Journal of BSA, Vol. 19, No. 1 & 2, 2006

Original Article

COMPARATIVE STUDY OF "HAEMODYNAMIC CHANGES BETWEEN ENDOTRACHEAL INTUBATIONS AND LMA INSERTION"

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SUMMARY

To compare the haemodynamic changes between LMA insertion & endotracheal intubation, 60 patients were assigned randomly to one of the two groups of thirty each. They were grouped randomly by card sampling. Every patient included in the study was allowed a card preoperatively. According to the card number patients were grouped.

Group A. Airway was maintained by LMA.

Group B: Airway was maintained by ETT.

Haemodynamic parameter i.e. pulse rate, systolic blood pressure, diastolic blood pressure and presence of any dysrhythmia were monitored after 1,3,5 & 10 minutes after LMA insertion or ETT intubations. There was statistically significant changes ($P<0.05$) in pulse rate, systolic blood pressure, diastolic blood pressure and (appearance of dysrhythmia in some patients) in group ti patients whereas there was less changes in pulse rate, systolic blood pressure, diastolic blood pressure whose airway was maintained by LMA insertion (Group-A).

We conclude that LMA insertion causes less Haemodynamic changes than that of endotracheal intubation. So LMA insertion is safer than ETT intubations in some selected patients.

INTRODUCTION

Haemodynamic stability is an important aspect to the anaesthesiologist for the benefit of the patients especially during intubations, laryngeal mask insertion Laryngoscopy and endotracheal intubation can cause striking changes in Haemodynamics as result of intense stimulation of sympathetic nervous system. These changes are potentially dangerous in patients with cardiovascular or cerebrovascular disease as they may lead to per & post operative life threatening ischaemia ,infarction or cerebral haemorrhage.

To avoid these complications LMA can be used as alternative to tracheal intubations for airway management during anaesthesia for short case procedure.

Many studies has shown that there is an attenuated Haemodynamic response to insertion of LMA as compared to endotracheal tube[1,2,3].

Another study has shown that there is same haemodynamic response to insertion of LMA as compared to endotracheal tube[4].

LMA insertion is easier than endotracheal intubation. Insertion of LMA is possible with the patient's neck and head in any position and with practice the operator can insert it from the side or from in front of the patient[5]. It avoids the need of muscle relaxation and useful in managing difficult & failed intubation.

LMA can be used with either spontaneous or controlled ventilation. It is also useful in patients with airway distortionsecondary to tumour, congential problems, mandibular fracture, haematoma, burns involving the mouth & chin, poor mobility of cervical spine[6].

The use of LMA may be associated with less coughing, straining, breath holding and lower incidence of postoperative sorethroat.

LMA is reusable and can he reused up to 50 times and cost effective when used in place of disposable single use of tracheal tubes.

To establish the benefits of LMA, more specifically the haemodynamic stability with LMA, we compare the cardiovascular response to LMA insertion and endotradheal tube intubations.

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MATERIALS & METHODS:

60 (sixty) patients of both sex were selected between the ages of 15 to 50 pears having ASA physical status I & II without any respiratory or cardiovascular diseases. They were randomized by card sampling. A total of 60 cards, 30 for each group was prepared by another person who was not aware of the study. Every patient included in the study was allowed to pick a card preoperatively. According to the card number, patients were grouped in to group A (LMA insertion) & group 13 (ETT intubation). Informed consent was taken from both the groups about the procedure.

All patients were pre-medicated with 0.3 mg atropine. LMA insertion or endotracheal inhabations was done after administering the induction agent (thiopental sodium) plus suxamethonium and was maintained by 70% nitrous oxide, 30 % oxygen, 0.5 '% halothane, IV fluid, vecuronium and fentanyl 1 µg/kg body weight.

In both the groups after arrival into the operating room cardiovascular parameter ere recorded. The cardiovascular parameter such as pulse rate, systolic blood pressure, diastolic blood pressure and presence of any dysrhythmia (drop beat) were recorded before induction and 1,3,5,10 minute after LMA insertion or tracheal intubations. Blood pressure was measured by sphygmomanometer with mercury column.

The cardiovascular parameter before induction of anaesthesia was treated as control value.

RESULTS:

There was no significant difference between group A and group B in respect of age, sex and weight (Table-I).

