

# Comparison of Efficacy of Propofol 1% and Propofol 0.5% Admixture with Thiopentone 1% in Terms of Hemodynamic Stability and Ease of Insertion of LMA Among Paediatric Patients Undergoing Elective General Surgical Procedures

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## ABSTRACT

**Objective:** To compare the efficacy of propofol 1% and propofol 0.5% admixture with thiopentone 1% in terms of Hemodynamic stability and ease of insertion of LMA among paediatric patients undergoing elective general surgical procedures.

**Patients and Methods:** It was a randomized controlled trial conducted at Pediatric Surgery Department, Mayo Hospital Lahore, for a period of 6 months from 02-06-2019 to 19-12-2019. A total of 104 patients aged 3-12 years of either gender undergoing elective general surgery were included and divided in two equal groups. 10 ml of propofol 1% was given to Group A and for Group B, propofol 1%, thiopentone 2% was mixed in a 1:1 ratio. Ease of insertion of LMA was scored according to LMA Insertion Score. The hemodynamics (pulse and blood pressure) was monitored after 1 minute and after 3 minutes.

**Results:** The mean age of patients in group A was  $7.38 \pm 1.95$  years and in group B was  $7.44 \pm 2.05$  years. Out of these 104 patients, 60 (57.69%) were male and 44 (42.31%) were females. Ease of insertion was found in 37 (71.15%) group A (propofol 1%) patients and in 46 (88.46%) group B (propofol 0.5% admixture with thiopentone 1%) patients (p-value = 0.028). Hemodynamic stability was found in 27 (51.92%) patients of group A and in 41 (78.86%) patients of group B (p-value = 0.004).

**Conclusion:** The efficacy of propofol 0.5% admixture with thiopentone 1% is better in terms of hemodynamic stability and ease of insertion of LMA among paediatric patients undergoing elective general surgical procedures as compared to propofol 1%.

**Keywords:** Laryngeal mask airway, thiopentone, Hemodynamic stability.

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## INTRODUCTION

The number of children with age less than 18 years admitted for elective surgery per annum has been estimated about 450,000. Out of which 25% are younger than 3 years of age.<sup>1</sup> Airway management is one of prime concern during anesthesia. One of the most controversial issues in pediatric anesthesia has revolved around the choice of induction agent especially in upper respiratory tract infection and in critical illness.<sup>2</sup> In 2014, it was reported that the perioperative cardiac arrest rates are still high and similar in the underdeveloped and developed countries.<sup>3-5</sup>

With invention of LMA, it has become possible to maintain airway without endotracheal intubation especially in short procedures, day care surgery and difficult airway.<sup>6,7</sup> Use of the laryngoscope and tracheal tube during induction of general anesthesia results in many complications such as sore throat, cough, vocal cord injury and injection of muscle relaxants to facilitate the endotracheal intubation.<sup>8</sup> LMA insertion needs suppressing airway reflexes and sufficient depth of anesthesia to prevent adverse effects like gagging, coughing, involuntary movements, laryngospasm and bronchospasm and to maintain hemodynamic stability during insertion of LMA.<sup>9,10</sup>

Thiopentone an excellent induction agent cannot be used alone for LMA insertion because of its excitatory

effect on the laryngeal reflexes.<sup>11-13</sup> Propofol has been successfully used, however, it has certain cardiovascular effects which can be deleterious in susceptible individuals. In children, this direct suppression of cardiac function may be exaggerated as cardiac output is dependent on heart rate. It may lead to circulatory collapse and cardiac arrest.<sup>14</sup>

The aim of this study was to compare the efficacy of propofol 1% and propofol 0.5% admixture with thiopentone 1% in terms of Hemodynamic stability and ease of insertion of LMA among paediatric patients undergoing elective general surgical procedures

## PATIENTS AND METHODS

This randomized controlled trial was conducted at operation theatre of Pediatric Surgery Department, Mayo Hospital Lahore during the period 20-06-2019 to 19-12-2019. Sample size of 104 patients (52 patients in each group) was estimated by using 5% level of significance, 90% power of test with expected %age propofol and thiopentone as 51% and propofol as 78%.<sup>14</sup> Non-probability, convenience sampling was used. Patients with age between 3-12 years of age with weigh more than 10kg, from either gender undergoing elective general surgery. Pre-anesthesia evaluation of all patients was made with ASA class I and II for inclusion in study. However, patients with risk of regurgitation documented on pre anesthesia

evaluation form, patients with predicted difficult airway documented on pre anesthesia evaluation form and patients with known allergy to either agents were excluded from study on patient's history were excluded from study. A written informed consent was obtained from the attendants of patients.

