Research Paper

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A COMPARATIVE STUDY OF AGENTS (PROPOFOL AND THIOPENTONE WITH LOCAL ANAESTHETIC SPRAY) FOR LARYNGEAL MASK AIRWAY INSERTION.

Medical Science

KEYWORDS : LARYNGEAL MASK AIRWAY, PROPOFOL, THIOPENTONE, LOCAL ANAESTHETIC SPRAY.

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ABSTRACT

Background: To assess whether the application of lignocaine to the posterior oropharynx prior to the use of thiopentone would allow the insertion of an LMA as easy as following propofol. A prospective randomized double blind study was conducted on 80 patients of ASA1&2 between the age group of 18-60 yrs undergoing various elective minor surgical procedures under general anaesthesia. Patients were randomly divided into two groups of 40 each. In group B or thiopentone group, the patients were given 3 sprays of 10% lignocaine to the posterior oropharynx before preoxygenation and anaesthesia was induced with thiopentone 5mg/kg IV. In group A after preoxygenation anaesthesia was induced with propofol 2.5mg/kg IV. An appropriate size of LMA was introduced.The anaesthesiologist who performed the LMA insertion also graded the LMA insertion conditions using six variables i.e mouth opening, coughing, gagging, laryngospasm, limb movements & ease of insertion in a three point scale. The six variables, three point scores were then summed to give an overall insertion condition score. The haemodynamic parameters, namely pulse rate, BP, respiratory rate and SpO2 were monitored. There were no statistically significant differences regarding the insertion conditions for LMA insertion between the two groups. Fall in blood pressure (systolic & diastolic) and respiratory depression was significantly greater in the propofol group compared to thiopentone with local anaesthetic spray group.

INTRODUCTION:

The laryngeal mask is a new form of airway (LMA), which is introduced blindly into the hypopharynx to form a seal around the larynx. It has been shown to provide a clear airway and leaves the anaesthesiologist's hands free.[2]

In order to introduce LMA during anaesthesia, one require an induction agent eg; propofol or thiopentone which are the most commonly used induction agents.[3] The insertion of LMA requires the abolition of upper airway reflexes to prevent gagging, coughing and laryngospasm.

Thiopentone has been assessed for the insertion of an LMA but produces less satisfactory conditions than propofol. This may be because propofol is more effective at suppressing airway reflexes than thiopentone.[5] Various drugs are used as adjuvants to thiopentone to decrease the incidence of adverse responses to insertion of the LMA like,

- Lidocaine topical or IV
- Benzodiazepines like Midazolam
- Low dose muscle relaxants like atracurium.

Hence, the present study is designed to assess whether the application of lignocaine to the posterior oropharynx prior to the use of thiopentone would allow the insertion of an LMA as easy as following propofol.

METHODS:

A prospective randomized double blind study was conducted on 80 patients of ASA1&2 between the age group of 18-60 yrs undergoing various elective minor surgical procedures under general anaesthesia. Patients were randomly divided into two groups of 40 each.

Group A – Propofol group
n=40
Group B – Thiopentone with local anaesthetic spray group
n=40

Inclusion criteria:

- ASA grade 1&2
- Age 18-60 yrs
- Weight 30-80kg
- Who give informed valid consent

Scheduled to undergo various elective minor surgical procedure under general anaesthesia

Exclusion criteria:

1. Risk of gastric aspiration
2. Smokers
3. Patients undergoing oral surgeries
4. Grossly obese patients
5. Those with respiratory diseases
6. ASA grade 3&4 patients

ANAESTHETIC TECHNIQUE:

On arrival at the operation theatre, an intravenous line was secured and the patient's baseline vital data were recorded using pulse oximeter (for O2 saturation), ECG and NIBP. Both groups received Inj.Glycopyrrolate (0.2mg) IV, Inj.Midazolam (0.05mg/kg) IV and Inj. Pentazocin (0.3mg/kg) IV prior to induction.

All patients were preoxygenated for 3 minutes. In group B or thiopentone group, the patients were given 3 sprays of 10% lignocaine to the posterior oropharynx before preoxygenation and anaesthesia was induced with thiopentone 5mg/kg IV. In group A after preoxygenation anaesthesia was induced with propofol 2.5mgkg IV. Loss of eyelash reflex was considered as the end point of induction in both groups. An appropriate size of LMA was introduced using standard technique by an experienced anaesthesiologists blinded to the dose and type of induction agent. He stayed outside the anaesthetic room during the initial induction period and was called after the loss of eyelash reflex for the insertion of the LMA. If the depth of anaesthesia was inadequate, propofol or thiopentone was repeated in a dose of 0.5mg/kg or 1mg/kg respectively. The cuff was inflated with the recommended volume of air. Proper placement was assured by observing bag movements, and auscultating chest for bilateral equal air entry. Following LMA insertion, anaesthesia was maintained with nitrous oxide in oxygen along with halothane with the patient breathing spontaneously.

