



**ORIGINAL RESEARCH PAPER**

**Anaesthesiology**

**HAEMODYNAMIC RESPONSE TO LARYNGOSCOPY AND ENDOTRACHEAL INTUBATION: FENTANYL VS ESMOLOL**

**KEY WORDS:** Fentanyl Vs Esmolol, Haemodynamics, Endotracheal Intubation.

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**ABSTRACT** The haemodynamic responses were first recognized as early as 1940 by Reid and Bruce. In 1950, Burstein et al, studied the effects of laryngoscopy and tracheal intubation on ECG changes on 100 patients undergoing elective surgeries. They found majority of patients developed tachycardia ranging from 110-170 beats per min during laryngoscopy and intubation. They also found other ECG changes like ST depression, Ventricular ectopics and atrial fibrillation in a few cases. This study tries to find Haemodynamic response to laryngoscopy and endotracheal intubation: fentanyl vs esmolol.

**INTRODUCTION:**

The haemodynamic responses were first recognized as early as 1940 by Reid and Bruce. In 1950, Burstein et al, studied the effects of laryngoscopy and tracheal intubation on ECG changes on 100 patients undergoing elective surgeries. They found majority of patients developed tachycardia ranging from 110-170 beats per min during laryngoscopy and intubation. They also found other ECG changes like ST depression, Ventricular ectopics and atrial fibrillation in a few cases. He suggested pressor responses as consequences of an increase in sympathetic and sympatho adrenal activity. These responses are transitory variable and unpredictable and are much more pronounced in hypertensive patients than normotensive individuals. This haemodynamic stimulus is associated with increase in plasma noradrenaline concentrations parallel with increase in blood pressure<sup>3-6</sup>.

Transient hypertension and tachycardia are probably of no consequence in healthy individuals, but either or both may be hazardous to those with hypertension, myocardial insufficiency or cerebrovascular diseases. The transient changes can result in potentially deleterious effect like left ventricular failure, pulmonary edema, myocardial ischemia and cerebral haemorrhage.<sup>7,8</sup> The utilization of inhalational anaesthetic agents like halothane and enflurane has vastly improved blunting of laryngoscopic reactions, as a result of smooth & rapid induction. It was found that 1.5 MAC halothane or enflurane sufficiently blunted the laryngoscopic reactions. However as the depth of anaesthesia is increased, it leads to hypotension, bradycardia and myocardial ischemia and this is dangerous for hypertensive patients. This disadvantage fuelled the continuation of search for other pharmacological drugs. This study tries to find Haemodynamic response to laryngoscopy and endotracheal intubation: fentanyl vs esmolol.

**AIMS AND OBJECTIVES:**

Haemodynamic response to laryngoscopy and endotracheal intubation: fentanyl vs esmolol

**MATERIALS AND METHODS:**

This study was done from April 2018 to March 2019.

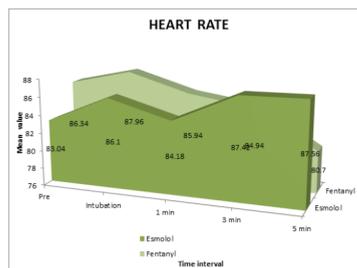
This study was done in the Department of Anesthesiology, A.J. Institute of Medical Sciences, Mangalore.

Sixty patients were allotted for the study. Thirty were allotted in one group and were given Fentanyl and the rest thirty were allotted in another group and were given Esmolol.

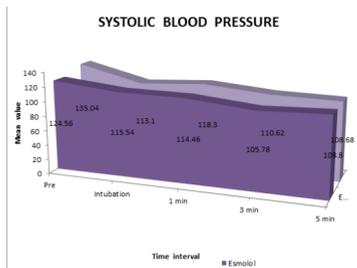
Patients were evaluated by taking detailed history, physical examination, airway assessment and relevant investigations preoperatively. They were asked to fast overnight. Group 1 patients received Inj.Fentanyl 1.5 microgram per kg intravenously 5 minutes prior to laryngoscopy. Group 2 received Inj.Esmolol 2 milligram per kg intravenously 3

minutes prior to laryngoscopy.

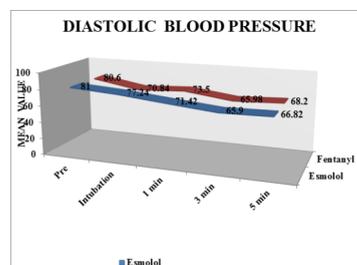
**RESULTS:**



**Heart Rate**



**Blood Pressure: Systolic**



**Blood Pressure: Diastolic**

**DISCUSSION:**

Gupta S and Tank P in their article "A comparative study of efficacy of esmolol and fentanyl for pressure attenuation during laryngoscopy and endotracheal intubation" studied the efficacy of Esmolol, Fentanyl and control group of normal saline. Each group was of 30 patients each. They used esmolol 2mg/kg, fentanyl 2 mcg/kg and normal saline 10ml for the three groups respectively. Drug was injected 3 min before induction and recorded HR and BP at baseline, after drug administration and 15 min after intubation. They concluded that both esmolol and fentanyl were effective in suppressing the hemodynamic response to laryngoscopy and endotracheal intubation. However Esmolol was better than fentanyl in consistently attenuating both HR and RPP.<sup>3</sup>

