ORIGINAL RESEARCH

Assessment of effect of esmolol & dexmedetomidine in attenuating haemodynamic response to laryngoscopy and endotracheal intubation

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ABSTRACT

Background: Laryngoscopy and tracheal intubation are unpleasant stimuli that cause a brief but noticeable sympathetic reaction that increases heart rate (HR), blood pressure, and other symptoms. The present study assessed effect of esmolol & dexmedetomidine in attenuating haemodynamic response to laryngoscopy and endotracheal intubation. **Materials & Methods:** 60 adult patients scheduled for elective surgery under general anesthesia were divided into 3 groups. In groupI, 10 ml normal saline was administered 5 minutes before laryngoscopy and intubation.Group II patients received 0.5 mg/kg esmolol IV diluted to 10 ml with distilled water, 5 minutes before laryngoscopy and intubation. In group IIII, patients received 0.5µ/kg of dexmedetomidine IV diluted with distilled water to make 10 ml, 5 minutes before laryngoscopy and intubation. Parameters such as duration of laryngoscopy, HR (BPM), SBP (mmHg), DBP (mmHg), MAP (mmHg), RPP (mmHg/min) X 100, mean dose of propofol, RSS and VASwas recorded. **Results:** Age group 20-30 years had 4 in group I, 6 in group II and 5 in group III, age group 31-40 years had 6, 7 and 5, 41-50 years had 9, 5 and 6 and 51-60 years had 11, 12 and 14 patients respectively. The duration of laryngoscopy was 10.5, 10.8 and 10.7, HR (BPM) was 87.2, 87.4 and 87.2, SBP (mmHg) was 129.6, 128.3 and 126.5, DBP (mmHg) was 78.5, 79.2 and 80.0, MAP (mmHg) was 95.5, 96.3 and 97.2, RPP (mmHg/min) X 100 was 112.4, 117.3 and 114.1, dose of propofol was 101.8, 102.2 and 76.5, RSS was 2.3, 2.1 and 2.7 and VAS was 4.6, 4.0 and 2.7 in group I, II and III respectively. The difference was non- significant (P> 0.05). **Conclusion:** Intravenous dexmedetomidine attenuated the stress response to laryngoscopy and intubation and maintains haemodynamic stability during the intraoperative period. Dexmedetomidine 0.5 mcg/kg attenuated the haemodynamic response to laryngoscopy and intubation more effectively and maintains intraoperative haemodynamic parameters more stable.

Key words: dexmedetomidine, Laryngoscopy, tracheal intubation

INTRODUCTION

Laryngoscopy and tracheal intubation are unpleasant stimuli that cause a brief but noticeable sympathetic reaction that increases heart rate (HR), blood pressure, and other symptoms.[1] These alterations peak right after intubation and last for 5–10 minutes, which are likely to be tolerated by healthy fit people. Patients with ASA 1 status. The hemodynamic abnormalities in patients with cardiovascular disease can result in serious complications such myocardial ischemia, abrupt heart failure, and cerebrovascular accidents.[2] Treatment options include vasodilators such sodium-nitroprusside; nitroglycerine; topical lignocaine sprays; deeper planes of anesthesia by inhalational/intravenous (IV) agents or narcotics; calcium channel blockers; and deeper planes of anesthesia using narcotics or intravenous (IV) agents. Even though there are several ways, intubation and laryngoscopy pressor response attenuation research is still ongoing.[3]

Numerous methods that target various points along the reflex arc have been proposed to reduce the haemodynamic unfavourable reactions.Therefore, there are numerous recommendations for reducing reflex tachycardia and hypertension.[4] The anesthesia for patients at risk must also meet the following criteria in addition to limiting the cardiovascular response: it must be applicable independent of patient

cooperation, prevent impairment of cerebral blood flow, and prevent patient arousal. It shouldn't take too long, and it shouldn't change the length or type of the subsequent anesthesia.[5]The present study assessed effect of esmolol & dexmedetomidine in attenuating haemodynamic response to laryngoscopy and endotracheal intubation

MATERIALS & METHODS

The present study comprised of 60 adult patients scheduled for elective surgery under general anaesthesia after obtaininginformed consent patients of both genders.