Patients were randomly divided into two groups. General anesthesia was induced by same anesthetist. On dorsum of non-dominant hand, A 22 gauge cannula was inserted. The patients were monitored for oxygen saturation (SpO<sub>2</sub>), electrocardiography (ECG), heart rate (HR) and non-invasive blood pressure (NIBP); intravenous nalbuphine 0.1 mg/kg was administered for postoperative pain and dexamethasone 0.2mg/kg for control of postoperative nausea and vomiting. Preoperative Pulse and BP was recorded. 10 ml syringes were used for preparation of intravenous induction agents. 10 ml of propofol 1% for Group A and for Group B, in propofol 1%, thiopentone 2% was mixed in a 1:1 ratio. The induction agent either propofol 1% or an admixture of thiopentone and propofol, both at the dose of 0.25ml/kg was given over 30 seconds. An appropriate size LMA was inserted by anesthesiologist who is blinded to drugs. Ease of insertion of LMA was scored according to LMA insertion Score. The

hemodynamics (pulse and blood pressure) was monitored after 1 minute and after 3 minutes. Additional boluses of same agent was given if LMA insertion become difficult, to achieve the required conditions.

All the data was analyzed using SPSS version 20. Comparison of two groups (Propofol 1% and Admixture group) was checked by Chi-square test. P value ≤ 0.05 was taken as significant.

## RESULTS

Age range in this study was from 3 to 12 years with mean age of 7.41 ± 2.01 years. The mean age of patients in group A was 7.38 ± 1.95 years and in group B was 7.44 ± 2.05 years. The number of patients in age slot of 8-12 years was high i.e 55 (52.88%) as shown in Table 1. Out of these 104 patients, 60 (57.69%) were male and 44 (42.31%) were females with male to female ratio of ratio of 1.4:1.

In this study, ease of insertion was found in 37 (71.15%) group A patients and in 46 (88.46%) group B patients (p-value = 0.028). Hemodynamic stability was found in 27 (51.92%) group A patients and in 41 (78.86%) group B patients (p-value = 0.004) as shown in Table 2.

Table 1: Age distribution for both groups.

Age (Years)	Group A (n=52)		Group B (n=52)		Total	
	No. of patients	%age	No. of patients	%age	No. of patients	%age
3-7	25	48.08	24	46.15	49	47.12
8-12	27	51.92	28	53.85	55	52.88
Mean ± SD	7.38 ± 1.95		7.44 ± 2.05		7.41 ± 2.01	

Table 2: Comparison of Hemodynamic stability in both Groups.

Comparison		Group A (n=46)		Group B (n=46)		p-value
		No.	%age	No.	%age	
Hemodynamic Stability	Yes	27	51.92	41	78.85	0.004
	No	25	48.09	11	21.15	

## DISCUSSION

In anesthetic practice in children, general anesthesia is usually provided by laryngeal mask airway (LMA) as it permits maintenance of clear airway and enables anesthesiologist to have both hands free so the operating surgeon has full field to perform particularly in ophthalmic surgery. Till now, for LMA preferred induction agent is intravenous propofol (1%),<sup>4</sup> but it is not only expensive rather results in causes pain site of injection for that require additional administration of lignocaine.<sup>6,7</sup> This study was conducted to compare the efficacy of propofol 1% and propofol 0.5% admixture with thiopentone 1% in term of hemodynamic stability and ease of insertion of LMA among paediatric patients undergoing elective general surgical procedures.

In my study, I have found ease of insertion in 37 (71.15%) group A patients and in 46 (88.46%) group B patients (p-value = 0.028). In this study hemodynamic stability was seen in 27 (51.92%) group A patients and in 41 (78.86%) group B patients (p-value = 0.004). Satisfactory conditions for LMA insertion were achieved with the propofol thiopentone admixture which was comparable with propofol (73% vs 85%, P>0.05) with no statistically significant difference.<sup>14</sup>

Studies by Yeo et al.<sup>14</sup>, Sinha et al.<sup>13</sup>, and Rashid et al.<sup>15</sup> compared haemodynamics at induction and/or intubation, recovery characteristics (apart from other characteristics too in some of these studies) between thiopentone / propofol and/or an admixture of the two used induction doses of these medications roughly proportionate to a propofol to thiopentone (hypnotic) potency ratio of 1: 2-2.5. Naguib et al.<sup>16</sup> and Grounds et al.<sup>17</sup>, yielded a (hypnotic) potency ratio varying from 1:1.604 to 1:2.2-2.<sup>21</sup> In the studies by Coley et al.<sup>18</sup>, Rashid et al.<sup>15</sup>, and Wong et al.<sup>19</sup>, comparing either the haemodynamic changes after induction and intubation, recovery characteristics or interaction between thiopentone / propofol /admixture, loss of eyelash reflex was considered as end point of induction rather than loss of response to verbal command.

A very strong limitation to the present study was that we didn't compare various side effects between the treatment groups. Long term follow-up to see side effects is also required to establish the efficacy of treatment.

## CONCLUSION

The efficacy of propofol 0.5% admixture with thiopentone 1% is better in terms of hemodynamic stability and ease of insertion of LMA among paediatric patients undergoing

elective general surgical procedures as compared to propofol 1%.

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