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Comparision of the Haemodynamic Responses Between Laryngeal Mask Airway Insertion and Endotracheal Intubation in short Surgical Procedures

KEYWORDS: Haemodynamics, Laryngeal mask airway, endotracheal intubation.

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ABSTRACT *Background:*

Patients & Methods:Fifty adult patients of both sexes and age ranging from 20-40 years undergoing elective surgery under general anaesthesia in ASA 1 and Mallampati Grade 1 and 2 were divided into two groups at random with 25 patients in each group, control group : (Endotracheal tube group), Study group : (Laryngeal mask airway group).

Results: Pressor response, and its duration are less in study group compared to control group. Hemodynamic stability in study group patients is was much better than control group.

Conclusion: The use of LMA is more beneficial when compared to ETT for general anesthesia in the group of patients studied.

INTRODUCTION

Direct laryngoscopy and endotracheal intubation following induction of anaesthesia is always associated with haemodynamic changes due to reflex sympathetic discharge caused by epipharyngeal and laryngopharyngeal stimulation. This increased sympatho-adrenal activity may result in hypertension, tachycardia and arrhythmias. These are all usually transitory, variable and unpredictable.

Transitory hypertension and tachycardia are probably of no consequence in healthy individuals[5] but either or both may be hazardous to patients with hypertension, myocardial insufficiency, penetrating eye injuries, intracranial lesion, or cerebrovascular diseases. This laryngoscopic reaction in such individuals may predispose to development of pulmonary oedema[6] myocardial insufficiency and cerebrovascular accident.

Attenuation of pressor responses to manipulation of the airway has been practiced either by deepening the plane of anaesthesia, by the use of drugs known to obtund them or by using advanced airway devicesl.

Many methods have been devised to reduce the extent of haemodynamic events including high dose of opioids alpha and beta adrenergic blockers,[13] calcium channel antagonist like diltiazem, verapamiland vasodilatation drugs like nitroglycerine. α2 – agonist like clonidine.

None of the above approaches or agents have proved to be ideal. Hence the search for an ideal agent was still continuing.

PATIENTS & METHODS :

Fifty adult patients of both sexes with age ranging from 20-40 years undergoing elective surgery under general anaesthesia with ASA 1 and Mallampati Grade 1 and 2 were included in the study. They were divided into two groups at random(25 patients in each group)

Control group : Endotracheal tube group.
Study group : Laryngeal mask airway group

Patients below 18 years and above 60 years, Mor bidly obese , respiratory disease, cardiovascular disease, history of smoking , risk of aspiration, severe systemic diseases and neurological diseases were excluded from the study. In the operating theatre, patients were made to lie supine, Intravenous line was secured, and the baseline vitals like heart rate, systolic blood pressure, diastolic blood pressure and spo_2 were record ed by using Datex multipara monitor . Resuscitation equipment was kept ready. All the patients were received injection Glycopyrrolate 0.2 mg, Ondansetron 4 mg , 3 minutes prior to induction and Tramadol (1.0-1.5mg/kg) intravenously. Heart rate, systolic blood pressure, diastolic blood pressure and SPO_2 were recorded before induction, after induction, at ETT and LMA insertion in 1min, 3min, 5min.

STATISTICAL ANALYSIS (see the table):

Hemodynamic parameters at pre induction i.e, before preoxygenation shows no significant difference in these readings (P<0.05). But fall in SBP, DBP, MAP in both groups after induction , which were not significant (P<0.05).

Summary of haemodynamic responses to laryngoscopy and intubation or insertion of laryngeal mask airway in control group and study group along with p-value at various stages and timings (see the table & graph).