Data such as name, age, gender etc. was recorded.In groupI, 10 ml normal saline was administered 5 minutes before laryngoscopy and intubation.Group II patients received 0.5 mg/kg esmolol IV diluted to 10 ml with distilled water, 5 minutes before laryngoscopy and intubation.In group IIII, patients received 0.5µ/kg of dexmedetomidine IV diluted with distilled water to make 10 ml, 5 minutes before laryngoscopy and intubation. Parameters such as duration of laryngoscopy, HR (BPM), SBP (mmHg), DBP (mmHg), MAP (mmHg), RPP (mmHg/min) X 100, mean dose of propofol, RSS and VASwas recorded. Results were analysed statistically where p value less than 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Age group (years)	Group I	Group II	Group III
20-30	4	6	5
31-40	6	7	5
41-50	9	5	6
51-60	11	12	14

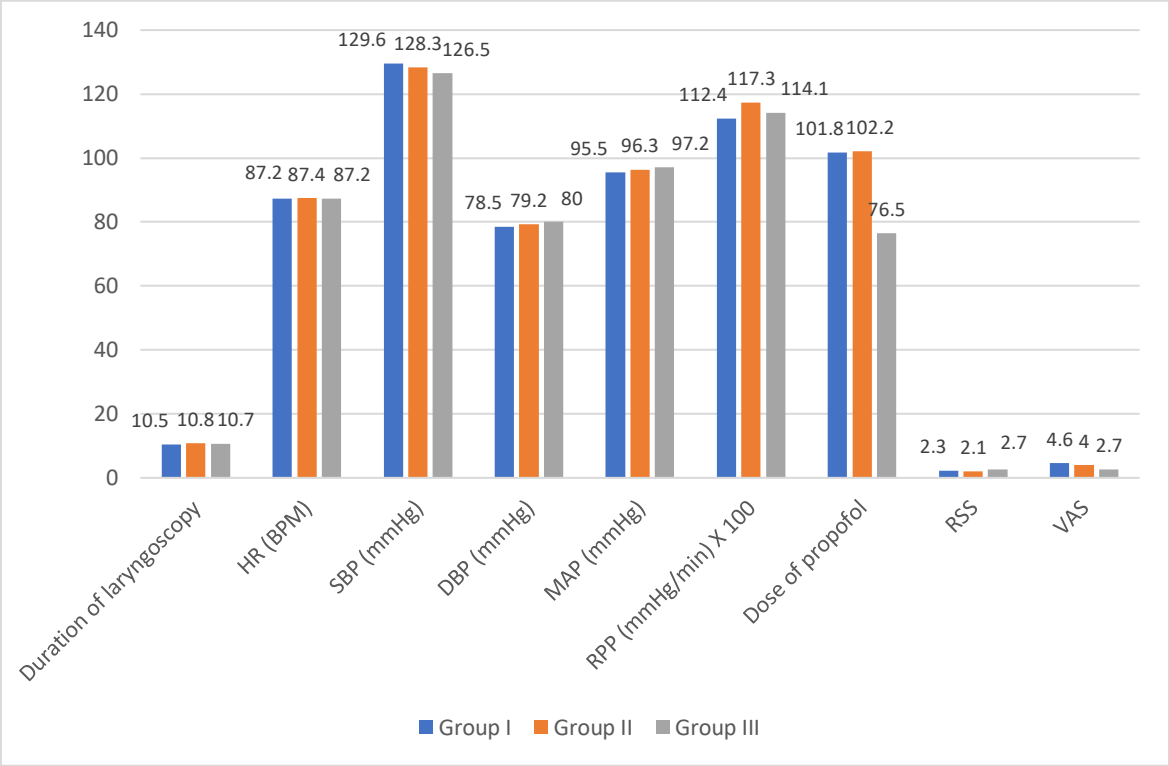
Table I shows that age group 20-30 years had 4 in group I, 6 in group II and 5 in group III, age group 31-40 years had 6, 7 and 5, 41-50 years had 9, 5 and 6 and 51-60 years had 11, 12 and 14 patients respectively.

Table II Comparison of parameters

Parameters	Group I	Group II	Group III	P value
Duration of laryngoscopy	10.5	10.8	10.7	0.91
HR(BPM)	87.2	87.4	87.2	0.54
SBP(mmHg)	129.6	128.3	126.5	0.82
DBP(mmHg)	78.5	79.2	80.0	0.94
MAP(mmHg)	95.5	96.3	97.2	0.15
RPP (mmHg/min) X 100	112.4	117.3	114.1	0.26
Dose of propofol	101.8	102.2	76.5	0.37
RSS	2.3	2.1	2.7	0.62
VAS	4.6	4.0	2.7	0.74

Table II, graph I shows that duration of laryngoscopy was 10.5, 10.8 and 10.7, HR (BPM) was 87.2, 87.4 and 87.2, SBP (mmHg) was 129.6, 128.3 and 126.5, DBP (mmHg) was 78.5, 79.2 and 80.0, MAP (mmHg) was 95.5, 96.3 and 97.2, RPP (mmHg/min) X 100 was 112.4, 117.3 and 114.1, dose of propofol was 101.8, 102.2 and 76.5, RSS was 2.3, 2.1 and 2.7 and VAS was 4.6, 4.0 and 2.7in group I, II and III respectively. The difference was non- significant (P> 0.05).

