COMPARATIVE ASSESSMENT OF HAEMODYNAMIC RESPONSE TO LARYNGOSCOPY AND INTUBATION USING MACINTOSH DIRECT LARYNGOSCOPE AND VIDEO LARYNGOSCOPE FOR NASOTRACHEAL INTUBATION

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ABSTRACT

BACKGROUND

Nasotracheal intubation is frequently used for orofacial and ENT surgeries. Greater variations occur in haemodynamics of the patient during nasotracheal intubation. So, in order to find a laryngoscope which will provide better haemodynamic stability, the present study was conducted where changes in haemodynamic parameters were compared between Truview EVO2 video laryngoscope and Macintosh laryngoscope during laryngoscopy and nasotracheal intubation.

MATERIALS AND METHODS

This is a randomised controlled trial. Sixty adult patients of ASA grade I and II posted for orofacial and ENT surgeries were randomly allocated into two groups depending on the type of laryngoscope used: Group 1 (n= 30)- laryngoscopy with Macintosh blade and Group 2 (n= 30)- laryngoscopy with Truview EVO2 blade. After induction with propofol and succinylcholine, laryngoscopy and nasotracheal intubation was performed according to the group. Haemodynamic variables (HR, SBP, DBP, MAP) were recorded at different time intervals upto 15 minutes duration after intubation. The data was tabulated and statistically analysed.

RESULTS

As compared to Macintosh laryngoscope, Truview EVO2 video laryngoscope had lesser fluctuations in heart rate, systolic blood pressure, diastolic blood pressure and mean arterial pressure at 1 and 5 minutes after intubation.

CONCLUSION

As compared to Macintosh laryngoscope, video laryngoscope provides greater haemodynamic stability during nasotracheal intubation.

KEY WORDS

Macintosh Laryngoscope, Video Laryngoscope, Nasotracheal Intubation, Orofacial Surgeries, ENT Surgeries.

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BACKGROUND

Nasotracheal intubation is usually needed to secure and maintain airway in orofacial surgeries and ENT surgeries. The process of laryngoscopy and intubation can result in significant haemodynamic response such as tachycardia, hypertension and dysrhythmias.[1,2] As compared to orotracheal intubation, these responses are significantly greater during nasotracheal intubation and with conventional laryngoscopes. Therefore, various newly designed laryngoscope blades have been studied for determining their role in maintaining haemodynamics during laryngoscopy and intubation. So with the aim of finding a laryngoscope which maintains greater haemodynamic stability during laryngoscopy and nasotracheal intubation, the present study was conducted by comparing the haemodynamic changes during nasotracheal intubation using Truview EVO2 video laryngoscope and conventional Macintosh laryngoscope.

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MATERIALS AND METHODS

After getting approval from Institutional Ethics Committee (IEC), this randomised controlled trial was conducted in the 'Department of Anaesthesiology,' Shyam Shah Medical College and associated Sanjay Gandhi Memorial Hospital, Rewa (MP) from April 2016 to March 2017. Sixty adult patients of age 18-55 years of either sex and with ASA grade I and II, posted for orofacial surgeries and ENT surgeries under general

anaesthesia were selected for the study. Patients with modified Mallampati grades III and IV, history of basal skull fracture (CSF rhinorrhoea), frequent episodes of epistaxis or previous surgeries on nasal cavity were excluded from the study.

Sample Size

From previous year's hospital records, we have observed that number of patients posted for maxillofacial surgeries were only few in number (around 80 patients per year). So we decided to include only 60 patients (who have met our inclusion and exclusion criteria) in our study whenever they came for maxillofacial surgery during one-year study period. 60 paper chits named with the type of laryngoscope (30 chits with Macintosh laryngoscope and 30 chits with Truview EVO2 video laryngoscope) were placed in a bag and shuffled up. Whenever a patient came in the operating room, he/she was asked to pick up a chit from the bag and laryngoscopy was performed in that patient with the laryngoscope which was mentioned in the chit. In this way, the technique of laryngoscopy was randomised, and the selected patients were allocated into two groups, each group consisting of thirty patients-

Group 1 (n= 30)- laryngoscopy was done using the Macintosh direct laryngoscope.

Group 2 (n= 30)- laryngoscopy was done using the Truview EVO2 video laryngoscope.

