TRACHEAL INTUBATION;

DIRECT LARYNGOSCOPIC ORAL INTUBATION VS FIBEROPTIC BRONCHOSCOPIC NASAL INTUBATION HAEMODYNAMIC RESPONSE

ORIGINAL
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ABSTRACT... Introduction: Haemodynamic response to direct laryngoscopy and tracheal intubation has always been concern especially in cardiac patients. The use of fiberoptic bronchoscope for endotracheal tube placement may reduce the haemodynamic changes associated with intubation. **Objectives:** To compare haemodynamic changes (pulse and mean arterial pressure) following tracheal intubation, using direct laryngoscopic technique with fiberoptic bronchoscopic technique. **Study Design:** Randomized Controlled Trial (RCT). **Settings and Duration:** Department of Anaesthesiology, Intensive Care and Pain management Military hospital Rawalpindi. The study was of six months duration starting from April 2008 to October 2008. **Subject and Methods:** ASA-I and II patients (n=160) undergoing surgery meeting the inclusion and exclusion criteria.Informed consent was taken from all the patients undergoing the study. Patients were divided in two groups. Patients assigned to Group A got endotracheal intubation through direct laryngoscopic technique and Group B through fiberoptic bronchoscopic technique after induction of general anaesthesia. Pulse and Mean arterial pressure were recorded before induction of anaesthesia and three minutes after the intubation. **Results:** One hundred and sixty patients were studied. Eighty patients intubated through direct laryngoscopy (Group A) and eighty patients intubated through fiberoptic bronchoscope and it was observed that fiberoptic bronchoscopic intubation is haemodynamically safer as compared to conventional laryngoscopic intubation. **Conclusion:** The study concluded that bronchoscopic intubation provides better haemodynamic stability than direct laryngoscopic intubation.

Keywords: Fiberoptic bronchoscopic intubation, Direct laryngoscopy, Haemodynamic stress response

INTRODUCTION

Stress response to laryngoscopy and intubation has always been concern especially for cardiac patients. The stimulation of pharyngeal structures is thought to be the most important factor in producing pressor response and tachycardia during intubation[1]. Direct laryngoscopy produces maximum pressor response due to direct stimulation of pharyngeal structures[1,2]. The pressor response may be especially deleterious in patients with preexisting myocardial ischemia[3] and cerebral insufficiency[4]. A number of drugs have been used to reduce pressor response[5,6,7]. The alternate technique like LMA, ILMA, and lightwand has been used to reduce the response[8,9].

Intubation with fiberoptic bronchoscope is best alternate technique because it produces less pressor response[10] and secure definite airway in difficult intubation[11].

METHODS AND MATERIAL

The study was conducted in department of anaesthesiology and intensive care during Apr 2008 to Oct 2008 after approval from hospital ethical committee and informed written consent. A total of 160 ASA I and II female patients requiring tracheal intubation for elective surgery enrolled. Patients expecting difficult intubation, having hypertension or severe respiratory disease were excluded. Patients were randomly divided into two equal groups of 80 patients each. In group A intubation was done through direct laryngoscopy using Macintosh laryngoscope and in group B using fiberoptic bronchoscope.

Premedication was given to all patients with midazolam 2 mg IV 5 min before induction. Monitoring was applied before induction including NIBP, ECG and Pulse oximetry. In group B Xylometazoline 0.1% nasal spray was used for nasal vasoconstriction 3 min before induction. Preoxygenation with 100% oxygen done for 3 min. induction with Thiopentone 5 mg/kg and Nalbuphin 0.1 mg/kg and Atracurium 0.5 mg/kg was used as muscle relaxant. In group A polyvinyl chloride (PVC) ETT size 7.0 mm internal diameter placed using Macintosh laryngoscope. In group B 7.0 mm internal diameter PVC

ETT passed through patent nostril and gently pushed into nasopharynx. Fiberoptic bronchoscope passed through tube into trachea under direct vision and then sliding the tube over bronchoscope. Cuff inflated with air and ETT connected to breathing circuit. Tube placement was confirmed by chest wall movement, bilateral chest auscultation and capnography. Haemodynamic values, MAP and heart rate, were recorded before induction and 3 min after intubation. The values given in results are mean with standard deviation. Student t-test was used to analyse the data and P value less than 0.05 was taken as significant. All results were analyzed using SPSS version 17.

RESULTS

There was no statistically significant difference in age and weight among the two groups.

In direct laryngoscopic group (n=80), 77 patients (96%) had significant increase in MAP 3 patients (4%) had insignificant increase in MAP. In direct laryngoscopic group (n=80). 70(87.5%) of the patients had significant increase in heart rate and 10(12.5%) patients had insignificant increase in their heart rate.

In the fiberoptic bronchoscopic group (n=80), 57 patients (71%) had significant increase in MAP and 23 patients (29%) had insignificant increase in MAP after intubation. In fiberoptic bronchoscopic group (n=80), 59(73%) patients had significant increase in heart rate and 21(27%) had insignificant increase in heart rate after intubation.