Table-I

Demographic Data of the Present Study.

Parameter	Group A (LMA)	Group B (ETT)	P. Value
Age	26.861± 10.72	27.83 ± 7.82	0.703
Weight	46.10± 5.66	48.43± 6.03	0.531
Sex: Male	7 (23.33 %)	15 (50%)	
Female	23 (76.66%)	15 (50%)	

*Values are expressed as mean -1 SD or in frequency.

*Data are analyzed by student's 't test. Values are regarded as significant if P<0.05.

There was no significant difference in respect of heart rate (base line) between the groups and there were highly significant difference 1,3,5 &10 min. after insertion/intubations but response was less significant in group A (Table-II).

Table-II

Changes in heart rate in two studied groups.

Group/Time	Base line	I min.	3 min.	5 min.	10 min.
Group A (LMA)	85.6± 7.97	97.86± 8.18	97.6±8.17	88.66±7.79	82.66±5.88
Group B (ETT)	85.86 ±7.4	108.53±6.36	115.06±7.40	100.66±3.33	88.53±4.42
P. Value	0.890	0.000	0.000	0.000	0.000
Comment	NS	S	S	S	S

*Values are expressed as mean 1 SD.

*S= Statistically significant.

*NS= Statistically not significant.

*Data are analysed by student's 't' test. Values are regarded as significant P<0.05.

There was no significant difference between the groups in respect of base line & 10 min. (SBP) after insertion/ intubations and there were highly significant difference l, 3 & 5 min. after insertion/intubations but response was less significant in group A (Table-III)

Table-III

Changes in systolic blood pressure in two studied groups.

Group	Base line	1 min.	3 min.	5 min.	10 min.
Group A (LMA)	112.3311.72	120.16±1 7 L70	121.161±1.93	111.86+±11.00	107.66±10.06
Group B (ETT)	114.33110.14	135.13±15.05	144.16±17.37	123.00±10.05	11.83±9.23
P. Value	0.459	0.000	0.000	0.000	0.000
Comment	NS	S	S	S	NS

*Values are expressed as mean ± SD.
*S= Statistically significant.
*NS= Statistically not significant.
*Data are analysed by student's 'T test. Values are regarded as significant P<0.05.
10 min. 6E+10,06
1.83 E-9.Z3
0.000 NS
There was significant difference between the groups in respect of base line,1,3,5 & 10 min.(DBP) after insertion/ intubations but response was less significant in group A (Table-IV).

Table- IV

Changes in diastolic blood pressure in two studied groups.

Group	Base line	1 min.	3 min.	5 min.	10 min.
Group A(LMA)	72.41±8.15	81.64±7.80	82.20±9.74	75.16±8.41	70.00±6.95
Group B (ETT)	77.48±8.32	96.49±9.79	102.09±11.01	90.16±9.17	79.19±8.17
P. Value	0.081	0.000	0.000	0.000	0.000
Comment	NS	S	S	S	S

*Values are expressed as mean ± SD. *S= Statistically significant.
*Data are analysed by student's 't' test. Values are regarded as significant P<0.05.

One patient in group A & 3 patients in group B suffered from dysrhythmia after I & 3 min. of insertion & intubations. Dysrhythmia appeared in 3.33% cases in group A & 10% cases in group B. So dysrhythmia is more common in group B than that of group A. There was no statistically significant difference between the groups in respect of dysrhythmia (Table-V). Although the statistical value did not show any difference, a three fold higher incidence of dysrhythmia in ETT group seems to be significant, which may become evident in large scale study.

Table-V

Appearance in dysrhythmia (drop bcat) after 1& 3 min. of LMA insertion / ETT intubations.

Group	No. of patient	X^2	P value
Group A (LMA)	1 (333%)	1.06	NS
Group B (ETT)	3 (10%)		P>0.05

*Values are expressed as frequency. Within parenthesis are percentage over column total. *Data are analyzed by Chi-square test, Values are regared as significant if P<0.05. *NS=Statistically not significant.

The elevation of haemodynamic response between the groups were compared by student 'Y' test. Values of group A (LMA insertion) were significantly lower than that of group B (ETT group).

