

# Haemodynamic Responses to Insertion of Proseal Laryngeal Mask Airway with Sodium Thiopentone Preceded by Topical Lignocaine: A Comparison with Propofol alone

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## ABSTRACT

**BACKGROUND:** Propofol is the most common inducing agent for Laryngeal Mask Airway insertion but it causes haemodynamic instability.

**OBJECTIVE:** To assess haemodynamic responses to insertion of Proseal Laryngeal Mask Airway (pLMA) with sodium thiopentone administration preceded by topical lignocaine and comparing with Propofol.

**METHODS:** 100 patients of either sex in the age range of 16-60 years belonging to ASA I/II scheduled for open cholecystectomy were selected and allocated into one of the two groups. Group I (Propofol group) received Propofol 2.5mg/kg while as Group II (Thiopentone group) received topical lignocaine and intravenous sodium thiopentone for pLMA insertion. All patients received fentanyl 1µg/kg intravenously 3 minutes before induction. Haemodynamic parameters like pulse rate, mean systolic and diastolic blood pressures between the two groups were compared.

**RESULTS:** The decrease in pulse rate, systolic and diastolic pressures in propofol group was more as compared to topical lignocaine and sodium thiopentone group while inserting pLMA. Number of attempts of pLMA insertion and oxygen saturation were same between the two groups when pLMA was inserted but the duration of apnoea was more in propofol than in topical lignocaine and sodium thiopentone group. Thus we concluded that sodium thiopentone administration preceded by topical lignocaine provided more haemodynamic stability as compared to propofol while Proseal LMA insertion. JMS 2010;13(2):56-59

**Key Words:** Propofol, Proseal Laryngeal Mask Airway (pLMA), Laryngospasm

Endotracheal intubation is regarded as a gold standard technique for maintaining airway but this technique needs an expert for intubation and is associated with increased pressure response and postoperative complications like sorethroat.<sup>1</sup> Airway management has been revolutionized with new airway

devices.<sup>2</sup> LMA is one of the new supraglottic airway devices used commonly to maintain airway. LMA is an alternative to endotracheal intubation and facemask for spontaneous as well as controlled positive pressure ventilation.<sup>3-5</sup> Compared to facemask, it provides better seal in edentulous patients or if the patient has beard. Besides it keeps anesthesiologists hands free, so fatigue is less and remote observation is possible.<sup>2,6</sup> LMA has become popular in airway management during elective anaesthesia and difficulty airway situation as well as emergency situation.<sup>7</sup>

Propofol is the most commonly used inducing agent for insertion of LMA.<sup>8</sup> A depolarizing muscle relaxant is not

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necessary for insertion of LMA, thus avoiding succinylcholine induced muscle pain which is particularly of benefit when early ambulation is important.<sup>9</sup> In the setting of day care anaesthesia with its emphasis on early ambulation, newer induction agent propofol with its short elimination<sup>9</sup> and rapid clearance was introduced. The drug is not available in all countries and is expensive, so its routine use has been questioned.<sup>10,11</sup> Comparison has therefore been made between propofol and other induction agents including sodium thiopentone for insertion of Proseal LMA.<sup>9</sup> These studies showed propofol to be a better agent causing less gagging, coughing and laryngospasm when compared with sodium thiopentone but provided haemodynamic instability. The present study was designed to assess haemodynamic responses obtained with topical lignocaine and sodium thiopentone during Proseal LMA insertion and compared them with propofol administration.

## Methods

After obtaining the approval from Institutional Ethics Committee, one hundred patients of either sex in the age range of 16-60 years belonging to ASAI/II scheduled for open cholecystectomy were selected. Informed consent of every patient was taken. Proseal LMA was used for this study. Patients with gross obesity, severe hypertension, severe diabetes, ischemic heart diseases and history of allergy to thiopentone, lignocaine and propofol were excluded from this study. Patients were randomly allocated to two groups of 50 patients each.

**Group-I:** Propofol group received injection propofol 1% in the dose of 2.5mg/kg body weight over 30 seconds as an induction agent.

**Group-II:** Sodium thiopentone group received injection sodium thiopentone (2.5%) in the dose of 5mg/kg body weight over 30 seconds as an induction agent preceded by three minutes four sprays of topical lignocaine 10%. Out of four sprays of lignocaine, two were applied on each side of posterior pharynx.

