INTRODUCTION

Pain after tonsillectomy is due to trigeminal nerve stimulation. Inadequate pain relief after tonsillectomy leads to poor oral intake, which leads to lassitude, delayed recovery of strength and well being. Various methods of postoperative pain relief include infiltration of local anesthetics, Non-steroidal anti-inflammatory drugs, opioids, Glossopharyngeal nerve block, local anaesthetic sprays.

Infiltration of local anesthetics can cause infection, abscess, inadvertent intravascular injection leading to central nervous system and cardiovascular toxicity, hemorrhage, airway obstruction, vocal cord paralysis.

NSAIDs cause bleeding tendency because of inhibition of platelet adhesion. It also causes gastritis, nausea and vomiting. Glossopharyngeal nerve block can cause airway obstruction.

Opioids can produce undesirable side effects like respiratory depression, Pruritis, nausea and vomiting.

Topical anesthetics are rapidly absorbed from mucosal surfaces and hence immediate pain relief is obtained. It is safe and simple to perform without the side effects of other methods.

The use of topically applied local anesthetics is an important component of the atraumatic administration of regional anesthesia.

The concentration of an anesthetic used topically is greater than that same agent administered for local infiltration, central neuraxial blockade and peripheral nerve block. Topical anesthesia is effective on surface tissue (2-3 mm). Peak anesthetic effect following topical blockade and peripheral nerve block. Topical anesthesia is effective on surface tissue (2-3 mm). Peak anesthetic effect following topical application occurs within 2-5 minutes and anesthesia last for 30 to 45 minutes.

In this study we have compared the efficacy of topical analgesia for post tonsillectomy pain with 4% Lignocaine and 0.5% Bupivacaine.

AIM OF THE STUDY

To compare the efficacy of topical application of 4% Lignocaine and 0.5% Bupivacaine in reducing post-operative pain after tonsillectomy.

MATERIALS AND METHODS

The study population consisted of 105 ASA I/II patients in the age group of 8 – 35 years admitted to undergo elective Adeno tonsillectomy in a tertiary care hospital.

The patients were randomly allocated into 3 groups of 35 each.

Group N - Control group where Normal Saline was used

Group L - 4% Lignocaine was used

Group B - 0.5% Bupivacaine was used.

Cases of peritonsillitis, peritonsillar abscess or neoplastic lesions were excluded. The study was approved by the Institutional Ethical Committee and written consent was obtained from the patients. The patients were subjected for anesthetic fitness. ASA grade I &II patients were selected.

All patients were premedicated with Tablet Diazepam 0.2 mg/kg on the night prior to surgery. On the day of surgery, patients were premedicated with Inj. Glycopyrrolate 0.01 mg/kg, 30 minutes prior to surgery. After shifting to the Operating room, intravenous cannula was inserted in the upper limb and Ringer Lactate started. Monitors (NIBP, pulse oximetry, ECG) were connected. Patients were preoxygenated with 100% O2 for 3 minutes. Injection Thiopentone sodium 2.5% 5mg/kg was used for induction. Intubation was facilitated with Injection Succinyl hydrochloride 2mg/kg.

Naso tracheal intubation was done with an appropriate size ETT and secured. Anesthesia was maintained with O2: N2O 50:50, halothane and Inj. Vecuronium 0.1mg/kg. Intermittent positive pressure ventilation was employed with closed circuit or Jackson Rees circuit. Intraoperative fluid therapy was maintained according to Holiday and Segar 4-2-1 formula. After obtaining surgical hemostasis, a gauze measuring 3cm2 soaked in 2ml of Normal Saline or 4% Lignocaine or 0.5% Bupivacaine according to the group was kept in both tonsillar fossae for a period of 3 minutes.

Patients were reversed with Inj. Neostigmine 0.05 mg/kg and Inj. Glycopyrrolate 0.02 mg/kg and extubated after return of reflexes. After ensuring spontaneous respiration with adequate tidal volume, patients were shifted to the recovery room.

Postoperative pain assessment was done by Visual Analogue Scale. Visual Analogue Scale is used to assess pain in children aged 5 or more. It is quick, simple to perform.

The Visual Analogue Scale is most commonly a straight 100 mm line, without demarcation, that has the words “no pain” at the left most end and “worst pain imaginable” at the right most end. Patients are instructed to place a mark on the line indicating the amount of pain that
they feel at the time of the evaluation. The distance of this mark from
the left end is then measured, and this number is used as a numeric
representation of the severity of the pain.

