

**ORIGINAL RESEARCH**

# Hemodynamic changes with Propofol and Etomidate during General Anaesthesia

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**ABSTRACT**

**Background:** By attenuating autonomic nervous activity, myocardial depression, and vasodilatation, general anesthetic induction drugs can lower arterial blood pressure. The present study was conducted to assess hemodynamic changes with Propofol and Etomidate during general anaesthesia. **Materials & Methods:** The present study was conducted in ASMC Etah between period 2023 and 2024. 64 patients scheduled for surgical procedure under general anaesthesia of both genders were divided into 2 groups of 32 each. Group I patients received Propofol, and group II received Etomidate. All the patients were premedicated with alprazolam 0.25 mg and ranitidine 150 mg one night before the surgery. All the hemodynamic parameter was recorded during the surgery procedure. **Results:** Group I had 20 males and 12 females and group II had 16 males and 16 females. The mean heart rate (beats/min) at baseline was 84 and 85, at induction was 85 and 88, at laryngoscopy was 86 and 88, at one minute was 88 and 90, at five minutes was 86 and 89 and at fifteen minutes was 88 and 89. The mean arterial pressure (mm Hg) at baseline was 94 and 96, at induction was 105 and 94, at laryngoscopy was 97 and 95, at one minute was 98 and 92, at five minutes was 90 and 92 and at fifteen minutes was 92 and 91 in group I and II respectively. The difference was significant ( $P < 0.05$ ). **Conclusion:** Etomidate was discovered to be a more effective anesthetic agent than propofol.

**Key words:** Propofol, Etomidate, general anaesthesia

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**INTRODUCTION**

By attenuating autonomic nervous activity, myocardial depression, and vasodilatation, general anesthetic induction drugs can lower arterial blood pressure.<sup>1</sup> On the other hand, unintended cardiovascular reactions such as hypertension, tachycardia, and dysrhythmias are brought on by laryngoscopy and endotracheal intubation. This can occasionally cause a "alpine hemodynamic response" when general anesthesia is induced.<sup>2</sup>

Propofol is a sedative-hypnotic drug that is nonopioid, nonbarbiturate, and has a quick start and short half-life.<sup>3</sup> Injection discomfort and hypotension are examples of adverse effects. Etomidate is a hypnotic that has a very stable hemodynamic profile and very little histamine production. However, the most frequent adverse effects of this medication include myoclonus and injection discomfort.<sup>4</sup> The novel fat emulsion of etomidate (Medium chain triglyceride and soya bean called Etomidate – Lipuro, B. Braun, Melsungen, Germany) has eliminated injection pain,

venous irritation, and hemolysis; however, the incidence of myoclonus following etomidate injection has not decreased by this new solvent.<sup>5</sup> In patients with open globe injuries or emergency non-fasting circumstances, myoclonus is a major concern. Etomidate exhibits a little depressing effect on blood pressure during induction, contributing to its good hemodynamic profile.<sup>6</sup> The present study was conducted to assess hemodynamic changes with Propofol and Etomidate during general anaesthesia.

**MATERIALS & METHODS**

The present study was conducted in ASMC Etah between period 2023 and 2024. The present study consisted of 64 patients scheduled for surgical procedure under general anaesthesia of both genders. All gave their written consent to participate in the study.

Data such as name, age, gender etc. was recorded. Patients were divided into 2 groups of 32 each. Group I patients received Propofol, and group II received

Etomidate. All the patients were premedicated with alprazolam 0.25 mg and ranitidine 150 mg one night before the surgery. All the hemodynamic parameter

was recorded during the surgery procedure. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

## RESULTS

**Table: I Distribution of patients**

| Groups | Group I  | Group II  |
|--------|----------|-----------|
| Drug   | Propofol | Etomidate |
| M:F    | 20:12    | 16:16     |

