda A, Ulku A. A clinical comparison of Etomidate-lipuro, Propofol and admixture at induction. *Saudi J Anaesth.* 2011;5:62–6.
2. Ghafoor H, Afshan G, Kamel R. General anaesthesia with laryngeal mask airway: Etomidate vs. Propofol for hemodynamic stability. *Open J Anesthesiol.* 2012;2:161–5.
3. Hosseinzadeh H, Golzari SE, Torabi E, Dehdilani M. Hemodynamic Changes following Anesthesia Induction and LMA Insertion with Propofol, Etomidate, and Propofol + Etomidate. *J Cardiovasc Thorac Res.* 2013;5:109–12.
4. Shivaprakash S, Shio P, Sathyanarayan J. A comparative study of hemodynamic effects of Propofol and Etomidate as an induction agent in coronary artery surgery. *JEMDS.* 2015;4:598–607.
5. Kay B. Total intravenous anesthesia with etomidate part II: Evaluation of a practical technique for children. *Acta Anaesthesiol Belg.* 1977;28:115–121.
6. Streisand JB, Jaarsma RL, Gay MA, Badger MJ, Maland L, Nordbrock E, Stanley TH. Oral transmucosal etomidate in volunteers. *Anesthesiology.* 1998;88:89–95.
7. Mayer M1, Doenicke A, Nebauer AE, Hepting L. Propofol and etomidate-Lipuro for induction of general anesthesia. Hemodynamics, vascular compatibility, subjective findings and postoperative nausea. *Anaesthesist.* 1996 Nov;45(11):1082-4.
8. Aggarwal S1, Goyal VK2, Chaturvedi SK1, Mathur V1, Baj B1, Kumar A1. A comparative study between propofol and etomidate in patients under general anesthesia. *Braz J Anesthesiol.* 2016 May-Jun;66(3):237-41.
9. Stoelting Robert, Simon C. *Hiller Pharmacology and Physiology in Anesthetic practice.* 4th Ed. Philadelphia: Lippincott Williams and Wilkins publishers; 2006. pp. 159–60.
10. Kaushal, R. P., Vatal, A., & Pathak, R. (2015). Effect of etomidate and propofol induction on hemodynamic and endocrine response in patients undergoing coronary artery bypass grafting/mitral valve and aortic valve replacement surgery on cardiopulmonary bypass. *Annals of cardiac anaesthesia*, 18(2), 172–178. <https://doi.org/10.4103/0971-9784.154470>
11. Mayer M, Doenicke A, Nebauer AE, Hepting L. Propofol und Etomidat-Lipuro zur Einleitung einer Allgemeinanästhesie. Hämodynamik, Venenverträglichkeit, subjektives Empfinden und postoperative Übelkeit [Propofol and etomidate-Lipuro for induction of general anesthesia. Hemodynamics, vascular compatibility, subjective findings and postoperative nausea]. *Anaesthesist.* 1996 Nov;45(11):1082-4. German. doi: 10.1007/s001010050343. PMID: 9012304.