COMPARISON OF MIDAZOLAM AND MINI DOSE SUCCINYLCHOLINE IN AIDING LMA INSERTION IN ADULT ELECTIVE SURGERY PATIENTS - A RANDOMISED CLINICAL TRIAL IN GVMC

Rajamani Jayadharmarajan Balamurugan1, Iswaran Chandra Thendral Arasu2
1Senior Assistant Professor, Department of Anaesthesiology, Government Vellore Medical College Hospital, Adukkamparai, Vellore.
2Assistant Professor, Department of Anaesthesiology, Government Vellore Medical College Hospital, Adukkamparai, Vellore.

ABSTRACT

BACKGROUND
The LMA1 has gained widespread acceptance as general purpose airway and is used in up to 30% of patients undergoing general anaesthesia.2-4 The most popular induction agent for LMA insertion continues to be propofol as it obtunds oropharyngeal reflexes.5

MATERIALS AND METHODS
1. All patients were randomly grouped under 2 groups viz., Group A propofol with midazolam, Group B propofol with succinylcholine. Group A received 0.04 mg/kg body weight of midazolam.
2. All patients are pre oxygenated with 100% O2 for 3 min. All patients are then induced with propofol bolus until the endpoint of loss of eye lash reflex is obtained. Then, in group B alone 0.1 mg/kg succinylcholine is injected. We wait for 60 sec. for fasciculations if any and proceed with LMA. Insertion. Patients were then maintained on assisted ventilation with 100% oxygen over a period of 60 sec.

RESULTS
In this study, the conditions of LMA insertion, patient’s response to LMA insertion and the haemodynamic changes7,5,6 during and after LMA insertion6 in the following two groups of patients were observed.
Group A – Inj. Propofol 2.5 mg /kg + 0.04 mg/kg midazolam.
Group B – Inj. Propofol 2.5 mg/kg + 0.1 mg/kg succinylcholine.

CONCLUSION
To conclude, addition of Midazolam (0.04 mg/kg) to the standard dose of propofol provides better LMA insertion conditions than the addition of mini dose Succinylcholine (0.1 mg/kg).

KEYWORDS
Midazolam, Propofol, Succinylcholine.

attempts for insertion, airway trauma and total dose of propofol.

- Patient’s response to insertion of laryngeal mark airway such as gagging, coughing, head and limb movements, laryngospasm, etc.
- Haemodynamic parameters like mean arterial pressure, heart rate and oxygen saturation.

MATERIALS AND METHODS

After obtaining institutional ethical committee clearance and the patient consent, the study was carried out on 50 patients posted for elective surgical procedures lasting less than or equal to 45 min. at Government Vellore Medical College.

Patient belonging to the age group of 18–50 years of both the sexes were selected.

Inclusion Criteria

- Elective short surgical procedures lasting less than or equal to 45 min. patients of ASA physical status I and II.
- Aged between 18 – 50 years of both sexes.

Exclusion Criteria

- Patients with full stomach, pregnant patient.
- Patients posted for emergency surgery.
- Patients with oral, perioral pathology such as tumours, abscess or grossly enlarged tonsils.
- Patients with fixed reduced pulmonary compliance such as pulmonary fibrosis, severe cardiovascular, hepatic or renal disease.

Types of Surgeries

The various types of surface surgeries that were included in this study are shown in Table 1.

<table>
<thead>
<tr>
<th>Types of Surgeries</th>
<th>Group A</th>
<th>Group B</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fibroadenoma Excision</td>
<td>5</td>
<td>8</td>
<td>13</td>
</tr>
<tr>
<td>Epidermoid Cyst Excision</td>
<td>4</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>Hydrocele – Excision and Eversion</td>
<td>2</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Herniorrhaphy</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Ganglion Excision</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Gynaeomastia – Webster’s Procedure</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Haemorrhoids, fissure in ano</td>
<td>3</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Other minor surgeries</td>
<td>6</td>
<td>4</td>
<td>10</td>
</tr>
</tbody>
</table>

Table 1

Patient Preparation

All patients were advised overnight fasting.