After complete pre-anaesthetic evaluation and informed written consent taken from patients, they were kept fasted for 8 hours before surgery. On arrival in the operating room, standard basic monitoring were attached and their baseline parameters were recorded. Xylometazoline nasal drops were instilled in both the nostrils 10 minutes before nasotracheal intubation. After premedication with glycopyrrolate, midazolam and fentanyl, pre-oxygenation was with 100% oxygen for 3 minutes. Anaesthesia was induced with Inj. Propofol 2.5 mg/kg IV and Inj. Succinylcholine 1.5 mg/kg IV. After adequate neuromuscular blockade, lubricated nasotracheal tube was inserted through the most patient's nostril until its tip lies in the pharynx. Then laryngoscopy was performed by the laryngoscope according to the group of the patient and a view of laryngeal opening was obtained. Different manoeuvres like use of external laryngeal pressure and Magill forceps were used to improve glottis exposure in case of difficult intubation. If all attempts failed, oral intubation was performed, and that candidate was excluded from the study. During the procedure, heart rate, non-invasive blood pressure (SBP, DBP, MAP), SpO2 and ETCO2 values were noted at different time intervals upto 15 minutes after intubation.

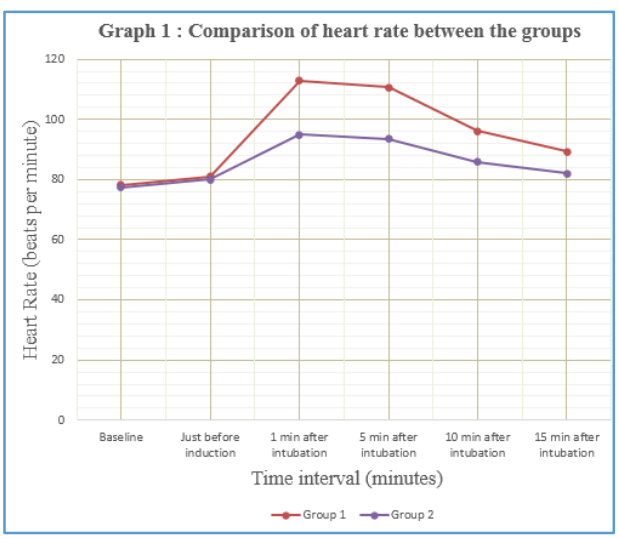
Anaesthesia was maintained with 30% O_2, 70% N_2O and Sevoflurane and adequate neuromuscular blockade with Inj. Atracurium 0.1 mg/kg IV.

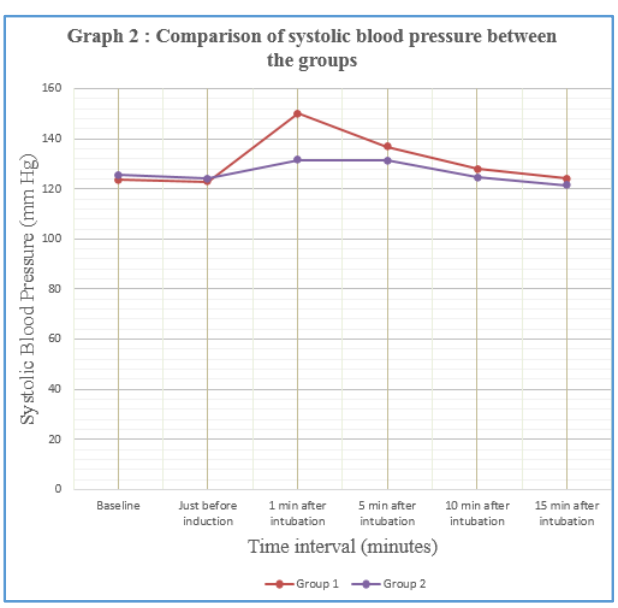
At the end of the surgery, residual neuromuscular blockade was reversed with Inj. Neostigmine 0.05 mg/kg IV and Inj. Glycopyrrolate 0.01 mg/kg IV and tracheal extubation was done.

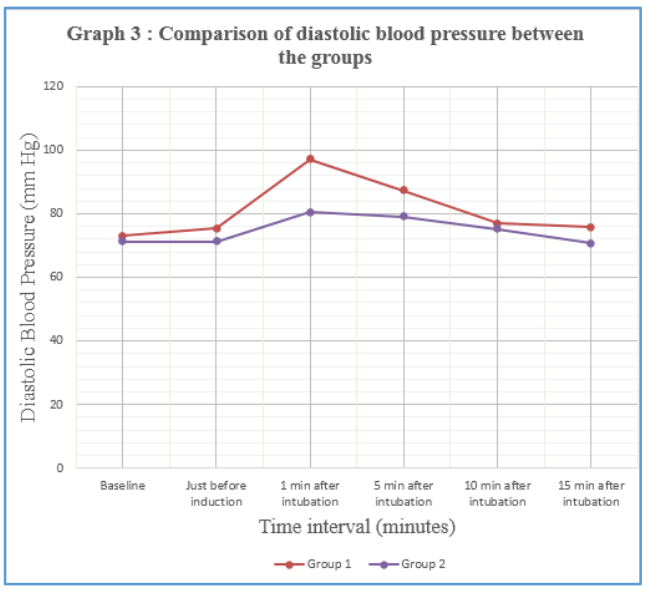
At the end of the study the observations were recorded, tabulated and statistically analysed using 'GraphPad InStat.' Chi-square test and unpaired t-test were used wherever applicable. For comparison, p-value < 0.05 was considered as statistically significant, p < 0.001 as highly significant and p < 0.0001 as extremely significant.