If the pain scoring was more than 5, we have planned to give Inj.
fentanyl 2mcg per kg as rescue analgesic. At each visit pain, dysphagia
and difficulty in speaking were assessed

**OBSERVATIONS AND ANALYSIS**

Statistical analysis was done using SPSS version 12 software.
Sociodemographic details, patient profiles and variables used in this
study were calculated by descriptive analysis. Each group was
compared by using Analysis of Variance (ANOVA) test. Categorical
data were compared after constructing contingency tables and
applying the Chi-square test. A value of P<0.05 was considered
statistically significant.

Hundred and five ASA I / II patients aged between 8-35 years were
taken up for our study and analyzed. They were randomly allocated
into three groups of 35 each namely Group N, Group L and Group B.
The groups were comparable with respect to demographic
characteristics like age, sex, body weight and duration of surgery. In
the postoperative period they were monitored by an observer blinded
to the study.

**Table 1: Demographic variables (Mean ± SD)**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Group N</th>
<th>Group L</th>
<th>Group B</th>
<th>P value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>10.91±2.44</td>
<td>11.09±2.61</td>
<td>11.51±2.34</td>
<td>&gt; 0.05</td>
</tr>
<tr>
<td>Weight</td>
<td>24.37±7.10</td>
<td>24.11±5.94</td>
<td>26.31±7.25</td>
<td>&gt; 0.05</td>
</tr>
<tr>
<td>Duration of surgery(minutes)</td>
<td>40.43±7.94</td>
<td>40.66±6.64</td>
<td>39.69±6.81</td>
<td>&gt; 0.05</td>
</tr>
</tbody>
</table>

* P > 0.05 - Statistically insignificant.

**GRAPH 1: MEAN VALUES OF AGE AND WEIGHT**

This shows that the age distribution among the three groups is almost
the same. The weight range is also almost the same in all the three
groups. Hence, there is no bias in age and weight in all the three groups.
The mean duration of surgery in all the three groups is almost the
same. All the surgeries were done by surgeons of equal experience in
the field and they followed the same technique.

**Table 2: Group Sex Cross tabulation**

<table>
<thead>
<tr>
<th>Group</th>
<th>Sex</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female</td>
<td>51.4%</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>48.6%</td>
</tr>
<tr>
<td>Group N</td>
<td>18</td>
<td>51.4%</td>
</tr>
<tr>
<td>Group L</td>
<td>20</td>
<td>57.1%</td>
</tr>
<tr>
<td>Group B</td>
<td>18</td>
<td>51.4%</td>
</tr>
</tbody>
</table>

**GRAPH 2: SEX DISTRIBUTION**

The sex distribution in the groups is also not of much difference. This is
evidenced by the bar diagram. There is no bias in sex distribution.

**Table 3: Comparison of visual analogue scale in between the
groups**

<table>
<thead>
<tr>
<th>Group</th>
<th>VAS1</th>
<th>VAS2</th>
<th>VAS4</th>
<th>VAS8</th>
<th>Average VAS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>N</td>
<td>Std. Deviation</td>
<td>N</td>
<td>Std. Deviation</td>
</tr>
<tr>
<td>Group N</td>
<td>5.94</td>
<td>35</td>
<td>0.70</td>
<td>11.2</td>
<td>35</td>
</tr>
<tr>
<td>Group L</td>
<td>3.00</td>
<td>35</td>
<td>1.19</td>
<td>0.64</td>
<td>35</td>
</tr>
<tr>
<td>Group B</td>
<td>5.46</td>
<td>35</td>
<td>0.70</td>
<td>3.60</td>
<td>35</td>
</tr>
</tbody>
</table>