Pre-Loading

All patients are preloaded with 10 mL/kg of balanced salt solution.

Pre-Medication

All patients were premedicated with

\textbf{Inj: Glycopyrrolate 4 mcg/kg IV.}

\textbf{Inj: Fentanyl 2 mcg/kg.}

Monitors Used

Noninvasive Blood pressure (NIBP), Electrocardiogram (ECG), Pulse oximetry, ET CO2

Methodology

All patients were randomly grouped under 2 groups viz., Group A propofol with midazolam, Group B propofol with succinylcholine. Group A received 0.04 mg/kg body weight of midazolam.

All patients are preoxygenated with 100% O2 for 3 min. All patients are then induced with propofol bolus until the endpoint of loss of eye lash reflex is obtained. Then in group B alone 0.1 mg/kg succinylcholine is injected. We wait for 60 sec. for fasciculations if any and proceed with LMA insertion. Patients were then maintained on assisted ventilation with 100% oxygen over a period of 60 sec. After 60 sec., well-lubricated LMA was inserted by the standard techniques described in the intravenous manual. During insertion of laryngeal mask airway jaw relaxation, gagging/coughing, heads & limb movements, presence or absence of laryngospasm were noted. If jaw relaxation was found to be inadequate to permit LMA insertion, boluses of propofol were given until adequate jaw relaxation occurred.

Jaw Relaxation

Was graded by Young, Clark, Dundee.

- Adequate – Adequate jaw relaxation and LMA insertion done without any difficulty.
- Incomplete – Inadequate jaw relaxation but LMA insertion is possible with difficulty.
- Poor – Inadequate jaw relaxation and LMA insertion is not possible.

Overall Insertion Conditions

Was graded by Lund and Stovner.

- Excellent - (Insertion – easy, no reaction from the patient).
- Good – (Insertion results in slight cough or movements).
- Poor – (Insertion possible but with marked unacceptable response).

Gagging or Coughing on Insertion

Was graded as present or absent.

Head and Limb Movements

Was graded as present or absent.

After insertion of LMA, cuff was inflated with appropriate volume of air and connected to the breathing circuit. Correct positioning of the LMA was verified by bilateral chest expansion, bilateral air entry by auscultation, capnography and the absence of leak around the cuff. The ventilation was assisted with bag until resumption of spontaneous respiration. Anaesthesia was maintained with oxygen (2 L/min), Nitrous oxide (4 L/min) and Halothane (1%). The haemodynamics were monitored before premedication, 1 minute after LMA insertion and throughout till agents were discontinued and 100% oxygen administered. LMA was removed after the patient had gained adequate level of consciousness and after adequate return of pharyngeal reflexes. After removal of LMA, the patient was observed for any spasm, coughing, vomiting. In the postoperative period, the patients were observed in the ward for 24 hours.
Jemds.com

Statistical Analysis Using Student T-Test
The t-test assesses whether the means of two groups are statistically different from each other. The t-value will be positive if the first mean is larger than the second and negative if it is smaller. Once we compute the t-value we look it up in a table of significance to test whether the ratio is large enough to say that the difference between the groups is not likely to be a chance finding.

RESULTS
This study was conducted and 50 patients were divided into 2 groups of 25 patients each.

Group A – Propofol with midazolam group.
Group B – Propofol with Succinylcholine.

Demographic Profile
In group B, 48% of patients are male and rest 53% are female, while in group A 52% of patients are male and rest female. The mean age of patient is 30.12 and 30.84 in groups A and B respectively. The mean weight is 53 and 53.22 in groups A and B respectively. Patients in each were statistically comparable in relation to sex, age and weight. See Fig. -1.

Comparison of Conditions for LMA Insertion
One –Sample Test

Jaw relaxation, overall insertion conditions and number of attempts for LMA insertion were observed and the results were tabulated as follows. Also see figure 2.

