

A COMPARATIVE STUDY OF PROPOFOL VERSUS SEVOFLURANE FOR LARYNGEAL MASK AIRWAY INSERTION IN PATIENTS UNDERGOING BURNS SURGERY.

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ABSTRACT :

Background and objectives: The laryngeal mask airway[LMA] provides a useful alternative for airway management during spontaneous or controlled ventilation. LMA can be inserted successfully after suppression of airway reflexes under deep anesthesia using intravenous propofol or inhalational method using sevoflurane. The anesthesiologist's priority in burns patients undergoing surgery are to maintain cardiovascular stability & secure airway.

Methods: A cross sectional STUDY WAS CARRIED OUT in 50 patients of ASA group I & II aged between 15-60 years of either sex having burn injury and divided into 2 groups of twenty five each in medical college in Gujarat. Induction time, quality of LMA insertion and complications during insertion as well as post operative was noted.

Patient's vitals were measured before induction, immediately after LMA insertion and 5 min, 8min, & 10 min. after LMA insertion.

Result: Mean induction time was 61.88 ± 6.71 seconds in group A & 92.8 ± 6.55 seconds in group B. LMA was successfully inserted in all cases. In group-A LMA insertion was done in 1st attempt in all patients, while in group-B 5 patients(20%) required 2nd attempt. Decrease in mean arterial pressure after LMA insertion in group-A was significant compare to group-B. *in group-A there was higher incidence of hypotension, apnoea >30 seconds and pain on injection site while in group-B there was high incidence of coughing during insertion and PONV.*

Conclusion: Our study found that *both propofol & sevoflurane provide good quality of anesthesia for insertion of LMA in burns patients. As sevoflurane causes less hemodynamic changes than propofol which is beneficial in burns patients. So sevoflurane is better alternative to propofol for laryngeal mask airway insertion*

Key Words: LMA , propofol, sevoflurane, burns patient, hemodynamic changes.

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INTRODUCTION:-

The laryngeal mask airway[LMA] provides a useful alternative for airway management during spontaneous or controlled ventilation¹. Over last decade LMA has gained widespread acceptance. LMA can be inserted successfully after suppression of airway reflexes under deep anesthesia using intravenous propofol or inhalational method using sevoflurane².

Propofol has the advantages of rapid and smooth induction with depression of upper airway reflexes³. It provides rapid recovery with less post operative nausea and vomiting.

Sevoflurane is recently introduced halogenated volatile anesthetic agent with pleasant odour and low blood gas solubility, it does not irritate the airway and allows rapid smooth induction and recovery⁴. The anesthesiologist's priority in burns patients undergoing surgery are to maintain cardiovascular stability & secure airway.

Abnormalities in response to depolarizing and nondepolarising muscle relaxants in thermally injured patients have been recognized for many years⁵. As LMA can be inserted without use of muscle relaxant it is better alternative to endotracheal intubation. Direct thermal injury to head and neck will result in difficulty in securing the airway making the use of LMA very useful.

Severely contracted neck is a particular problem which may be best managed using a mask or LMA, until contracture has been surgically released before intubation⁵.

Therefore this study was conducted to compare intravenous method using propofol and inhalation method using sevoflurane for insertion of LMA in patient undergoing burns surgery.

METHOD:-

THIS cross sectional STUDY WAS CARRIED OUT in 50 patients of ASA group I & II aged between 15-60 years of either sex having burn injury and divided into 2 groups of twenty five each. The aims of study are induction time (time required to loss of eyelash reflex), quality of LMA insertion, complications during attempted LMA insertion, analysis of hemodynamic parameters, and post operative complications.

EXCLUSION CRITERIA

- 1) Cardiovascular, renal or liver dysfunction
- 2) Drug allergy
- 3) History of bronchial asthma or COPD
- 4) Potential risk of gastric regurgitation

Each patient was assessed preoperatively, explained about the procedure. A written informed consent was taken. Routine and special investigations according to history of medical illness were advised. All the patients were checked for adequate mouth opening & neck extension. Patients were kept nil orally for at least 6 hours pre-operatively & 4 hours post-operatively. In operation theatre all routine monitors were applied. A large vein was catheterized by NO. 18 venous canula. Patients were pre-medicated by giving inj. Glycopyrolate-0.2 mg/kg I.V, inj. Midazolam -0.02mg/kg I.V and inj. Fentanyl -2microgram/kg I.V. Pre-oxygenation with 100% O₂ was done for 3 min before induction. Vitals were recorded just before induction.

Induction method

GROUP-A[intravenous]

Patient received propofol [1%]2.5mg/kg[4ml/10sec] until loss of eyelash reflex.

GROUP-B[Inhalation]

Patient received a mixture of 8% sevoflurane+50% O₂ 8 l/min via face mask until loss of eyelash reflex.

