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Comparison between Propofol and Thiopentone for Laryngeal Mask Airway Insertion in Day Care Surgery

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Abstract **Original Research Article**

Background: Insertion of Laryngeal Mask Airway (LMA) requires an adequate depth of anesthesia. Optimal insertion conditions and hemodynamic stability during LMA insertion are mainly influenced by the choice of the intravenous induction agent. Propofol was recommended as a standard induction agent for LMA insertion. ***Objective:*** To assess the effectiveness of thiopentone compared to propofol on LMA insertion. ***Material and Methods:*** A prospective study conducted at tertiary care hospital in department of Anaesthesia from March 2019 to April 2020 in 80 patients randomized into propofol group (Group A) and thiopentone group (Group B). ***Result:*** There was easy insertion of LMA in all the patients of group A whereas in group B satisfactory conditions were seen in 8 patients for insertion of LMA. This result was found statistically significant (<0.001) though no insertion failure was noticed in either groups. ***Conclusion:*** This study demonstrated that for smooth insertion of LMA Thiopentone sodium is a cost effective and safe alternative for Propofol.

Keywords: Laryngeal Mask Airway, Thiopentone, Propofol.

INTRODUCTION

The Laryngeal Mask Airway (LMA) is a supraglottic airway device that is designed to provide and maintain a seal around the laryngeal inlet for spontaneous as well as positive pressure controlled ventilation [1]. The use of LMA is well established in anesthetic practice. LMA precludes the need for tracheal intubation during positive pressure ventilation [2]. Successful insertion of LMA requires sufficient depth of anesthesia and depression of airway reflexes to avoid gagging, coughing and laryngospasm. It is popular because of its easy insertion technique and for providing a secured airway for patients in spontaneous ventilation [3, 4].

Propofol is considered the drug of choice for LMA insertion during induction of anesthesia because of its depressant effect on airway reflexes. The induction dose is 1-2.5 gm / kg body weight. It has got smooth recovery with no hangover effect [5-6]. As a matter of fact propofol and LMA insertion has become synonymous. However, there are some problems related to the use of propofol, for example pain on injection, fall in blood pressure and high cost of the drug etc [7].

Thiopentone sodium is another common intravenous induction agent. It is used in a dose of 5-7 mg/kg body weight. The hypnotic action is potent and consciousness is usually regained in 5-10 minutes. Elimination half life is 11 hours so recovery is slow and there are more chances of hang over effect. Although thiopentone is cheaper but propofol is preferred over it for outpatient anasethesia because it does not suppress airway reflexes adequately [8-10].

We conducted this comparative study of propofol and thiopentone sodium as induction agent for LMA insertion in short procedures and also compared side effects after insertion in both the drugs. The effort was to improve the quality of anesthesia with a better induction agent for LMA insertion and using better anesthetic technique to avoid the postoperative complications.

MATERIAL AND METHODS

After approval from institutional ethical committee, this prospective randomized controlled study was carried out in 80 patients, aged between 18 to 45 years of ASA grade I and II, posted for short surgical procedures like fibro adenoma excision, incision and

drainage of abscess, release of contractures etc. The exclusion criteria included patient's refusal, patients with increased risk of aspiration, any known airway or pharyngeal pathology, anticipated difficult airway like Mallampatti grade III and IV, mouth opening less than two finger, thyromental distance less than 6 cm etc. Two groups were formed in our study, Group A (Propofol group) and Group B (Thiopentone group) each comprising of 40 patients. Written informed consent and fasting status of the patient was confirmed. In the operation theatre, IV line was secured with 20G cannula and pre-medication was done with Inj glycopyrolate 0.2mg and Inj midazolam 0.02 mg/kg 10 min prior to induction. Routine vital parameters were recorded using – five lead ECG, NIBP, pulse oximeter. After premedication and pre oxygenation for 3 minutes, anaesthesia was induced with propofol 2 mg/kg in patients of group A and thiopentone sodium 5 mg/kg in group B. In both groups of patients inducing doses were titrated to loss of verbal contact, loss of eye lash reflex and relaxation of jaw. After confirming the possibility of bag and mask ventilation, the proper size classic LMA according to weight of the patient was chosen. All the patients were graded for incidence of coughing, gagging /swallowing, laryngospasm and limb movements according to table 1, ease of insertion and jaw relaxation were graded according to table 2. We have not used any muscle relaxants for insertion of LMA. Maintenance was done with oxygen, nitrous oxide and inhalational anaesthetic agent. After completion of the procedure the supraglottic device was removed in the deeper plane with the patient on spontaneous ventilation to avoid any kind of complication. The patients were observed with bag mask till they became fully awake and were following all verbal commands. Patients were shifted to recovery after vocalizing.

Table-1: Adverse response to airway manipulation grading

1	Absent	No adverse response
2	Mild	Response lasting < 5 seconds
3	Moderate	Lasting > 5seconds, but subsiding within 20 seconds
4	Severe	Lasted > 20 seconds or extra boluses of drugs required

Table-2: Grading of ease of insertion and jaw relaxation

Excellent	No adverse response
Satisfactory	Mild adverse response to laryngeal mask airway insertion, but not resulting in failure of insertion.
Poor	Moderate/ severe adverse response or > 2 attempts needed to insert laryngeal mask airway.