Preanaesthetic evaluation was done at least 24hrs prior to surgery and patients were advised to remain fasting for 12 hrs. In the operating room multichannel monitor was attached to the patient and baseline parameters including pulse rate, blood pressure, oxygen saturation and ECG were recorded. All patients received injection fentanyl 1 µg/kg body weight intravenously three minutes before induction. Patients were preoxygenated

with 100% oxygen. Induction of anaesthesia was done with one of the two techniques mentioned above. Appropriate sized Proseal LMA was inserted by one of the anaesthesiologist who did not know the type of induction technique employed. Blood pressure, pulse rate, oxygen saturation and ECG were recorded at 30 seconds after induction, 1 and 3 minutes after Proseal LMA insertion.

Number of attempts required for successful insertion of pLMA was recorded. Apnoea time was also recorded. Apnoea time is the time interval during which the patient stops breathing and is measured from start of apnoea to start of spontaneous respiration. During this period patient's lungs were not manually ventilated. They received neither volatile anaesthetic agents nor nitrous oxide. Once the patient starts spontaneous respiration, non-depolarizing muscle relaxant was given and anaesthesia was maintained by oxygen and nitrous oxide (50% : 50%) with vapours of isoflourane. After completion of surgery, neuromuscular block was reversed. Postoperative complications including sore throat were recorded. Statistical analysis was done using student's 't' test, Manyt-Whitney test, chi square and odds ratio.

## Results

In our study there were no significant differences among the two groups with respect to age, sex, body weight and ASA status of the patient as shown in Table 1. The mean pulse rate, systolic and diastolic blood pressures are shown in Table 2. The difference in mean pulse rate before induction between the two

**Table 1: Demographic profile in the two groups. (Mean ±SD)**

	Propofol Group	Sodium thiopentone Group
Age(years)	45 ± 9.5*	43 ± 9
Sex(M:F)	82:18	80:20
Body (Weight)	54.8 ± 6.2	53.8 ± 5.7
ASA (I: II)	88:12	88:12

\*Mean ± SD

groups was statistically insignificant, however after induction at 30s, 60s and 180s, it was 75.6 ± 9.6, 69.3 ± 6.2 and 68.9 ± 5.3 in GI while as it was 81.1 ± 7.4, 76.7 ± 6.3 and 74.7 ± 5.1 in GII respectively. The Statistical comparison between the two groups

**Table 2: Comparison of haemodynamic parameters in the two groups (Mean ± SD)**

	Propofol Group				Sodium thiopentone Group			
	Baseline	30s	60s	180s	Baseline	30s	60s	180s
Pulse(bpm)	86.9 ± 6.9	75.6 ± 9.6	69.3 ± 6.2	68.9 ± 5.3	85.3 ± 7.7	81.8 ± 7.4	76.7 ± 6.3	74.7 ± 5.1
Systolic blood pressure(mmHg)	126.1 ± 10.8	104.6 ± 6.9	99.8 ± 6.2	105.6 ± 6.8	123.5 ± 12.2	116. ± 18.1	113.4 ± 7.5	118 ± 7.8
Diastolic blood pressure(mmHg)	78.7 ± 8.2	68.2 ± 6.3	66.8 ± 5.8	70.8 ± 4.0	78.4 ± 8.0	75.3 ± 5.0	76 ± 4.7	77.3 ± 4.9

\*Mean ± SD

after induction at 30s, 60s and 180s was significant ( $p < 0.05$ ). Preinduction systolic blood pressure comparison between the two groups was statistically insignificant. The mean values of systolic blood pressure at 30s, 60s and 180s in GI were  $104.6 \pm 6.9$ ,  $99.8 \pm 6.2$  and  $105.6 \pm 6.8$  while as in GII were  $116.1 \pm 8.1$ ,  $113.4 \pm 7.5$  and  $118 \pm 7.8$  respectively. Statistical comparison of systolic blood pressure at 30s, 60s and 180s between the two groups was significant ( $p < 0.05$ ). Preinduction diastolic blood pressure comparison between the two groups was statistically insignificant. The mean values of diastolic blood pressure at 30s, 60s, 180s in Group I were  $68.2 \pm 6.3$ ,  $66.8 \pm 5.8$  and  $70.8 \pm 4$  while as in Group II were  $75.3 \pm 5.0$ ,  $76.0 \pm 4.7$  and  $77.3 \pm 4.9$  respectively. Statistical comparison of diastolic blood pressure at 30s, 60s and 180s between the two groups was statistically significant ( $p < 0.05$ ).