**Table 4: ANOVA Table**

<table>
<thead>
<tr>
<th>Group</th>
<th>Sum of squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>VAS1 *</td>
<td>Between Groups (Combined) Within Groups Total</td>
<td>174.229</td>
<td>2</td>
<td>87.11</td>
<td>90.14</td>
</tr>
<tr>
<td></td>
<td>Within Groups Total</td>
<td>98.571</td>
<td>98.571</td>
<td>2</td>
<td>102</td>
</tr>
<tr>
<td>VAS2 *</td>
<td>Between Groups (Combined) Within Groups Total</td>
<td>216.076</td>
<td>2</td>
<td>108.03</td>
<td>151.38</td>
</tr>
<tr>
<td></td>
<td>Within Groups Total</td>
<td>72.914</td>
<td>72.914</td>
<td>2</td>
<td>104</td>
</tr>
<tr>
<td>VAS4 *</td>
<td>Between Groups (Combined) Within Groups Total</td>
<td>158.914</td>
<td>2</td>
<td>79.45</td>
<td>137.16</td>
</tr>
<tr>
<td></td>
<td>Within Groups Total</td>
<td>59.086</td>
<td>59.086</td>
<td>2</td>
<td>104</td>
</tr>
<tr>
<td>VAS8 *</td>
<td>Between Groups (Combined) Within Groups Total</td>
<td>44.705</td>
<td>2</td>
<td>22.35</td>
<td>31.74</td>
</tr>
<tr>
<td></td>
<td>Within Groups Total</td>
<td>71.829</td>
<td>71.829</td>
<td>2</td>
<td>104</td>
</tr>
<tr>
<td>VAS *</td>
<td>Between Groups (Combined) Within Groups Total</td>
<td>86.623</td>
<td>2</td>
<td>43.31</td>
<td>119.11</td>
</tr>
<tr>
<td></td>
<td>Within Groups Total</td>
<td>37.089</td>
<td>37.089</td>
<td>2</td>
<td>104</td>
</tr>
</tbody>
</table>

Patients in Group L had significantly lower VAS scores than in Group
B and Group N at the time interval of 1, 2 and 4 hours. But the patients
in Group L had higher pain scores at the end of 8th hour (4.34±0.68) when compared with patients in Group B (2.83±0.71) and Group N. This shows that Group L shows superior and immediate postoperative pain relief when compared with Group B and Group N.

Patients in Group B had lower VAS scores at 4 and 8 hours and compared with patients in Group N. The patients in Group B had the lowest pain scores at the end of 6th hour than in Group L. The overall VAS scores were low in Group L (2.5714±1.6289) than in Group B (4.1000±0.4296) and Group N (4.7357±0.7147) which is statistically significant (P<0.0005).

**DISCUSSION**

Our study was a randomized single blind controlled trial. It was conducted to compare the efficacy of topical application of 4% Lignocaine and 0.5% Bupivacaine in reducing postoperative pain after tonsillectomy. There were 35 patients in each group. In Group N 2ml of Normal Saline, in Group L 4% Lignocaine and in Group B 0.5% Bupivacaine was kept in both the tonsillar fossae for 3 minutes. The pain scores were evaluated at the end of 1st, 2nd, 4th and 8th hours by Visual Analogue Scale.

Mean VAS scores for pain belonging to Group L and Group B were significantly lower (P < 0.05) as compared to those of Group N. VAS score was found to be lower in Group L at the end of 1st, 2nd and 4th hours postoperatively than the Group B and Group N. But at the end of 8th hour the VAS score was found to be lower in Group B than in Group L and Group N.

The pain relief was of longer duration well beyond the normal duration of pharmacological action of Lignocaine and Bupivacaine. This is explained by the phenomenon of ‘neuroplasticity’ which proposes that the pre-emptive blockade of release of nociceptive neuromediators may contribute to the elimination of hyperexcitable state responsible for maintenance of postoperative pain.

This study correlates well with the study results of Bruno Bissonnette et al. They reported that 10% aerosol Lignocaine applied directly on the tonsillar beds showed a superior and immediate post tonsillectomy pain relief.

The study by Kadar AA et al., and another study by T. Hung et al., suggested that topical Bupivacaine is effective in reducing postoperative pain in children compared with a similar concentration of Bupivacaine administered by spray or placebo.

Another study by A. K. Wong et al., showed that post tonsillectomy infiltration of 0.5% Bupivacaine with 1:200,000 Epinephrine reduces immediate postoperative pain in children compared with a similar concentration of Bupivacaine administered by spray or placebo.

In our study, topical application of 4% Lignocaine provided immediate postoperative pain relief when compared to 0.5% Bupivacaine. But 0.5% Bupivacaine provided a prolonged pain relief when compared to 4% Lignocaine and no significant pain relief in the immediate postoperative period as shown in the VAS 1.

**CONCLUSION**

We conclude that the topical application of 4% Lignocaine and 0.5% Bupivacaine in the tonsillar bed is an effective method of reducing postoperative pain in patients undergoing elective Adenotonsillectomy. Of these 4% Lignocaine was found to be superior and produced good analgesia for up to 4 hours postoperatively.

**REFERENCES**

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