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RESEARCH ARTICLE

A COMPARATIVE STUDY OF PROPOFOL AND THIOPENTONE WITH LOCAL ANAESTHETIC SPRAY AS INDUCING AGENTS FOR I-GEL INSERTION

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Abstract

Introduction:-

Satisfactory insertion of the I-GEL requires suppression of airway reflexes. A popular method of providing anaesthesia for I-GEL insertion is with the use of IV propofol, which has the advantage of inducing anaesthesia rapidly and depressing upper airway reflexes.[1]

However, 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 thiopental during induction of anaesthesia. A less expensive and more cardiorespiratory stable alternative to propofol induction would be advantageous.

Thiopentone has been assessed for the insertion of supraglottic airway but produces less satisfactory conditions than propofol. This may be because propofol is more effective at suppressing airway reflexes than thiopentone.[2] 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.[3]

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

Material & Methods:-

The study was conducted at Tertiary care teaching hospital, Ahmedabad during the period of July 2019 to June 2020.

This was a prospective randomized double blind study, conducted on 30 patients. Objectives were to compare the insertion conditions to i-gel insertion with the most commonly used induction agents, (A) propofol and (B) thiopentone along with a local anaesthetic spray as well as to assess which induction agent is more suitable and cost effective for insertion of i-gel in our hospital condition & to compare the hemodynamic changes during i-gel insertion in these two groups.

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Patients having ASA grade 1&2, between the age group of 18-60 years undergoing various elective minor surgical procedures under general anaesthesia and willing to give written informed consent were included in the study. Patients who were grossly obese, smokers, having respiratory disease, risk of gastric aspiration & undergoing oral surgeries were excluded from the studies.

Patients were randomly divided into two groups of 30 each.
Group A (Propofol group), n=30- after preoxygenation anaesthesia was induced with propofol 2.5mg/kg IV.

Group B (Thiopentone with local anaesthetic spray group), n=30- the patients were given 3 sprays of 10% lignocaine to the posterior oropharynx before pre-oxygenation and anaesthesia was induced with thiopentone 5mg/kg IV.

An appropriate size of I-Gel was introduced using standard technique by an experienced anaesthesiologists blinded to the dose and type of induction agent.

I- gel insertion conditions were graded in terms of Mouth opening, coughing, gagging, laryngospasm, limb movements, ease of insertion, The six variables, three point scores were then summed to give an overall insertion condition score.

Total score	Insertion condition
18	Excellent
16-17	Satisfactory
<16	Poor

Post- operatively hemodynamic parameters and sore- throat were assessed.

Result:-

Mouth opening	Group A (n=30)	Group B (n=30)
Full	28 (93.33%)	29 (96.66%)
Partial	2 (6.66%)	1 (3.33%)
Nil	-	-

Table 1: Distribution of patients according to Mouth opening

Table 1 is showimg distribution of patients according to mouth opening. Mouth opening was graded as full in 28(93.33%) patients in group A and 29(96.66%) in group B patients, it was graded as partial in 2(6.66%) patients in group A and 1(3.33%) patients in group B. None of the patient showed nil grade of mouth opening. The incidence was comparable in both the groups ($p>0.05$).