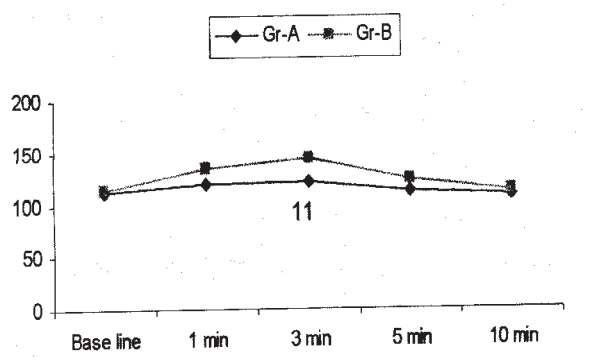

Fig.-1: *Changes of systolic blood pressure in two groups at different time period*

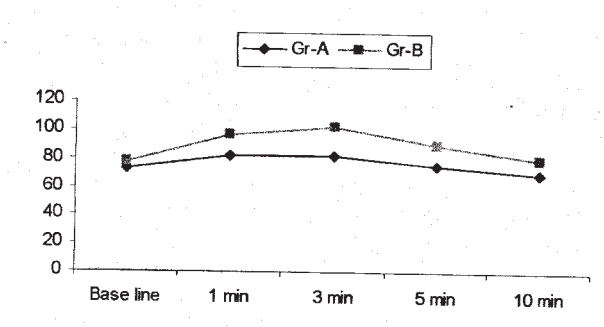

Fig.-2: *Changes of diastolic blood pressure in two groups at different times period*

DISCUSSION:

Haemodynarnic stability is an integral and essential goal of any anaesthetic management plan but haemodynamic changes during intubation especially heart disease, hypertension, increase ICP etc. are a great problem for anaesthesiologist. So anaesthesiologist always try to reduce these haemodynamic changes by applying methods and/ or drugs.

Many drugs have been suggested in modifying haemodynamic responses to laryngoscopic intubation. These include the use of premedication, variety of general anaesthetic agents, lignocane[7], narcotics, ß-blockers, calcium channel blockers, vasodilators and magnesium. Unfortunately none of these pharmacological manipulations can consistently and effectively attenuate these adverse responses, nor are they free from complications. These may prolong recovery time and may lead to cardiovascular complications.

Kihara et. al. had demonstrated that LMA insertion has no significant haemodynamic effect compared to base line. They also shown that LMA removal too did not change haemodynamic parameter significantly[8]. An our study LMA insertion compared to ETT intubation demonstrates statistically significant haemodynamic effect in ETT group.

Idress & Khan et. al. in another study demonstrated LMA insertion and ETT intubations (for IPPV) that LMA did significantly attenuate (P<o.05) haemodynamic response compared to ETT group which is as like as our study. They also showed the cardiovascular response to extubation was similar in both LMA & ETT group[4].

Kihara et al has demonstrated that LMA had no significant change on heart rate, $s_y$stolic blood pressure,diastolic blood pressure compared to Macintosch laryngoscopy in hypertensive patient[9]. An our study we used normotensive sample and found the same result. However, for reason less understood. Kihara et al did not found significant high pressure response in ETT group in normotensive patient. One reason may be they used propofol as induction agent which has better haemodynamic attenuation than thropentone induction[10]. The later was used in our sample. Propofol 2 mg/kg induction was used in Yamallchl et al series where they used LMA in normotensive and hypertensive group and compared to both groups and found similar haemodynamic response and concluded that propofol is an effective induction method preventing adverse cardiac response to LMA. But they did not compare with ETT.

Braude N et al compared the haemodynamic response of LMA insertion with insertion of oropharyngeal airway. They showed that small rise in heart rate, blood pressure and infra ocular pressure of LMA insertion compared with that of oropharyngeal airway. In our study less rise of heart rate, systolic blood pressure, diastolic blood pressure in LMA insertion compared with that of ETT intubations.

Holders R et al showed an attenuated pressure response associated with laryngeal manic airway insertion compared with conventional laryngoscopy and tracheal intubation '.In our Study we observed similar results.

CONCLUSION

We conclude that LMA insertion causes less changes of haemodynamic parameters when compared with that of ETT intubations. Our finding suggests that LMA can be safe and beneficial alternative to ETT for fit patients undergoing short surgical procedure.

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