Graph I Comparison of parameters



DISCUSSION

Laryngoscopy and endotracheal intubation are two highly important instruments in the arsenal of anesthesiologists for maintaining airway. Following its description by Rowbotham and Magill in 1921, endotracheal intubation has been used often in the treatment of anesthesia and critical patient care.[6]One of the biggest dangers for surgical patients with coronary artery disease and those with both coronary artery disease and an intracranial aneurysm is the intubation phase. Even while the response could only last for a moment, it is almost always significant, frequently persistent, and quite concerning.Modern anesthesia includes maintaining intraoperative hemodynamic stability as a key component.[7] Tachycardia, hypertension, and higher metabolic demands are unfavorable haemodynamic effects of stress brought on by anesthesia, surgery, and patient worry during the procedure. Adverse perioperative outcomes are a result of all of these. To accomplish perioperative anxiolysis, drowsiness, analgesia, and haemodynamic stability, many medications have been employed.[8] Preoperative medicine has historically included benzodiazepines, opioids, barbiturates, antihistamines, and beta-adrenoreceptor antagonists to prevent or reduce the stress reaction to anesthesia and surgery.[9]The present study assessed effect of esmolol & dexmedetomidine in attenuating haemodynamic response to laryngoscopy and endotracheal intubation. We found that age group 20-30 years had 4 in group I, 6 in group II and 5 in group III, age group 31-40 years had 6, 7 and 5, 41-50 years had 9, 5 and 6 and 51-60 years had 11, 12 and 14 patients respectively. The effects of clonidine and dexmedetomidine premedication on perioperative oxygen consumption and haemodynamic condition were examined by Taittonenet al[10]in their study30 patients with ASA I status who were having plastic surgery under general anesthesia were compared. In order to premedicate the patients, either saline (n=10), dexmedetomidine (n=10), or clonidine (4mcg/kg) were given intramuscularly (i.m.). The clonidine and dexmedetomidine groups had reduced perioperative oxygen consumption, systolic and diastolic blood pressure, and heart rates than the saline group.

We found that the duration of laryngoscopy was 10.5, 10.8 and 10.7, HR (BPM) was 87.2, 87.4 and 87.2, SBP (mmHg) was 129.6, 128.3 and 126.5, DBP (mmHg) was 78.5, 79.2 and 80.0, MAP (mmHg) was 95.5, 96.3 and 97.2, RPP (mmHg/min) X 100 was 112.4, 117.3 and 114.1, dose of propofol was 101.8, 102.2 and 76.5, RSS was 2.3, 2.1 and 2.7 and VAS was 4.6, 4.0 and 2.7 in group I, II and III respectively.But et al[11] assessed the impact of pre-operative dexmedetomidine infusion on haemodynamicsin patients with pulmonary hypertension following mitral valve replacement surgery. The patients were split into placebo and dexmedetomidine groups at random. Dexmedetomidine was given in a 1 g/kg bolus dose to group D 10 minutes prior to the onset of anesthesia. In comparison to the values in the placebo group, the mean arterial pressure (MAP), mean pulmonary arterial pressure (MPAP), and pulmonary capillary wedge pressure (PCWP) were all significantly lower in group D and the post-sternotomy increase in the

systemic vascular resistance index (SVRI) and pulmonary vascular resistance index (PVRI) was lessened. Fernandez-Galinski et al[12] found that none of the study drugs blocked the increase in mean arterial pressure induced by endotracheal intubation, but esmolol provided better overall haemodynamic stability. All groups had an adequate level of hypnosis.

CONCLUSION

Intravenous dexmedetomidine attenuated the stress response to laryngoscopy and intubation and maintains haemodynamic stability during the intraoperative period.Dexmedetomidine 0.5 mcg/kg attenuated the haemodynamic response to laryngoscopy and intubation more effectively and maintains intraoperative haemodynamic parameters more stable.

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