Patient's vitals were measured before induction, immediately after LMA insertion and 5 min, 8min, & 10 min. after LMA insertion. Appropriate size laryngeal mask airway was inserted with patient in intubation position[sniffing position] after applying lignocaine gel on back surface of LMA, after inflating the cuff and connecting it to Bain circuit. The LMA was inserted after the eyelash reflex has been lost. Conditions for LMA insertion was noted with reference to jaw opening, ease of LMA insertion and attempts of insertion.

Complications during LMA insertion like Apnoea>30 sec., coughing, gagging, laryngospasm, bronchospasm, patient movements were noted. Patients were maintained using O₂,N₂O, propofol infusion(4mg/kg/hr) in group A & O₂, N₂O, sevoflurane (2-3%) in group B.

After completion of surgery, LMA was taken out under deeper plane of anesthesia after deflating the cuff and suctioning the secretions if present.

All the patients were observed for post operative complications like excitatory phenomena, pain on injection site, nausea and vomiting.

The statistical analysis of data was done by using student's t-test and chi square test was used for difference of proportions. P<0.05 was considered significant

Results :-

Demographic data and physical status in both the groups were comparable. Mean induction time group-A and group-B was 61.88 ± 6.71 / 92.8 ± 6.55 seconds respectively which was statistically extremely significant ($p < 0.0001$).

Quality of LMA insertion was noted with reference to jaw opening, ease of LMA insertion and attempt of LMA insertion as shown in table-1

Complications during LMA insertions were noted as shown in table-2. Post operative complications were noted as shown in table-3.

Hemodynamic parameters – Mean arterial pressure and Heart Rate were noted at regular interval as shown in chart -1 and chart-2 respectively. ECG findings and Spo2 remains stable throughout the surgery in both the groups.

Table-1: Quality of LMA insertion.

		Grade	Group-A	Group-B
1.Jaw opening	Full	0	23(92%)	20(80%)
	Partial	1	2(8%)	5(20%)
	Impossible	2	0	0
2.Ease of insertion	Easy	0	23(92%)	20(20%)
	Difficult	1	2(8%)	5(20%)
	Impossible	2	0	0
3.Attempts		First	25(100%)	20(80%)
		Second	0	5(20%)

Table-2: Complications during LMA insertion

	Group-A	Group-B
1.Apnoea>30sec	14(56%)	0
2.Coughing	0	5(20%)
3.Gagging	0	0
4.Laryngospasm	0	0
5.Bronchospasm	0	0
6.Patient Movement	2(8%)	2(8%)

Table-3: post operative complications.

	Group-A	Group-B
Excitatory phenomena	2(8%)	0
Pain on injection site	6(24%)	0
Nausea & vomiting	0	4(16%)

Chart-1: Analysis of mean arterial pressure changes

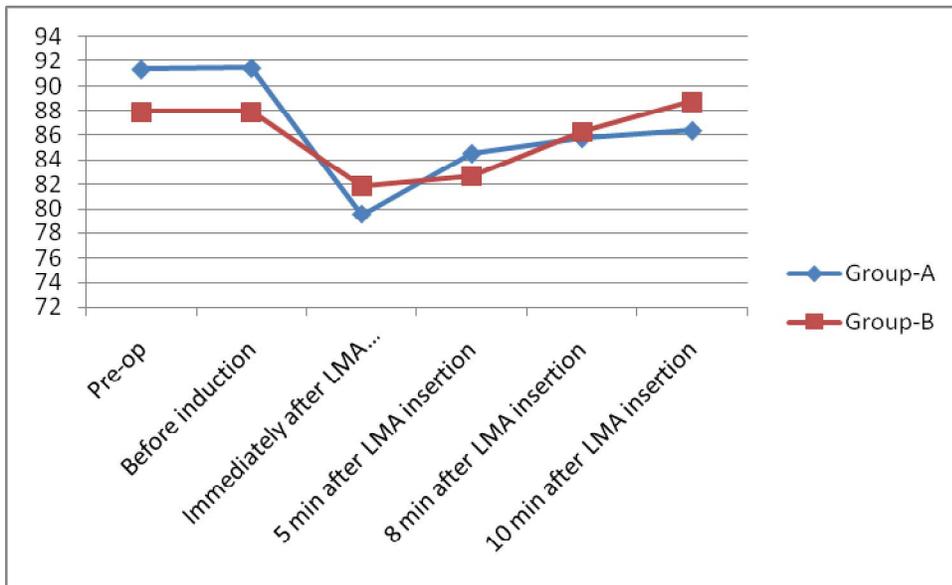
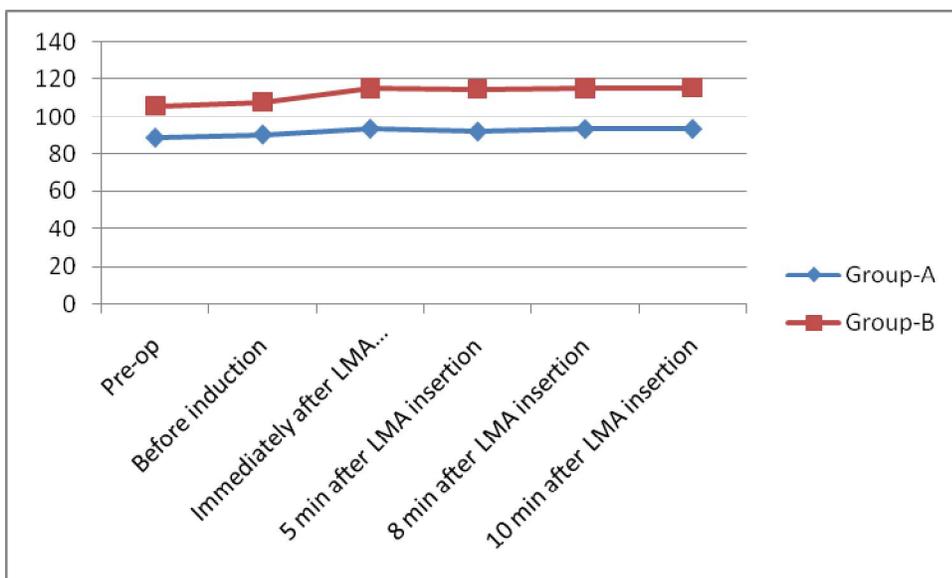