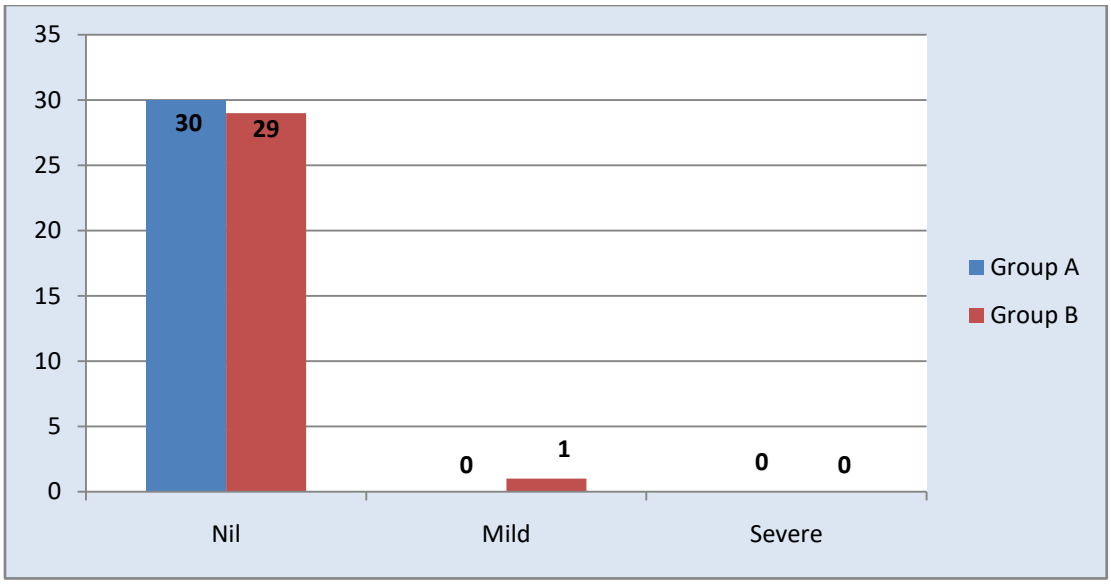

Figure 1: Distribution of patients according to occurrence of coughing

Figure 1is showing distribution of patients according to the second variable i.e. coughing. In group A none of the patients had coughing of any grade. In group B nil response was observed in 29(96.66%) patients and mild grade of coughing in 1(3.33%) patient (p>0.05).

Nil response was observed in 29(96.66%) of patients in both the groups and 1(3.33%) patient in each group showed mild grade of gagging. None of the patients showed severe grade of gagging. The response was comparable in both the groups (p>0.05).

None of the patients developed laryngospasm in both the groups.
28(93.33%) patients in group A and 29(96.66%) patients in group B showed nil response with respect to limb movements. Mild limb movements were present in 2(6.66%) and 1(3.33%) patients of group A and group B respectively. None of the patients had severe limb movements in both the groups (p >0.05).

29(96.66%) patients in group A and 28(93.33%) patients in group B had easy insertion of I GEL. Difficulty in insertion was observed in 1(3.33%) patient in group A and 2(6.66%) patients in group B. None of the patients came into the impossible category in both the groups (p >0.05).

Overall summation of scores of six variables: Excellent insertion score was observed in 25(83.33%) and 24(80%) patients in group A and group B respectively. Insertion score was satisfactory in 5(16.66%) patients of group A and 6(20%) patients of group B. None of the patients had poor insertion score in both the groups (p >0.05).

The mean basal pulse rate in group A was 85.2±2.32 and in group B was 85.8±5.95 which were comparable (P>0.05). There were no statistically significant differences in mean pulse rate between the two groups throughout the study.

The Mean Systolic/Diastolic blood pressure was 118.06±9.99/73.53±7.42 mm of Hg and 119±9.16/74.4±6.69 in group A and group B respectively which were comparable. Post-induction there was a significant decrease in blood pressure (P<0.05) in group A compared to group B. The blood pressure in group A was significantly lower compared to group B after the induction and till the end of the study. (figure 2 & figure 3)

