

**Original research article**

# Comparative study to know the haemodynamic response of thiopentone and etomidate on laryngoscopy and intubation

<sup>1</sup>Dr. Reshma Koteshwara, <sup>2</sup>Dr. Vasantha Shetty

<sup>1</sup>Associate Professor, Department of Anaesthesia, G.R. Medical College, Hospital and Research Center, Mangaluru, Karnataka, India

<sup>2</sup>Assistant Professor, Department of Anaesthesia, A.J Institute of Medical Sciences, Mangaluru, Karnataka, India

**Corresponding Author:**

Dr. Vasantha Shetty

**Accepted on:** 15-12-2021 **Published on:** 20-12-2021

## **Abstract**

The most often used method for safely administering general anaesthesia is laryngoscopy and endotracheal intubation. However, intubation and laryngoscopy are unpleasant stimuli that cause hemodynamic reactions in patients undergoing general anaesthesia for surgery. Determining the hemodynamic response to laryngoscopy and intubation using various induction medications is the purpose of the current investigation.

**Keywords:** Comparative, thiopentone, etomidate, laryngoscope

## **Introduction**

As it is the safest way to preserve the airway while under general anaesthesia, laryngoscopy and endotracheal intubation continue to be the gold standard procedure in airway management <sup>[1]</sup>. Laryngoscopy and intubation, however, both induce unpleasant sensations that stimulate the sympathetic nervous system, which alters the hemodynamic response and results in hypertension, tachycardia, and arrhythmias <sup>[2]</sup>. The premedication used during anaesthesia, the depth of anaesthesia, specific medications administered prior to airway manipulation, anaesthetic agents used at the time of induction and the length of laryngoscopy and intubation are just a few of the variables that may affect the magnitude of the hemodynamic response.

The main cause of hemodynamic alterations is sympathetic activation, which increases catecholamine release and, in turn, elevates heart rate and blood pressure. These changes are typically transient, varied, and unpredictable. These hemodynamic reactions are very well tolerated by healthy people, but they have been shown to be dangerous for people who already have high blood pressure, coronary artery disease, or cerebrovascular illness <sup>[3, 4]</sup>. The induction phase of anaesthesia is crucial, particularly in patients with low cardiac reserve. As a result, the induction drug should reduce the stress reaction and the associated haemodynamic response. A good induction agent should have quick clearance, minimum respiratory adverse effects, and hemodynamic stability <sup>[5, 6, 7]</sup>. Therefore, the goal of the current study is to investigate how different induction drugs, such as thiopentone and etomidate, affect the haemodynamic response during induction and intubation in patients who were scheduled for elective procedures under general anaesthesia.

## **Materials and Methods**

95 patients who were admitted to the A.J. Institute of Medical Sciences' critical care unit between May 2018 and May 2019 were the subject of the study. The study has been approved by the institution's ethical committee. Each subject gave their informed consent.

The day before, all of the subjects underwent complete pre-anaesthesia evaluations and the essential fundamental research. On the evening before surgery, each participant received one tablet of ranitidine 150 mg and one tablet of alprazolam 0.5 mg. For solids, the patients were kept off oral intake for 6 hours, and for clear liquids, 2 hours. On the day of the procedure, an 18G cannula IV line was placed on the non-dominant hand in the operating room, and 500ml of Ringer Lactate was preloaded onto the line 30 minutes before induction. The subjects were hooked up to a multi-parameter monitor for their ETCO<sub>2</sub>, SpO<sub>2</sub>, NIBP, and blood pressure. For three minutes, patients received preoxygenation with 100% oxygen. The pre-medicated participants received injections of fentanyl 2 mcg/kg and midazolam 0.02 mg/kg at the same time. All subjects received an IV injection of 2% (preservative-free) lidocaine at the conclusion of the third minute of preoxygenation. Patients were given injections of thiopentone (5 mg/kg BW slowly for group T)

and etomidate (0.3 mg/kg BW slowly for group E) at the end of the fourth minute. Inj. vecuronium 0.1 mg/kg BW was administered intravenously, and the patient was ventilated for three minutes through a mask with oxygen, N2O, and 1% isoflurane.