Shailaja S and Jodumut S, compared the effects of Esmolol and Esmolol+fentanyl on the stress response to laryngoscopy and intubation in controlled hypertensive patients. They studied the effects in 90 patients who were divided into 3 groups of 30 each. Group C received normal saline, Group E 1.5 mg/kg esmolol and group EF 1.5 mg/kg esmolol + 2mcg/kg fentanyl, 2 min before intubation. Heart rate and arterial pressure were recorded at baseline, immediately after intubation, 1, 3, 5 and 7 minutes post-intubation. In all 3 groups, the rise in heart rate and blood pressure was the highest at one minute post-intubation and immediately after intubation respectively. They found that, HR was significantly high in Group C compared to other groups at all the time intervals and there was no difference between Groups E and EF. Blood pressure was significantly different at all the time intervals between Groups C and E, between C and EF and between E and EF. 43% of patients in Group EF had significant hypotension during study period. So the concluded that esmolol 1.5 mg/kg is effective in attenuating haemodynamic response to laryngoscopy and intubation in controlled hypertensive patients. Esmolol 1.5 mg/kg with fentanyl 2 µg/kg causes hypotension following intubation in significant number of patients.<sup>4</sup>

Feng CK et al in 1996, compared the effect of lignocaine, fentanyl and esmolol on cardiovascular stress response to laryngoscopy and intubation in 80 patients undergoing non cardiac surgeries. 4 groups of 20 patients each were made. Control group received normal saline, study groups received lidocaine 2 mg/kg, fentanyl 3 mcg/kg and esmolol 2 mg/kg, respectively. Intubation was carried out 3 min after the designated drug was given. Heart rate (HR) and systolic arterial blood pressure (SBP) were obtained every min for 10 min after induction. They concluded that, only esmolol could reliably offer protection against the increase in both HR and SBP, fentanyl prevented hypertension but not tachycardia, and lidocaine had no effect to blunt adverse hemodynamic responses during laryngoscopy and tracheal intubation.<sup>4</sup>

Karuppiyah et al in their study, compared the effects of esmolol and fentanyl on cardiovascular stress response to laryngoscopy and intubation. Their study consisted of a control group receiving normal saline, and 2 study groups receiving esmolol 2mg/kg and fentanyl 2 mcg/kg given 3 min prior to induction. HR and BP were recorded before intubation, during intubation and every min after intubation for 5 mins. They did not find any significant difference in HR and BP readings between the study groups. However there was a statistically significant difference between the control and study groups. Hence they concluded that Fentanyl 2 g/kg bolus or esmolol 0.2 mg/kg bolus 3 min before induction significantly attenuates the hemodynamic response to laryngoscopy and intubation better than control group.<sup>5</sup>

Varma et al compared the attenuation of haemodynamic changes to laryngoscopy and intubation with IV bolus Esmolol 2mg/kg and IV Fentanyl 2µg/kg with control group. In patients with no drugs to attenuate the sympathetic response to laryngoscopy and intubation the maximum rise of heart rate, systolic, diastolic and mean arterial blood pressures are 41.1%, 20.0%, 17.2% and 18.1% respectively when compared with pre op values. Esmolol is more effective than Fentanyl in attenuation of sympathetic response to laryngoscopy and intubation.<sup>7</sup>

Ebert et al did a comparative study of attenuation by Esmolol (500µg/kg/min X 6 minutes, followed by 300µg/kg/min X 9 minutes), or Fentanyl (0.8µg/kg/min X 10 minutes). Fentanyl decreased the SBP, MAP and DBP significantly below the baseline, while these pressures were either retained at or elevated slightly above control in the Esmolol group. In these doses, the HR response to laryngoscopy was more effectively blocked by Fentanyl, while Esmolol better retained perfusion

pressure. There were no complications or ischemic electrocardiographic changes in any patient.<sup>9</sup>

Abu Lais Mustaque Ahmed et al. in their study found that Inj. fentanyl 2 mcg/kg IV administered 5 minutes before laryngoscopy and intubation was able to prevent adverse haemodynamic changes resulting from laryngoscopy and intubation better than Inj. esmolol 1 mg/kg IV administered 3 minutes prior to laryngoscopy and intubation during elective surgeries under general anaesthesia. Also, fentanyl maintained a stable haemodynamic profile throughout the whole intraoperative period and even after extubation. Heart rate, systolic blood pressure as well as diastolic blood pressure were better maintained within normal limits by fentanyl. Patients were sedated and less anxious during the preoperative period, thus, maintaining stable haemodynamic parameters in fentanyl group.<sup>8</sup>

**CONCLUSION:**

In conclusion, both fentanyl and esmolol are effective in attenuation of hemodynamic response to laryngoscopy and intubation. Fentanyl is more effective in preventing tachycardia while esmolol is more effective in controlling rise in systolic BP.

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