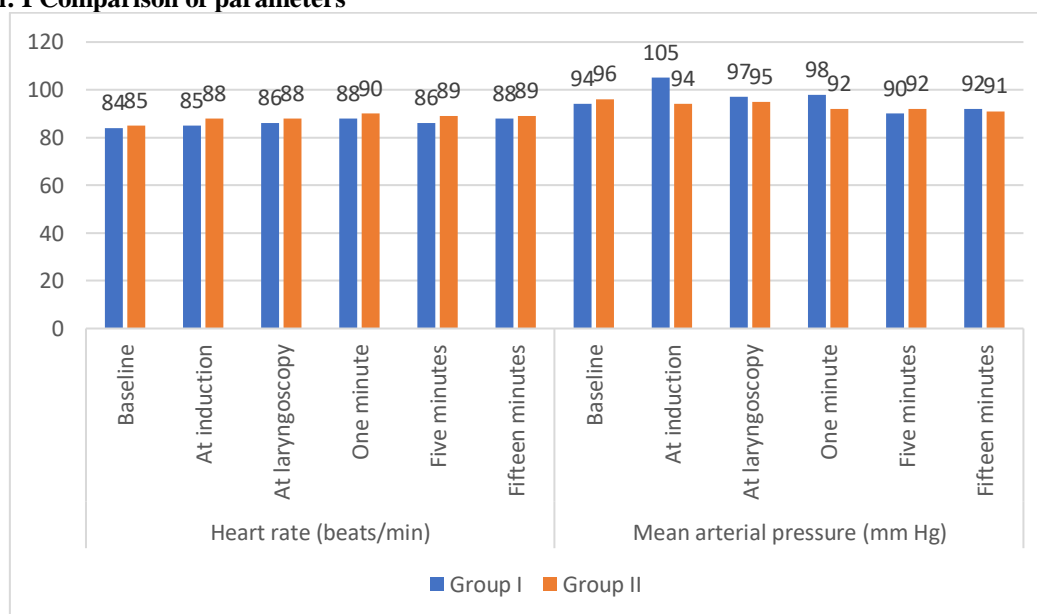
Table I shows that group I had 20 males and 12 females and group II had 16 males and 16 females.

**Table: II Comparison of parameters**

| Parameters                     | Variables       | Group I | Group II | P value |
|--------------------------------|-----------------|---------|----------|---------|
| Heart rate (beats/min)         | Baseline        | 84      | 85       | 0.91    |
|                                | At induction    | 85      | 88       |         |
|                                | At laryngoscopy | 86      | 88       |         |
|                                | One minute      | 88      | 90       |         |
|                                | Five minutes    | 86      | 89       |         |
|                                | Fifteen minutes | 88      | 89       |         |
| Mean arterial pressure (mm Hg) | Baseline        | 94      | 96       | 0.05    |
|                                | At induction    | 105     | 94       |         |
|                                | At laryngoscopy | 97      | 95       |         |
|                                | One minute      | 98      | 92       |         |
|                                | Five minutes    | 90      | 92       |         |
|                                | Fifteen minutes | 92      | 91       |         |

Table II, graph I shows that mean heart rate (beats/min) at baseline was 84 and 85, at induction was 85 and 88, at laryngoscopy was 86 and 88, at one minute was 88 and 90, at five minutes was 86 and 89 and at fifteen minutes was 88 and 89. The mean arterial pressure (mm Hg) at baseline was 94 and 96, at induction was 105 and 94, at laryngoscopy was 97 and 95, at one minute was 98 and 92, at five minutes was 90 and 92 and at fifteen minutes was 92 and 91 in group I and II respectively. The difference was significant ( $P < 0.05$ ).

**Graph: I Comparison of parameters**



## DISCUSSION

Drugs known as induction agents are those that, when administered intravenously at the proper dose, quickly induce unconsciousness.<sup>7</sup> Prior to other medications being administered to maintain anesthesia, induction agents are used as the only medication for brief procedures, to maintain anesthesia for longer

procedures through intravenous infusion, and to provide conscious sedation during procedures carried out in an intensive care unit or under local anesthesia.<sup>8,9</sup> The present study was conducted to assess hemodynamic changes with Propofol and Etomidate during general anaesthesia.

We found that group I had 20 males and 12 females and group II had 16 males and 16 females. Propofol and etomidate were compared by Aggarwal S et al<sup>10</sup> for their impact on hemodynamics and other side effects on patients undergoing general anesthesia. 100 ASA I and II patients, aged 18 to 60, who were scheduled for elective surgery under general anesthesia were split into two groups at random, each with 50 participants, and given an induction agent consisting of 0.3 mg/kg of etomidate and 2 mg/kg of propofol. The demographic characteristics of the two groups were similar. The mean arterial pressure (MAP) and heart rate (HR) of patients in the etomidate group did not differ significantly from baseline values when compared to propofol ( $p > 0.05$ ). While myoclonus activity was higher in the etomidate group, the propofol group had more pain during injection. According to the results of their investigation, etomidate is a more effective induction drug than propofol in terms of hemodynamic stability. We observed that mean heart rate (beats/min) at baseline was 84 and 85, at induction was 85 and 88, at laryngoscopy was 86 and 88, at one minute was 88 and 90, at five minutes was 86 and 89 and at fifteen minutes was 88 and 89. The mean arterial pressure (mm Hg) at baseline was 94 and 96, at induction was 105 and 94, at laryngoscopy was 97 and 95, at one minute was 98 and 92, at five minutes was 90 and 92 and at fifteen minutes was 92 and 91 in group I and II respectively. Hemodynamic alterations and complications brought on by propofol and etomidate during general anesthesia were evaluated by Bansal et al.<sup>11</sup> The incidence of complications was somewhat greater in group A individuals. Patients in group A had mean arterial pressure values of 92, 76, 105, 101, 92, and 95 at baseline, induction, laryngoscopy, one minute, five minutes, and fifteen minutes, respectively. Patients in group B had mean arterial pressure values of 95, 89, 95, 97, 94, and 96 at baseline, induction, laryngoscopy, one minute, five minutes, and fifteen minutes, respectively. Statistical analysis revealed that group A patients' mean arterial pressure and mean heart rate are significantly changed at various time intervals.<sup>12-15</sup>