The anaesthesiologist who performed the LMA insertion also graded the LMA insertion conditions accordingly to[6]

- Mouth opening - 3= Full, 2= Partial, 1= Nil,
- Coughing - 3= Nil, 2= Mild, 1= Severe
- Gagging - 3= Nil, 2= Mild, 1= Severe
- Laryngospasm - 3= Nil, 2= Mild, 1= Severe
- Limb movements - 3= Nil, 2= Mild, 1= Severe
- Ease of insertion - 3= Easy, 2= Difficult, 1= Impossible

The six variables, three point scores were then summed to give an overall insertion condition score.[33]

Total scoreInsertion condition

18	Excellent
16-17	Satisfactory
<16	Poor

The haemodynamic parameters, namely

- Pulse rate
- Non-invasive blood pressures (systolic and diastolic),
- Respiratory rate
- SpO_2 were monitored at baseline, 30 sec after induction, 1,2,3,5,10,& 15 min after insertion of LMA.

STATISTICAL ANALYSIS:

Data was analysed using students't' test for parametric data and Chi square test and Fisher's exact test for non parametric data. A value of p<0.05 was considered statistically significant.

RESULTS:

Demographic data such as age, sex, weight are comparable in both the groups.

Table 1:Distribution of patients according to Mouth Opening

Mouth opening	Group A n=40	Group B n=40
Full	37 (92.5%)	36 (90%)
Partial	3 (7.5%)	4 (10%)
Nil	-	-

Table 2:Distribution of patients according to occurrence of Coughing , Gagging, Laryngospasm& Limb movements;

	NIL Group A	NIL Group B	MILD Group A	MILD Group B	SEVERE Group A	SEVERE Group B
Coughing	40 (100%)	39 (97.5%)	-	1 (2.5%)	-	-
Gagging	38 (95%)	38 (95%)	2 (5%)	2 (5%)	-	-
Laryngospasm	40 (100%)	40 (100%)	-	-	-	-
Limb movements	37 (92.5%)	38 (95%)	3 (7.5%)	2 (5%)	-	-

Table 3:Distribution of patients according to Ease of insertion

Ease of insertion	Group A n=40	Group B n=40
Easy	39 (97.5%)	38 (95%)
Difficult	1 (2.5%)	2 (5%)
Impossible	-	-

Table 4:Distribution of patients according to Overall insertion scores

Overall insertion scores	Group A n=40	Group B n=40
Excellent	35 (87.5%)	34 (85%)
Satisfactory	5 (12.5%)	6 (15%)
Poor	-	-

Table 5: Changes in Mean Systolic BP& Mean Diastolic BP;

	SBP		P VALUE	DBP		P VALUE
	GROUP A	GROUP B		GROUP A	GROUP B	
BASAL	118.85±9.32	120±7.6	>0.05(NS)	75.25±6.03	76.9±5.3	>0.05(NS)
30SEC AFTER INDUCTION	100.5±8.51	113±25	<0.001(S)	62.85±5.48	73±5.33	<0.001(S)
1MIN AFTER INSERTION OF LMA	97.55±8.12	126.9±7.45	<0.001(S)	61±5.6	82.7±5.13	<0.001(S)
2MIN	95.2±8.21	125.9±7.35	<0.001(S)	59.8±4.7	81.45±5.06	<0.001(S)
3MIN	95.65±7.08	126.35±6.5	<0.001(S)	60.15±3.90	80.55±4.77	<0.001(S)
5MIN	98.9±6.29	125.3±5.93	<0.001(S)	61.85±3.34	79.1±3.29	<0.001(S)
10MIN	102.3±5.73	123.6±7.58	<0.001(S)	64.35±3.64	76.7±4.63	<0.001(S)
15MIN	109.9±5.10	121.55±6.84	<0.001(S)	70.9±2.82	76.15±4.25	<0.001(S)

DISCUSSION:

In 1981 Dr Archie Brain began looking at the anatomy of the upper airway and he began the development of the laryngeal mask airway.[8] It was designed primarily as a means of offering some of the advantages of endotracheal intubation while avoiding this fundamental disadvantage, since the vocal cords need be neither visualized nor forced apart.

Satisfactory insertion of the LMA requires suppression of airway reflexes. A popular method of providing anaesthesia for LMA insertion is with the use of IV propofol, which has the advantage

of inducing anaesthesia rapidly and depressing upper airway reflexes.9However, propofol is expensive and painful on injection. It is associated with a greater ventilatory depression and longer apnea than is thiopentone. Propofol also causes greater cardiovascular depression than thiopentone during induction of anaesthesia. A less expensive and more cardiorespiratory stable alternative to propofol induction would be advantageous.