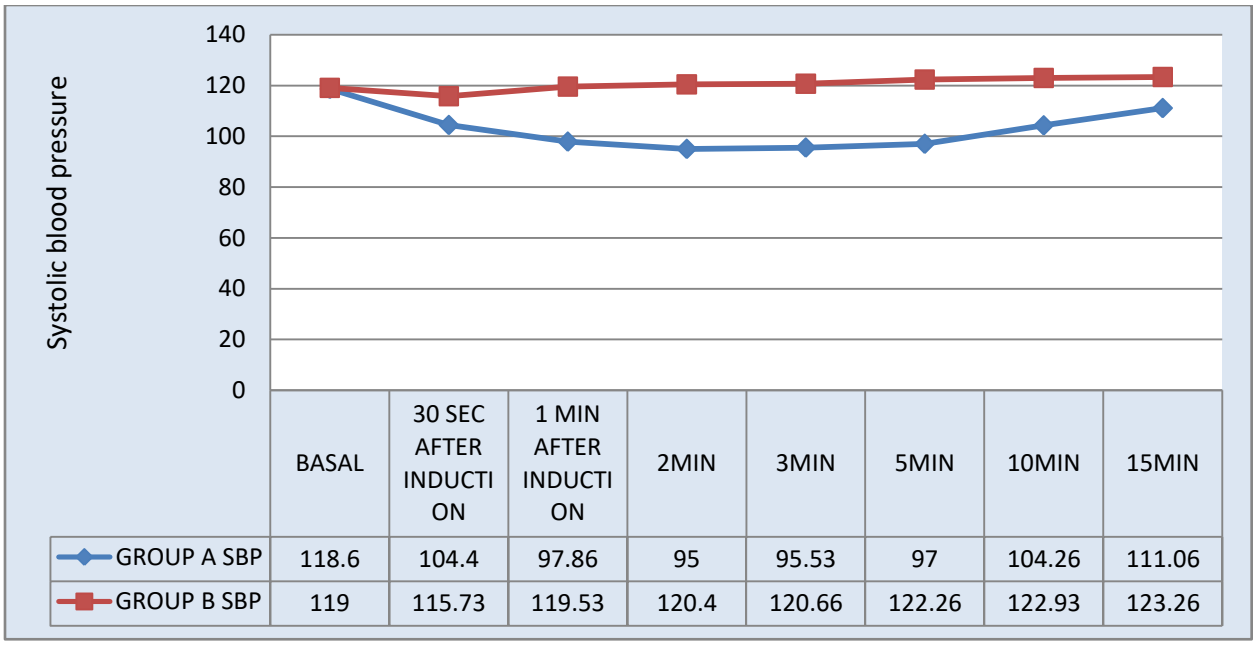

Figure 2: Changes in Mean Systolic BP

Table 2 shows changes in mean respiratory rate in both groups. The mean basal respiratory rate in group A was 16.3±1.39 and in group B was 15.8±1.39 which were comparable (P>0.05). In group A, the decrease in respiratory rate after induction and 1,2,3 min after insertion of I-Gel was statistically significant (P<0.05) compared to group B. After that no statistically significant difference in respiratory rate between two groups was observed.