The limitation of the study is small sample size.

## CONCLUSION

Authors found that etomidate was discovered to be a more effective anesthetic agent than propofol.

## REFERENCES

- Dayal A, Varshney A, Singh RP, Sachdeva A. A study of incidence and significance of arrhythmias in early and pre-discharged phase of acute myocardial infarction. *Eur J Mol Clin Med.* 2022;9(6):30-39.
- Varshney A, Rawat R. A cross-sectional study of echocardiographic characteristics of patients diagnosed with SARS-CoV-2 delta strain. *Glob Cardiol Sci Pract.* 2023;2023(3).
- Varshney A, Agarwal N. Incidence of arrhythmias in COVID-19 patients with double mutant strain of SARS-CoV-2 virus: a tertiary care experience. *Glob Cardiol Sci Pract.* 2022;2022.
- Varshney A, Rawat R. Comparison of safety and efficacy of dapagliflozin and empagliflozin in type 2 diabetes mellitus patients in India. *Rev Assoc Med Bras (1992).* 2023 Aug 14;69(8). doi: 10.1590/1806-9282.20230090.
- Kumar G, Ram VS, Kumar P, Varshney A. Vitamin D status and its association with disease activity in early rheumatoid arthritis in rural population of central India. *Eur J Mol Clin Med.* 2022;9(1):648-653.
- Kumar G, Ram VS, Kumar P, Mehra A, Varshney A. Study of electrocardiographic changes in normal subjects with or without family history of hypertension and type-2 diabetes mellitus in context of visceral adiposity in Central [region]. *J Cardiovasc Dis Res.* 2022;13(1):804-12.
- Morrison C, Brown B, Lin DY, Jaarsma R, Kroon H. Analgesia and anesthesia using the pericapsular nerve group block in hip surgery and hip fracture: a scoping review. *Reg Anesth Pain Med.* 2021;46:169-175.
- Antkowiak B, Rammes G. GABA(A) receptor-targeted drug development -New perspectives in perioperative anesthesia. *Expert Opin Drug Discov.* 2019 Jul;14(7):683-699.
- Singh PM, Arora S, Borle A, Varma P, Tripathi A, Goudra BG. Evaluation of Etomidate for Seizure Duration in Electroconvulsive Therapy: A Systematic Review and Meta-analysis. *J ECT.* 2015 Dec;31(4):213-25.
- Aggarwal S, Goyal VK, Chaturvedi SK, Mathur V, Baj B, Kumar A. A comparative study between propofol and etomidate in patients under general anesthesia. *Braz J Anesthesiol.* 2016 May-Jun;66(3):237-41.
- Sumit Bansal, Shailendra Kumar Patel, Raziullah Siddiqui. A Study to Find Hemodynamic Changes and Complication Occurring with Propofol and Etomidate During General Anaesthesia. *Int Arch BioMed Clin Res.* 2021;7(3): AN1-AN3.
- Varshney A. A prospective study to assess prevalence of anemia in school-going children. *J Adv Med Dent Sci Res.* 2020 Oct 1;8(10):165-8.
- Rawat R, Ram VS, Kumar G, Varshney A, Kumar M, Kumar P, Agrawal N. Awareness of general practitioners toward hypertension management. *J Pharm Bioallied Sci.* 2021 Nov;13(Suppl 2).
- Sachdeva A, Tiwari MK, Shahid M, Varshney A. Unravelling the complex nexus: adiposity, blood pressure, cardiac autonomic function, and arterial stiffness in young adults—an integrated analysis. *Pak Heart J.* 2023;56(2):215-219.
- Mohan P, Kapur S, Varshney A. Assessment of uterus specimens—A clinicopathological study. *J Adv Med Dent Sci Res.* 2016;4(4):243-246.