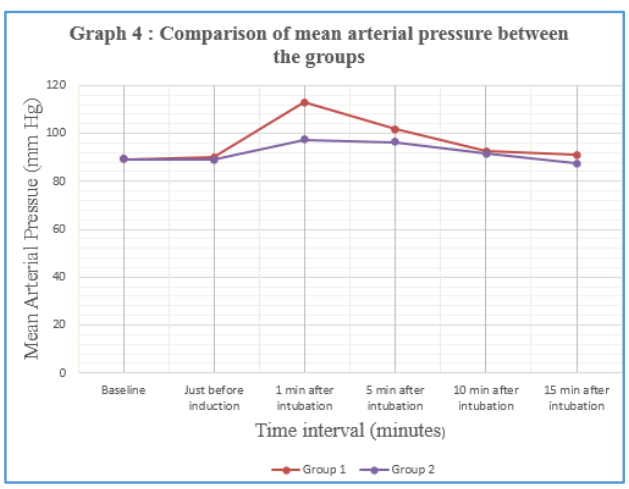
RESULTS

Patients of Group 1 and Group 2 were comparable with respect to demographic characteristics like age, weight, sex ratio and modified Mallampati grading. Both the groups had 100% success rate of intubation. As compared to Group 1, Group 2 had lesser fluctuation in heart rate at 1, 5 and 10 minutes after intubation (p < 0.0001) with maximum rise at 1 minute after intubation (Graph 1); lower fluctuation of mean arterial pressure and systolic blood pressure at 1 minute after intubation (p < 0.0001 and p= 0.0002 respectively) (Graph 2 and 3); lower fluctuation of diastolic blood pressure at 1 minute after intubation (p < 0.0001) and at 5 minutes after intubation (p= 0.0208) (Graph 4).









DISCUSSION

The present study has demonstrated lesser fluctuation in haemodynamics with Truview EVO2 video laryngoscope as compared to conventional Macintosh laryngoscope. On using Macintosh laryngoscope, there was significant rise of blood pressure and heart rate at 1 minute after intubation which returned to baseline values within 10 minutes after intubation. Similar results were also found in similar studies done in the past. MA Malik et al (2009)[3] also compared haemodynamic response to laryngoscopy and intubation using Macintosh laryngoscope, the Pentax AWS® and the Glidescope® in patients at increased risk for difficult tracheal intubation and found that heart rate increased significantly in all groups except for the AWS group after tracheal intubation. Roopa Sachidananda, Umesh G and Safiya I Shaikh (2016)[4] also studied haemodynamic responses to the use of different types of laryngoscopes and concluded that video laryngoscopes provide better attenuation of haemodynamic response compared to intubation using the Macintosh laryngoscope.

During laryngoscopy with conventional Macintosh blade, its tip is placed in the vallecullae to lift the epiglottis which stimulates the stretch receptors in the epipharynx. The stimulation of these receptors in epipharynx causes maximum cardiovascular response (mediated by glossopharyngeal nerve).[5] In addition to increased stretching of the tissues, duration of laryngoscopy and forces applied during laryngoscopy are also responsible for the haemodynamic changes.[6] Whereas in case of Truview EVO2 video laryngoscope, its angulated blade enables glottis visualisation without aligning the oral, pharyngeal and laryngeal axes. There is no need of placing its tip in the vallecullae for glottis visualisation and therefore stretch receptors in the epipharynx are minimally stimulated. Also, the lifting forced required during laryngoscopy is much lesser with Truview EVO2 video laryngoscope. These features of Truview EVO2 video laryngoscope helps in maintaining haemodynamic stability during laryngoscopy and intubation.

CONCLUSION

As compared to conventional Macintosh laryngoscope, Truview EVO2 video laryngoscope maintains greater haemodynamic stability during laryngoscopy and nasotracheal intubation. Therefore, it should be preferred for nasotracheal intubation, especially in patients with cardiac diseases like coronary artery disease or previous history of myocardial infarction where tachycardia and hypertension can be detrimental to the patient. It is also useful for intubation in patients with brain tumours and head injuries where it prevents further rise in ICP by keeping the blood pressure under control.

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