STATISTICAL ANALYSIS

Data was tabulated using Microsoft excel (2016) and was analyzed using SPSS software. Means of two groups were compared using independent Student's t-test, ANOVA test. P-value of <0.05 was considered to be statistically significant.

RESULTS

The demographic profile of all the patients in group A and group B were comparable. Mean procedure time was also found not significant (Table 3).

Table-3: Demographic profile

	Group A	**Group B**	**p-value with significance**
Mean Age (years)	39.36 ± 7.8	37.30 ± 6.0	0.824 (NS)
Mean weight (kgs)	58.2 ± 4.8	59.34 ± 5.6	0.329 (NS)
Gender (M/F)	18 / 22	19 / 21	0.615 (NS)
Mean procedure time (min)	37.24	40.23	0.789 (NS)

Mild coughing was observed in 2 patients of group A, and 4 patients of group B (p=0.32). Mild degree of swallowing/gagging was present in 10 patients of group A compared to 14 patients of group B. while moderate degree of swallowing/gagging was present in 5 patients of group B and not seen in group A (p< 0.01 significant). Mild laryngospasm was noticed only in one patient of group B which was not a significant finding. There were mild limb movements in 2 patients of group A whereas in 8 patients of group B (p<0.01 significant) (Table 4).

Table-4: Adverse response to airway manipulation grading

Response	Grading	Group A	Group B	P value
Coughing	1 2 3 4	36 04 00 00	38 02 00 00	0.32
Gagging/ swallowing	1 2 3 4	26 14 00 00	25 10 05 00	<0.001
Laryngospasm	1 2 3 4	40 00 00 00	39 01 00 00	0.890
Limb movements	1 2 3 4	38 02 00 00	32 08 00 00	<0.001

Jaw relaxation was excellent in both the groups except one patient in group B showed satisfactory relaxation. There was an easy insertion of LMA in all the patients of group A as compared to group B where in 8 patients satisfactory conditions for insertion of LMA were found. This result was found statistically significant (<0.001) though no insertion failure was noticed in both the groups (Table 5).

Table-5: Ease of insertion and jaw relaxation

	Grading	Group A	Group B	P value
Jaw relaxation	Excellent Satisfactory Poor	40 00 00	39 01 00	0.321
Ease of insertion	Excellent Satisfactory Poor	40 00 00	32 08 00	<0.001

DISCUSSION

Insertion of the supraglottic device is relatively a non-stimulating procedure as compared to endotracheal tube placement, as instrumentation and manipulation of structures associated with noxious reflex responses are avoided. Intravenous propofol has been the induction agent of choice for LMA insertion because it provides smooth induction with depression of airway reflexes. But it is also associated with several side effects, including pain on injection, myoclonus, apnea, hypotension, anaphylactic reaction and rarely, thrombophlebitis of the vein. Propofol is likely to cause profound hypotension in hypovolemic or previously hypertensive patients and those with cardiac disease as compared to thiopentone. Despite of these side effects propofol is an ideal drug for day care surgery because of its rapid recovery, no cumulative effects and lower incidence of nausea and vomiting. Thiopentone is the cheapest drug, easily available and commonly used compared to propofol which is relatively expensive and not easily available in rural setup. In a quest to find a better induction agent for LMA insertion we compared propofol with thiopentone in short surgical procedures.

Appropriate time for LMA insertion was guided by the loss of response to jaw thrust. Similar findings were shown by Drage *et al* in their study [11]. Our results have resemblance with the findings in the study of Talwar *et al* who found that LMA insertion was easier with propofol as compared to thiopentone group which was statistically significant ($P < 0.05$) [12]. This finding also corroborates with the study of Acalovschi *et al* where they observed that ease of LMA insertion was statistically very highly significant with propofol than with thiopentone ($P < 0.001$) [13]. Observations made by Nishiyama and Hanaok *et al*, Nakazawa *et al* and Talwar *et al* were also similar to our study [12,14,15]. There were fewer incidences of gagging, head movement and laryngospasm in propofol group as compared to thiopentone group that corroborates with Talwar *et al*, Scanlon *et al* and Brown and Ellis [17].

K.Mc Keating, I.M.Bali and J.W.Dandee studied the effects of thiopentone and propofol on upper airway integrity. They opined that depressed pharyngeal reflexes were observed more often with propofol than after thiopentone [18].

Hidekazu Yukioka *et al* observed that intravenous lidocaine in a dose of 2 mg/kg was effective in blocking cough reflex during tracheal intubation [19]. In our study we have not used any

topical or intravenous local anaesthetic agent, which may be used in future studies as it may improve ease of insertion of supraglottic devices.

In our study the undesired responses was found to be slightly more in thiopentone group compared to propofol group though they were statistically comparable. However, some studies concluded that thiopentone sodium with opoid does increase the depth of anaesthesia to facilitate smooth insertion of LMA with minimum side effects.

CONCLUSION

Ease of insertion of LMA was significantly greater in patients who were induced with propofol compared to induction with thiopentone sodium. This study demonstrated that for smooth insertion of LMA thiopentone sodium is a cost effective and safe alternative for propofol.

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