<table>
<thead>
<tr>
<th>Jaw Relaxation</th>
<th>Group A</th>
<th>Group B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adequate</td>
<td>25</td>
<td>16</td>
</tr>
<tr>
<td>Incomplete</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>Poor</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 2

Jaw relaxation was more in group A compared to group B and the results are statistically as shown in tables above.

Overall Ease of Insertion
The overall ease of insertion is graded as excellent, good, poor or unacceptable. The overall ease of insertion was excellent in 100% of group A patients, while it was 44% in group B. See Fig. 3 & Table 5.

Table 3

<table>
<thead>
<tr>
<th>Ease of Insertion</th>
<th>Group A</th>
<th>Group B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>25</td>
<td>11</td>
</tr>
<tr>
<td>Good</td>
<td>0</td>
<td>14</td>
</tr>
<tr>
<td>Poor</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 5
One-Sample Test

The overall insertion conditions are excellent in Group A (Propofol with Midazolam) compared to the other groups and this is statistically significant as shown above.

Number of Attempts for Successful Insertion of LMA
In 100% of patients in group A, LMA was inserted in the first attempt, while in only 64% of patients in group B respectively. This is represented as the following data. See Fig. 4 & Table B.

Comparison of Patient Response to LMA Insertion
Patient movement, gagging, coughing, laryngospasm during LMA insertion were compared between the 2 groups. See Fig. 5.

Patient Movement

<table>
<thead>
<tr>
<th>Patient Moving</th>
<th>Group A</th>
<th>Group B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>No</td>
<td>25</td>
<td>22</td>
</tr>
</tbody>
</table>

Table 11
One-Sample Statistics

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>3</td>
<td>5.00</td>
<td>6.245</td>
<td>3.606</td>
</tr>
<tr>
<td>No</td>
<td>3</td>
<td>20.00</td>
<td>6.245</td>
<td>3.606</td>
</tr>
</tbody>
</table>

Table 12

One-Sample Test

<table>
<thead>
<tr>
<th></th>
<th>t</th>
<th>Df</th>
<th>Sig (2-tailed)</th>
<th>Mean Difference</th>
<th>95% Confidence Interval of the Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lower</td>
</tr>
<tr>
<td>Yes</td>
<td>1.387</td>
<td>2.000</td>
<td>.300</td>
<td>5.000</td>
<td>-10.51</td>
</tr>
<tr>
<td>No</td>
<td>5.547</td>
<td>2.000</td>
<td>.031</td>
<td>20.000</td>
<td>4.49</td>
</tr>
</tbody>
</table>

Table 13

There was no patient movement in all patients in group A, whereas there was movement in 12% of patients in group B, which is statistically very significant. Additional doses of Propofol was used for those patients.

Laryngospasm

<table>
<thead>
<tr>
<th></th>
<th>Group A</th>
<th>Group B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>No</td>
<td>25</td>
<td>25</td>
</tr>
</tbody>
</table>

Table 14

In both the groups, there was no incidence of laryngospasm. Likewise there was no gagging or coughing in both 2 groups.

Total dose of Propofol (mg/kg) Required for LMA Insertion

<table>
<thead>
<tr>
<th></th>
<th>Group A</th>
<th>Group B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Propofol dose (mg/kg)</td>
<td>2.06</td>
<td>2.60</td>
</tr>
</tbody>
</table>

Table 15

One-Sample Statistics

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does</td>
<td>3</td>
<td>2.4733</td>
<td>.36679</td>
<td>.21177</td>
</tr>
</tbody>
</table>

Table 16

The mean total dose of propofol used are 2.06 and 2.60 respectively in group A, B which is also statistically significant.

Airway Trauma

<table>
<thead>
<tr>
<th></th>
<th>Group A</th>
<th>Group B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>No</td>
<td>25</td>
<td>16</td>
</tr>
</tbody>
</table>

Table 18

Also see fig. 6 & Table 18.