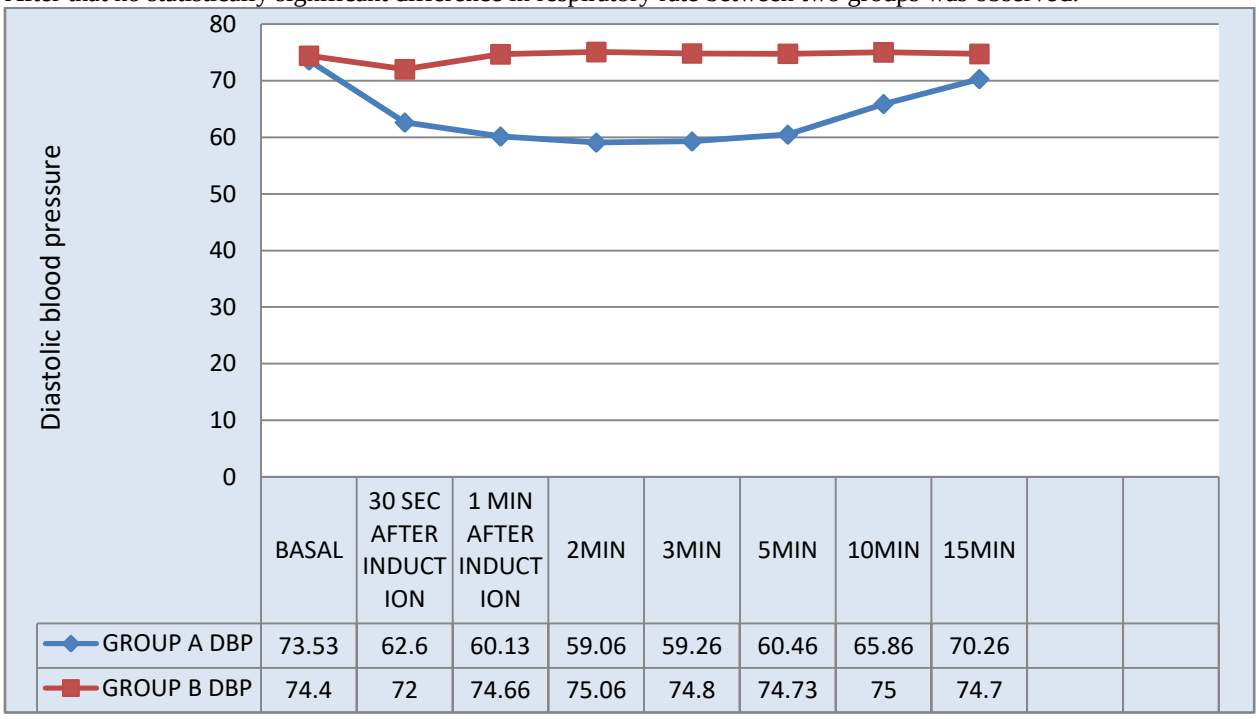

Figure 3: Changes in Mean diastolic BP

	RESPIRATORY RATE		P VALUE
	GROUP A	GROUP B	
BASAL	16.3±1.39	15.8±1.39	0.06897
30 SEC AFTER INDUCTION	11.4±1.64	14.8±1.78	**0.00863**
1 MIN AFTER INSERTION OF I-GEL	10±1.75	15.46±1.47	<**0.00001**
2 MIN	11±1.42	15.66±1.38	**0.000021**
3 MIN	14.13±1.43	15.76±2.8	**0.000071**
5 MIN	15.03±1.6	16.2±1.46	0.386481
10 MIN	16±1.18	16.7±1.16	1
15 MIN	16.3±0.95	16.7±1.02	0.122266
P value < 0.05 → S (significant) P value > 0.05 → NS (not significant)			

Table 2: Changes in Mean Respiratory rate in breaths/min

The mean SpO2 in group A was 99.06±0.25 and group B was 99.03±1.02 which were comparable. No significant difference in mean SpO2 between the two groups during the study.

Post- operative sore throat was observed in 3(10%) and 2(6.66%) in group A and group B respectively. The incidence was comparable in both the groups (p>0.05).

Discussion:-

Vandana Talwar, Rajesh Pattanayak, Sujesh Bansal[4] 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. They observed mouth opening in a three point scale which was comparable in both the groups. Out of 25 patients in propofol group 22 patients showed full mouth opening and 3 patients showed partial mouth opening. In thiopentone group 20 patients showed full mouth opening and 5 patients showed partial mouth opening. None of the patients showed nil grade of mouth opening. Our study correlates with this study.

Driver. I, Wilson .C, Wiltshire.S, Mills. P, HowardGriffin. R[5] assessed conditions for LMA insertion, comparing the co induction with Midazolam-alfentanil-propofol and Midazolam-alfentanil- thiopentone. They also observed mouth opening in a three point scale and full mouth opening was observed in 32 patients in propofol group(n=35) and 29 in thiopentone group(n=35). Three patients in each group showed partial grade of mouth opening. 3 patients in thiopentone group showed impossible grade of mouth opening compared to none in propofol group. The observations were found statistically insignificant between the two groups. Coughing and gagging are potent upper airway reflexes, triggered by irritation of the larynx or epiglottis and preventing foreign material entering the trachea and lungs.

In a study conducted by C.R. Seavell, T.M.Cook, C.M.Cox[2], coughing was present in one patient in thiopentone group compared to none in propofol group. The incidence was comparable between the two groups.

S Keerthi Kumar[6] studied the effectiveness of the thiopentone along with local anaesthetic spray to the larynx, with that of propofol for insertion of LMA. Out of 200 patients in each group, 5(2.5%) patients in propofol group and 4 patients in thiopentone group developed coughing which was statistically insignificant.

In C.R. Seavell, T.M.Cook, C.M.Cox[2] study 2 patients had laryngospasm in thiopentone group compared to none in propofol group which was statistically insignificant.

S Keerthi Kumar[6] also showed statistically insignificant difference in the incidence of laryngospasm between the two groups indicating topical lignocaine suppresses the airway reflexes.

In our study 28(93.33%) patients in group A and 29(96.66%) patients in group B showed nil response with respect to limb movements. Mild limb movements were present in 2(6.66%) and 1(3.33%) 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.
In S Keerthi Kumar[6]study 3(1.5%) patients in propofol group and 4(2%) patients in thiopentone group moved head and limbs during LMA insertion which was comparable between the groups. Our results correlate with this study.

In our study, the basal mean pulse rate was 85.2±2.32 beats per min and 85.8±5.95 in group A and group B respectively. Changes in mean pulse rate were comparable between the two groups till the end of the study. C.R. Seavell, T.M. Cook, C.M. Cox [2] observed that there was no significant difference in heart rate between the two groups. They observed the blood pressure (systolic & diastolic) at baseline, post induction and 1min after the insertion of LMA. The Mean basal systolic/diastolic blood pressure was 136±21/75±11 mm of Hg and 137±18/74±10 mm of Hg in propofol group and thiopentone group respectively which were comparable.

Conclusion:-

We have observed 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 I-Gel 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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