Parameters		HR	SBP	DBP	MAP
Pre-induction	C	81.28 ± 10.21	117.52 ± 11.99	79.52± 8.31	92.19± 8.57
	S	82.00 ± 7.63	111.12 ± 9.47	79.20 ± 5.69	89.84± 6.05
	P*	0.3895	0.0209	0.4373	0.1348

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After-induction	C	87.20 ± 6.12	103.20 ± 10.23	74.32± 6.62	83.95 ± 5.27
	S	92.08 ± 9.44	95.52 ± 21.49	69.60 ± 6.08	78.24± 8.45
	P*	0.0180	0.0573	0.0058	0.0033
Insertion of LMA	C	113.04 ± 6.03	136.56 ± 9.30	94.32 ± 6.82	108.40 ± 7.00
	S	109.60 ± 8.53	115.28 ± 10.06	79.52± 7.35	91.44± 6.18
	P*	0.0535	0.0001	0.0001	0.0001
1Minute	C	112.40 ± 8.04	132 ± 8.20	93.76 ± 6.72	106.51 ± 6.61
	S	106.96 ± 16.02	112.64±8.67	78.08 ± 7.93	89.60± 7.01
	P*	0.0690	0.0001	0.0001	0.0001
3Minute	C	107.36 ± 8.74	121.52±8.08	85.84 ± 6.43	97.73 ± 5.77
	S	98.80 ± 12.50	108.16±11.00	76.32± 6.37	86.93± 6.56
	P*	0.0038	0.0001	0.0001	0.0001
5Minute	C	95.52 ± 12.05	110.24±8.39	81.12 ± 7.00	90.83± 6.84
	S	92.56 ± 10.16	104.08±8.97	74.32 ± 5.12	84.24± 5.73
	P*	0.1762	0.0078	0.0002	0.0003

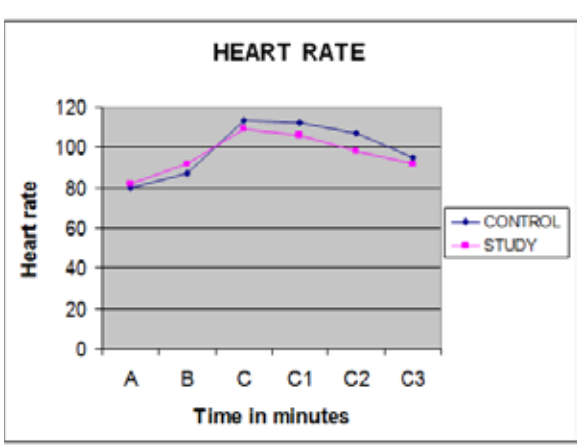
HR:Heart rate, SBP: Systolic bloodpressure, DBP: Diastolic blood pressure, MAP: Mean arterial pressure, C-Control group, S-Study group, P*-p value, Student T test.

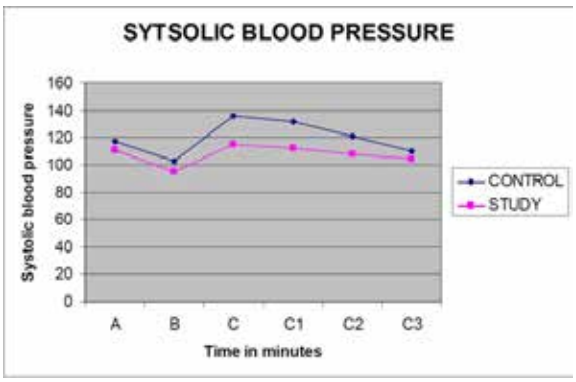
At the time of intubation/ insertion of LMA parameters were raised in both groups but the raise was significantly low in the study group (P<0.05) (see the table & graph).

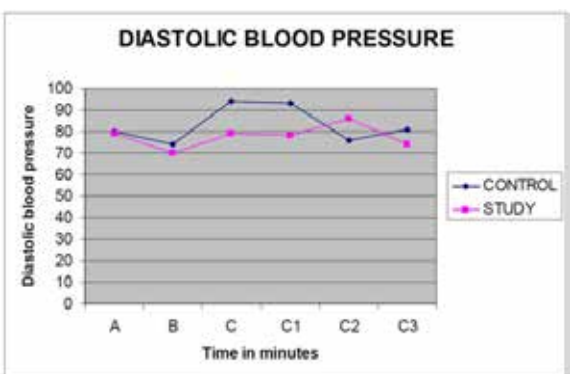
At 1 min of intubation or insertion of LMA, parameters were raised but of low significance in study group (P<0.05). The parameters in control group were significantly well above the study group (see the table & graph).