Lignocaine, a local anaesthetic in an intravenous or topical form has been widely used to decrease the laryngopharynx response to stimulation. Its usefulness in decreasing the hemodynamic response to laryngoscopy and intubation is well documented. Intravenous lidocaine acts by a direct depressant action on the central nervous system while the topical form acts by anaesthetising peripheral cough receptors in the hypopharynx and trachea in addition to central action after systemic absorption.**7**

Vandana Talwar, Rajesh Pattanayak, Sujesh Bansal **6**conducted a study to compare the efficiency of the two most commonly used induction agents, thiopentone and propofol, in facilitating insertion of the LMA in 50 ASA 1 patients. They assessed conditions for LMA insertion using six variables on a three point scale. We observed mouth opening in a three point scale which was comparable in both the groups (table 1).

In our study (Table no 2), the incidence of coughing was comparable in both the groups (A=0(0%) vs B=1(2.5%). Geeta Bhandari, Rajendra K, Singh, Poonam Bhadoria**7** conducted a study to assess the efficacy of topical v/s intravenous lidocaine prior to intravenous thiopentone in providing good conditions for LMA insertion. They observed that group receiving topical lidocaine had lower incidence of coughing compared to group receiving I.V lidocaine, which was statistically significant.

In our study, (Table no 2) 2 (5%) patients in each group showed mild grade of gagging which was comparable between the two groups. In Vandana Talwar, Rajesh Pattanayak, Sujesh Bansal**6** study 1(4%) patient in propofol group and 2(8%) patients in thiopentone group showed mild grade of gagging which was statistically insignificant. G.W. Brown, N. Patel, F.R. Ellis**2** in 1991, compared propofol and thiopentone for laryngeal mask insertion. They observed significantly higher incidence of gagging in the thiopentone group ($p<0.01$) probably due the fact that thiopentone alone suppresses airway reflexes less efficient compared to propofol.

In our study (Table no 2) none of the patients developed laryngospasm in both the groups. S Keerthi Kumar**3** also showed statistically insignificant difference in the incidence of laryngospasm between the two groups indicating topical lignocaine suppresses the airway reflexes.

In our study (Table no 2) 37(92.5%) patients in group A and 38(95%) patients in group B showed nil response with respect to limb movements. Mild limb movements were present in 3(7.5%) and 2(5%) patients of group A and group B respectively. None of the patients had severe limb movements in both the groups. The incidence was statistically insignificant. The ease of insertion of LMA was easy when adequate mouth opening, sufficient anaesthetic depth and adequate suppression of airway reflexes were achieved. In our study (Table no 3) ease of insertion was easy in 97.5% of patients in group A and 95% of patients in group B. Difficulty in insertion was observed in 1(2.5%) patient in group A and 2(5%) patients in group B which was statistically insignificant.

The six variables, three point scores were summed to give an overall insertion condition score. In our study, (Table no 4) excellent insertion score was observed in 35(87.5%) and 34(85%) patients in group A and group B respectively. Insertion score was satisfactory in 5(12.5%) patients of group A and 6(15%) patients of group B. None of the patients had poor insertion score in both the groups.

Blood pressure both systolic and diastolic was measured (Table no 5). The Mean basal systolic/diastolic blood pressure was 118.85±9.32/75.25±6.03 mm of Hg and 120±7.6/76.9±5.3 mm of Hg in group A and group B respectively which were comparable. After the induction the Mean basal systolic/diastolic blood pressure was 100.5±8.51/62.85±5.48mm of Hg and 113±25/73±5.33mm of Hg in group A and group B respectively. We observed that there was decrease in blood pressure after the induction in both the groups, but decrease was more in propofol group compared to thiopentone group which was statistically significant.

In our present study we observed the effects of both the induction agents on respiratory rate. The mean basal respiratory rate in group A was 16.6±1.21and in group B was 16.2±1.8 which were comparable ($P>0.05$). In group A the decrease in respiratory rate after induction and 1, 2, 3 min after insertion of LMA was statistically significant compared to group B. After that there was no statistically significant difference in respiratory rate between two groups indicating propofol causes greater initial ventilatory depression. G.W. Brown, N. Patel, F.R. Ellis **2** noted that induction of anaesthesia with Propofol was accompanied by a greater degree of ventilatory depression than following Thiopentone.

CONCLUSION:

In conclusion, we have shown that if 30 mg of topical lignocaine is sprayed onto the posterior pharyngeal wall 3 min before induction of anaesthesia with thiopentone, the conditions for insertion of an LMA are equal to those following an equipotent dose of propofol, but with greater haemodynamic stability and significantly less respiratory depression with more cost effectiveness.

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