**Results**

**Table 1:** Mean Heart Rate (Rounded off)

|        | Group T | Group E | Sig    |
|--------|---------|---------|--------|
| Basal  | 72      | 81      | No Sig |
| 1 min  | 78      | 85      | No Sig |
| 2 min  | 78      | 83      | No Sig |
| 3 min  | 76      | 88      | No Sig |
| 5 min  | 77      | 82      | No Sig |
| 10 min | 78      | 81      | No Sig |

**Table 2:** Systolic and Diastolic BP

|        | Group T | Group E | Sig    |
|--------|---------|---------|--------|
| Basal  | 124/88  | 122/82  | No sig |
| 1 min  | 122/82  | 124/90  | No sig |
| 2 min  | 126/86  | 122/92  | No sig |
| 3 min  | 122/88  | 122/88  | No sig |
| 5 min  | 112/88  | 126/84  | No sig |
| 10 min | 118/88  | 122/86  | No sig |

**Table 3:** Mean Arterial Pressure

|        | Group T | Group E | Sig    |
|--------|---------|---------|--------|
| Basal  | 94      | 94      | No sig |
| 1 min  | 96      | 95      | No sig |
| 2 min  | 94      | 93      | No sig |
| 3 min  | 92      | 93      | No sig |
| 5 min  | 91      | 94      | No sig |
| 10 min | 92      | 94      | No sig |

**Discussion**

Haemodynamic alterations result from the stress reaction during laryngoscopy and intubation, particularly in patients with pre-existing cardiac diseases including hypertension and ischemic heart disease 6. Arrhythmias, infarction, myocardial ischemia, hypertension, hypoxia, hypercapnia, laryngospasm, bronchospasm, elevated intracranial and intraocular pressure are just a few of the predictable side effects of laryngoscopy and tracheal intubation. The crucial part of anaesthesia is induction, particularly for patients with weak cardiac reserves. Induction agents should therefore reduce the stress response and have little to no impact on the hemodynamic response. A general anaesthesia induction drug should have quick clearance, low respiratory adverse effects, and hemodynamic stability. 5 Because of its quick onset and consistent activity, thiopentone sodium, a short-acting phenobarbitone, is one of the most widely utilised intravenous induction agents. Reduced cardiac output and depression of the respiratory system are the results. Patients with hypovolemia, cardiovascular disease, status asthmaticus, and myasthenia gravis require specialised care. 7 An alkyl phenyl derivative with a quick start of action, propofol also reduces post-operative nausea, vomiting, and shivering while attenuating upper airway reflexes. The fact that Propofol lowers systemic vascular resistance and, consequently, cardiac output is one of its downsides. As a result, it is not recommended for individuals who are hypovolemic or who are in shock. 8 A carboxylated imidazole chemical is etomidate. Its advantages include anaesthesia that sets in quickly, stable hemodynamics, no respiratory depression, and quick recovery.

**Conclusion**

Etomidate is still a better choice for its haemodynamic stability over Thiopentone.

**References**

1. Anthony L. Kovac Controlling the hemodynamic response to laryngoscopy and endotracheal intubation J Clin Anesth. Elsevier BV. 1996;81637:90952-8180.
2. Cedric preys Roberts anaesthesia and hypertension Br J Anaesth. 1984;567:11-24.
3. John C Sakles, Erik G Laurin, Aaron A Rantapaa, Edward A Panacek. Airway Management in the Emergency Department: A One-Year Study of 610 Tracheal Intubations Ann Emerg. Med. Elsevier BV. 1998;31332532:0196-0644.

4. Reid LC, Brace DE. Irritation of respiratory tract and its reflex effecton heart. *Surg. Gynecol. Obstet.* 1940;701:57-62.
5. Reves JG, Peter SA, Glass RD, Miiler LI, Erliksson JP, Wiener-Kronish. *Intravenous Anaesthetics Millers anaesthesia.* 7th ed. Churchill Livingstone Philadelphia, 2010, 719-22.
6. Kayhan Z, Aldemir D, Mutlu H, Öğüş E. Which is responsible for the haemodynamic response due to laryngoscopy and endotracheal intubation? Catecholamines, vasopressin or angiotensin? *Eur. J Anaesthesiol. Ovid Technologies (Wolters Kluwer Health.* 2005;22107805:0265-0215.
7. Stoelting RK, Hillier SC. Local anaesthetics. In: *Pharmacology and physiology in anesthetic practice Lippincott Williams and Wilkins Philadelphia,* 2006, 17999.
8. Aggarwal S. Comparative study between Propofol and Etomidate in patients under general anaesthesia *Braz J Anesthesiol.* 2016;66:323-741.