After 3 mins of intubation/ insertion of LMA parameters were still high in the control group where as the parameters study group were nearing basal values. The difference was statistically significant (see the table & graph).

After 5 mins of intubation or insertion of LMA the parameters in both groups are nearing the basal values shows significant difference except for Heart rate (see the table & graph).







DISCUSSION:

Laryngoscopy results in stimulation of pharyngeal wall and causes marked haemodynamic changes (Reid and Brace 1940)[1]. The same haemodynamic changes were harmful in cardiovascular daises patient after indotracheal tube intubation (Pyrs & Robers 1971)[2].

Attempts are made to attenuate this response with a variety of pharmacological maneuvers and more recently effect the effect of fibre optic laryngoscopy was investigated (Smith-1987)[3]. In 1983, Brain described LMA which was neither passed through glottis not requires laryngoscope, has it sits on the glottis.

Heart rate, systolic blood pressure, diastolic blood pressure were recorded at regular intervals i.e., pre induction, after induction, at Laryngoscopy and intubation or insertion of laryngeal mask and at regular intervals of l minute, 3minutes and 5 minutes after intubation or laryngeal mask insertion by using a non invasive blood pressure monitor (Datex multipara monitor). The anthropometric data of both the groups were comparable.

The pre induction values in both the groups were comparable and there was no statistically significant difference between them (P > 0.05). Following induction with propofol, there was a fall in systolic and diastolic blood pressure and a slight raise in heart rate in both the groups. Which were insignificant (P > 0.05).

The systolic blood pressure was found to be increased at laryngoscopy and endotracheal intubation or laryngeal mask insertion. But the increase in systolic BP in the study group was not as much as in the control group. It was statistically significant (P<0.05). The systolic blood pressure after one minute was nearing the basal value in the study group, whereas in the control group it reached its basal value at five minutes (P>0.05). There was a statistically sig-

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nificant difference between the two groups at end of three minutes (P<0.05).

I.G.W1LSON, FELL-D, ROBINSON-SL (1992)[4] compare dand found that mean maximum increase in systolic blood pressure after laryngoscopy and endotracheal intubation was 51.3 percent and 22.9 percent for laryngeal mask air way insertion also they expresses the greater increase of heart rate in response to ETT group then LMA insertion and remained elevated for longer time with ETT group.

BARCLAY.K. WAKK.T, WARE HAM-K et al (1994)[5] There randomized prospective study to examine the effects of ETT/LMA deposition, concluded that minimal effects on HR & MAP with LMA insertion and significant raised with ETT group relative to pre induction values.

BRAUDE.N, CLEMENTS.E.A.F, HODGE S.U.M.et al (1989)[6] conducted a study on pres sorresponse of laryngeal mask airway in comparison with endotrache al intubation and concluded that there were significant differences between the two groups in arterial diastolic pressure immediately after insertion or intubation and again two minute s after the insertion or intubation.

In our study, mean arterial pressures at the time of insertion of laryngeal mask airway or endotracheal intubation were increased in both the groups, but there was a significant raise in the control group (P < 0.05). The mean arterial pressure in the study group has reached to its basal value at one minute where as it took five minutes for the control group. There was a statistically significant difference between the mean arterial pressure of both the groups at the end of three minutes (P < 0.05).

LAMB K.JAMES.M.F.M, JANICKI.P.K.(1992)[7] there compared to study notice that the mean rate pressure was significantly decreased in LMA group than ETT group (p<0.01).

In the present study, heart rate at the time of insertion of laryngeal mask airway or endotracheal intubation was increased in both the groups but the increase was significant in control group (P < 0.05). Heart rate has reached its basal value within five minutes. But the heart rate was still high in control group even after five minutes also. However the difference was not statistically significant. There was a significant difference of heart rate at one minute and three minutes intervals between control and study group.