One-Sample Test

<table>
<thead>
<tr>
<th></th>
<th>Test Value =0</th>
<th>Test Value =0</th>
<th>Test Value =0</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>t</td>
<td>Df</td>
<td>Sig (2-tailed)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Airway Trauma</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>1.990</td>
<td>2.000</td>
<td>.185</td>
</tr>
<tr>
<td>No</td>
<td>6.788</td>
<td>2.000</td>
<td>.021</td>
</tr>
</tbody>
</table>

Table 20

The incidence of airway trauma as witnessed by blood staining of LMA is 32% in group B, while none of group A had any, which is statistically significant.

Haemodynamic Changes – Pulse Rate and MAP

The mean variability in heart rate (heart rate pre-op minus heart rate 1 min. post-insertion) is least in group A which is statistically significant. The pictorial representation of the
mean variability in heart rate (pre-op heart rate minus 1 min. post-insertion heart rate) is as follows.

Also see Fig. 7 & 8.

### One-Sample Test

<table>
<thead>
<tr>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>HR</td>
<td>3</td>
<td>19.28</td>
<td>2.383</td>
</tr>
</tbody>
</table>

### One-Sample Test

<table>
<thead>
<tr>
<th>t</th>
<th>df</th>
<th>Sig (2-tailed)</th>
<th>Mean Difference</th>
<th>95% Confidence Interval of the Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>HR</td>
<td>14.014</td>
<td>2</td>
<td>.005</td>
<td>19.280</td>
</tr>
</tbody>
</table>

The mean variability in mean arterial pressure (pre-op MAP minus 1 min. post-insertion MAP) is least in case of group A patients than group B, which is statistically significant. There is no change in saturation (SpO2) levels either preop, post-induction or post-insertion between the 2 groups.

### DISCUSSION

Adverse response to insertion of laryngeal mask airway such as gagging, coughing and laryngospasm, may make correct positioning difficult or even impossible. So LMA insertion requires suppression of upper airway reflexes. Although propofol obtunds the upper airway reflexes, Stonham, Bree and Sneyd reported that easy insertion of the LMA was seen in only approximately 60% of patients with Propofol anaesthesia, which means that the sole use of Propofol does not always guarantee successful insertion of LMA, comparisons have been made between various muscles relaxants in the LMA insertion.

Cook TM, Seavel et al compared topical and intravenous lignocaine to insertion of LMA with thiopentone. The group who had lignocaine topical had a lower incidence of laryngospasm. In the present study, there was no incidence of laryngospasm in both the groups.

Wafaa Taha Salem, Dept. of Anaesthesiology, National Cancer Institute, Cairo University investigated the use of
Midazolam or mini dose succinylcholine as a co-induction agent with propofol to facilitate LMA insertion in 60 patients undergoing urological procedures. The patients were divided into 3 groups; Propofol group (P) receiving 2.5 mg/kg Propofol for induction, while group PM received 0.04 mg/kg Midazolam 3 min. pre-induction and group PS received 0.1 mg/kg succinylcholine 30 sec. after propofol. The number of insertion attempts, total dose of propofol, jaw relaxation, gagging, coughing, patient movement, laryngospasm, overall insertion conditions and haemodynamic changes were recorded. Significant reduction in induction dose of propofol was noted in PM groups (40%). Success rate of first attempt was 60%, 95% and 90% in P, PM, PS groups respectively. Group PM showed less Haemodynamic change, overall insertion conditions were excellent in 20%, 75% and 50% respectively in three groups. In our study also total dose of propofol was low by 25% in group A, the ease of insertion and jaw relaxation was graded excellent in 100% of patients in group A. In our study also haemodynamics were stable in group A. Hence, it is concluded that midazolam aids LMA insertion in propofol anaesthesia.

CONCLUSION
To conclude, addition of Midazolam (0.04 mg/kg) to the standard dose of propofol provides better LMA insertion conditions than the addition of mini dose Succinylcholine (0.1 mg/kg).

REFERENCES