Significant difference between groups was detected in terms of mean arterial pressure and heart rate 3 minutes after intubation. The rise in MAP and HR in laryngoscopy group were highly significant ($P<0.001$) when compared with bronchoscopic group.

DISCUSSION

Direct laryngoscopic tracheal intubation during general anaesthesia is usually associated with stress response[12]. This stress response might not be of concern in young healthy patients, but in patients of cardiovascular disorders, the haemodynamic stress response may be hazardous and totally unacceptable[4]. There are many

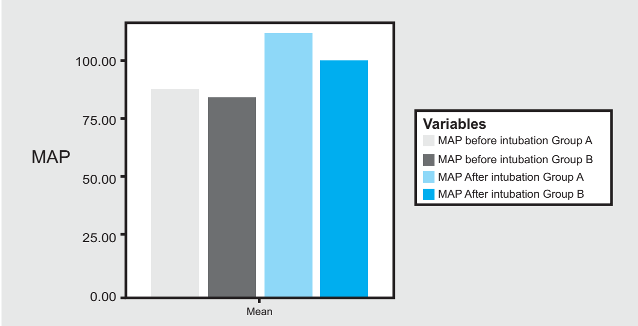

Fig-1. The distribution of map in both the groups before induction of anaesthesia and three minutes after intubation.

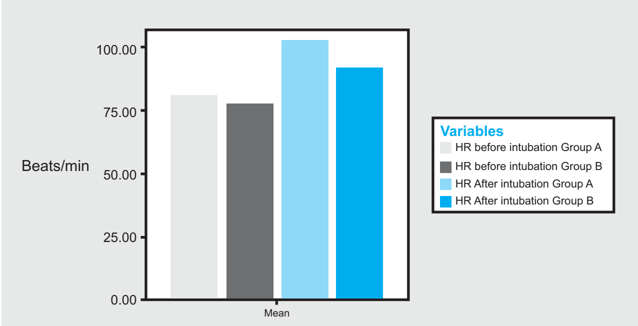

Fig-2. The distribution of mean heart rate in both the groups before induction of anaesthesia and three minutes after intubation.

studies conducted throughout the world which have compared the number of drugs and equipment to minimize the haemodynamic response. There are very few studies which compares the direct laryngoscopic and fiberoptic bronchoscopic techniques. Our study was designed to find out the better technique to minimize the haemodynamic response to intubation.

Direct laryngoscopic technique has been a conventional method used in general anaesthesia to place endotracheal tube. However its association with haemodynamic response is well known to anaesthetists[2].

Fiberoptic bronchoscopy is an alternative technique for endotracheal tube placement. This technique is commonly used in cases with suspicion of difficult intubation. Fiberoptic bronchoscopic technique is important tool in difficult airway management[11,13].
One advantage of the fiberoptic intubation is that it can

avoid the mechanic stimulus to the base of tongue, epiglottis and the receptors in pharyngeal muscles exerted by direct laryngoscope. Some studies have shown that the cardiovascular responses to tracheal intubation are greatly inhibited by attenuating or avoiding the oropharyngolaryngeal stimuli. (Kitamura T et al 2001[14], kimura A et al 2001[15], Nishikawa K 2001[16]).

Tsubaki T[10] (1992) detected fiberoptic intubation result in less pressor and tachycardiac response than direct laryngoscopic intubation.

Hawkyard SJ[17] et al (1992) detected under topical anaesthesia, the FOB produce less of cardiovascular response during nasotracheal intubation as compared to direct laryngoscopic intubation.

Adachi YU[18] et al (2000), Sun HT[19] et al (2005) and Xue FS[20] et al (2006) detected that there is no difference in terms of increase in HR and BP after laryngoscopic and bronchoscopic intubation. They explained it as tracheal intubation itself is very stressful procedure which cannot be overcomed by slight change in technique.

Xue FS[21] et al conducted a study in 2006 and showed that bronchoscopic intubation has more pressor effect as compared to direct laryngoscsopy.

Barak M[22] et al (2002) detected that longer the time of intubation the more likely is it to develop hypercapnia, which can result in hypertension and tachycardia. They said that as bronchoscopic technique required more time as compared to direct laryngoscopy therefore bronchoscopic technique is associated with cardiovascular stress effects.

Our study shows that maximum increase in MAP in group A (direct laryngoscopy) was higher as compared to group B (fiberoptic bronchoscopy). The reason may be that there is less physical pressure on pharyngeal structures during fiberoptic bronchoscopy as compared to direct laryngoscopy and intubation. The results of our study are comparable with study by Tsubaki T[10] et al. The increase in heart rate was higher in group A than group B; this is also comparable with results of Tsubaki T[10].

CONCLUSION

We concluded that intubation through fiberoptic bronchoscope is accompanied by lesser cardiovascular response than those associated with direct laryngoscopic intubation. So fiberoptic bronchoscopic intubation is not only useful tool for difficult intubation but can also be used in patients in whom pressor response to intubation may be deleterious.

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