The mean duration of apnoea in Group I was  $108 \pm 15.1$  and in Group II was  $74.4 \pm 10.1$  as shown in Table 3. These values were statistically compared and the result obtained was significant ( $p < 0.05$ ). In Group I pLMA was inserted in first attempt in 86% patients and in second attempt in 14% patients

**Table 3: Comparison of different parameters in the two groups**

	Group I	Group II
Apnoea time(seconds)	$108 \pm 15.1$	$74 \pm 10.1$
Number of attempts of P LMA insertion 1:2	86:14	86:14
Intraoperative course	Uneventful	Uneventful

while in Group II pLMA was inserted in first attempt in 86% and in second attempt in 14% of patients. These results were statistically compared and found insignificant ( $p > 0.05$ ). Intraoperative course of all patients remained uneventful. Oxygen saturation ( $SpO_2$ ) between the two groups remained 99-100% and difference between two groups was statistically insignificant. All patients completed the study. In the postoperative period patients remained without complications except some patients developed sore throat which was statistically insignificant between two groups ( $p > 0.05$ ).

## Discussion

Insertion of Proseal LMA needs abolition of airway reflexes and pressure responses. This is most commonly achieved by using propofol as an induction agent. But this drug is costlier one and is not available in all countries. These things make one to assess and think for an alternative induction agent. Many induction agents have been used for this purpose. Propofol provided satisfactory conditions for pLMA insertion as compared to other agents but caused haemodynamic instability.<sup>9,12</sup> The reason being that propofol suppresses airway reflexes and pressure responses more effectively as compared to sodium thiopentone. This study was done to assess the haemodynamics responses obtained with use of topical lignocaine prior to sodium thiopentone administration during

Proseal LMA insertion and were compared with those obtained with propofol administration.

Demographic factors like age, weight, sex and age distributions were more or less same and statistically insignificant between the two groups. Initially heart rate remained normal due to adequate premedication by fentanyl. Insertion of Proseal LMA causes pressure responses due to sympathetic stimulation. Propofol induction caused decrease in heart rate, systolic and diastolic pressures while pLMA insertion and resulted in haemodynamic instability. Topical lignocaine was used in this study prior to sodium thiopentone induction to abolish airway reflexes and haemodynamic responses, which resulted in better haemodynamic stability while pLMA insertion. In our study, decline in heart rate, systolic and diastolic blood pressures occurred more in propofol group at 30, 60 and 180 seconds after Proseal LMA insertion than in topical lignocaine and sodium thiopentone. S. Carlier and Van Akin<sup>13</sup> in 1989 found a decrease in heart rate after propofol administration. C.R. Seavell *et al*<sup>8</sup> 1996, G.C. Cumings *et al*<sup>14</sup> 1984 and S. Carlier *et al*<sup>15</sup> 1989 found a greater fall in systolic as well as diastolic blood pressures in Propofol group than in Thiopentone group. Our study also showed the same results. Thus topical lignocaine and sodium thiopentone provided better haemodynamic stability during Proseal LMA insertion than Propofol.

Duration of apnoea was more in propofol Group (108 sec) as compared to Thiopentone Group (74 sec) and difference between two groups was statistically significant. CR Seavell *et al*<sup>8</sup> found a mean duration of apnoea of 103 sec in propofol group as compared to 65.4 sec in thiopentone group. Propofol is a potent respiratory depressant. Proseal LMA was inserted in both groups in the first attempt in most of patients. Seven patients out of 50 in each group needed second attempt for successful insertion of pLMA. C.R. Seavel<sup>18</sup> found that LMA was inserted in first attempt in all patients successfully. Only five out of 44 in propofol group and four out of 46 in Thiopentone group needed second attempt for insertion of pLMA. No patient had a fall in oxygen saturation while inserting pLMA. No patient developed complication intraoperatively and postoperatively over a period of 12 hours except sore throat which was found in equal numbers in both groups and was found to be statistically insignificant.

We conclude that topical lignocaine and sodium thiopentone provides better haemodynamic stability while Proseal LMA insertion than propofol but duration of apnoea was more in propofol group.

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