Chart-2: Analysis of heart rate changes



Discussion:-

Anesthesia for the burns patient is great challenge to the anesthesiologist. Access to the airway is difficult because of laryngeal edema, neck contracture, facial edema etc. Burns patient often required many operative procedure in short succession. LMA is therefore most useful device to prevent tracheal tube damage in burns patient.

This study was done to compare the quality of insertion of LMA in burns patient using intravenous method (inj. Propofol 2.5 mg/kg) and inhalation method (sevoflurane 8% + O₂ 50% + N₂O 50%, 8L/min). All patients were premedicated with inj. Glycopyrrolate, inj. Fentanyl and inj. Midazolam.

Demographic and physical status of both groups were comparable.

Mean induction time was 61.88±6.71 seconds in group A while it was 92.8±6.55 seconds in group B. Induction time was longer in sevoflurane group. In Group A shortest induction time was 50 seconds and longest time was 76 seconds. While in Group B shortest induction time was 84 seconds and longest tie was 104 seconds. Ismail Kati(2003)⁶ in their study compared LMA insertion time, hemodynamic changes and complications in patients anesthetized by inhalation of sevoflurane with those of intravenous induction with propofol. Our results were comparable with their study.

Full jaw opening with easy LMA insertion was possible in 92% patients in group-A while 80% patients in group-B. There was partial jaw opening in 8% patients in group A while 20% patients in group B.

LMA was successfully inserted in all cases. In group-A LMA insertion was done in 1st attempt in all patients, while in group-B 5 patients (20%) required 2nd attempt. This was comparable with earlier study [Lian Kah Ti(1999)]⁴ who compared quality and ease of LMA insertion after either single vital capacity breath of sevoflurane 8% or intravenous propofol 3mg/kg.

In group-A 14 patients (56%) had apnoea >30 seconds while none had in group B. [Lian Kah Ti(1999)] coughing was not seen in any patients in group-A while it was seen in 5 patients(20%) in group-B.

Immediately after LMA insertion in propofol group 88% patients had increase in heart <10 and 4% patients had increase in range of 11-20, while in sevoflurane group 12% patients had increase in heart rate <10 and 88% patients had heart rate increase in range of 11-20.

Immediately after LMA insertion neither patient having heart rate 20/min.

Immediately after LMA insertion in propofol group 84% patients had decrease in systolic blood pressure upto 20 mm hg, hile in sevoflurane group 96% patients had decrease in systolic <10 mm Hg. Mean arterial pressure reduced significantly in group A than group B immediately after LMA insertion. Thus decrease in mean arterial pressure after LMA insertion in propofol group was extremely significant compare to sevoflurane group. This was comparable with earlier study [Ismail Kati(2003)].

Pain on injection site was observed in 6 patients(24%) and excitatory phenomena in 2 patients(8%)s. nausea & vomiting was not observed in any patient in Group-A. No patient had excitatory phenomena but nausea & vomiting was observed in 4 (16%) patients in group –B.

Conclusion:-

Propofol and sevoflurane both provides rapid and smooth induction of anesthesia and recovery. Propofol had shorter induction time with full jaw opening and easy LMA insertion. There was no post operative nausea & vomiting in propofol group. However propofol was associated with hypotension, apnoea>30 seconds and pain on injection site. Sevoflurane had longer induction time with comparable jaw opening and LMA insertion. There was no incidence of hypotension in sevoflurane group but has higher incidence of post operative nausea and vomiting.

To conclude with both propofol & sevoflurane provide good quality of anesthesia for insertion of LMA in burns patients. As sevoflurane causes less hemodynamic changes than propofol which is beneficial in burns patients who are already hemodynamically compromised. So sevoflurane is better alternative to propofol for laryngeal mask airway insertion in patients undergoing burns surgery.

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