Brian has devised the laryngeal mask air way (LMA) to give general anesthesia as an alternative to endotracheal tube. The mechanism of raise in IOP & haemodynamic responses, manifesting as increase in heart rate and blood pressure were due to reflex sympathoadrenal discharge provoked by epilaryngeal and laryngotracheal stimulation mechanically by subsequent to laryngoscopy and tracheal intubation.

AMEET KUMAR K.K., GIRIDHAR et al (2000)[8] studied in 60 patients, discloses HR & BP significantly higher in ETT group than LMA group, concluded the use of LMA safe haemodynamically compromised patients.

Insertion of LMA is easy, it does not need laryngoscopy. Controlled and spontaneous ventilation can be achieved. Thus LMA attenuates the pressor response, but few authors have found that there will be raise in blood pressure, heart rate and intraocular pressure while using LMA, but still the mean arterial pressure will be less. So they recommend to use the LMA in both elective and emergency cases, for controlled and spontaneous ventilation even when intubation is difficult.

AKTAR NAQIB, QUAZI SYED, AFTAB AHEMED BEG (2004)[9] compared the haemodynamic changes with LMA & ETT groups, noted a raise in HR & BP in ETT group only.

SYED ALTAF BUKHARI, INTIAZ NAQASH, JAVED ZARGAR et al (2003)[10] studied the press or response in both group and found a significant raise of SBP & DBP in ETT group as compared to LMA group (p <0.01)

M.SHAFIQUE TAHIR, NADEEM AHMAD KHAN, MUHAMMAD MASOOD, SALMAN WARIS et al (2008)[11] found statistically significant raise or HR, SBP & DBP with ETT group and duration press or response was also longer with ETT group than LMA group.

SUMMARY:

In the present study 50 patients belonging to ASA 1 of both sexes between age group 20 to 40 years were studied in two groups of 25 each as LMA group/ Study group and ETT group/ control group. The data of both the groups were compiled and statistically analysed using Student 't' test and p value were calculated.

The heart rate in LMA group showed an increase during and after induction, and even in the 1st and 3rd minutes. Where as in ETT group after induction, an initial small raise in heart rate from the baseline value and at 1st, 3rd and 5th minutes but the heart rate had progressively increased (p<0.001).

In LMA group the systolic & diastolic blood pressure are decreased from its baseline value after induction but there was a raise during insertion and at 1st,3rd minutes of insertion. But its blood pressure remained lower than the ETT group.

In ETT group ,the systolic & diastolic pressure had an initial fall after induction and later on showed a rising trend at 1st ,3rd and 5th minutes of insertion of endotracheal tube.(p<0.001). There was no fall in oxygen saturation at any point.

Hence this study is in favour of use of LMA to a conventional use of endotracheal for administering general anaesthesia specially for haemodynamically compromised patients and intraocular surgeries. It was associated with significant rise in IOP and cardiovascular response in the form of raised blood pressure and tachycardia because of sympathetic discharge following laryngotracheal stimulation by laryngoscopy and tracheal intubation. Use of Brains LMA as an alternative to endotracheal tube has attracted the attention of several workers with regard to haemodynamic and IOP changes.

CONCLUSION:

Pressor response and its duration to LMA insertion is much less than that of laryngoscopy and endotracheal intubation and returns to base line within 3min in LMA group and 5min or more in ETT group. It establishes the usefulness of laryngeal mask airway in airway management during anaesthesia mostly in CVS compromised patients without any un toward incident. The art of placing LMA can be learnt very easily. There was no difficulty in maintaining the anaesthesia at desired level.

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Patient tolerance to LMA was very good. Endotracheal intubation was associated with raise in heart rate, systolic blood pressure and diastolic blood pressure.

Overall statistical analysis of the present study and most of the literature published reveals that there was significant raise in HR, SBP & DBP in ETT group compared to LMA group. There was significant press or response and 1st & 3rd min's of ETT group than LMA group.

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