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Original Research Paper

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A COMPARATIVE STUDY OF TOPICAL ANALGESIA WITH LEVOBUPIVACAINE AND ROPIVACAINE FOLLOWING TONSILLECTOMY

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ABSTRACT The aim is to compare the topical analgesia of ropivacaine and levobupivacaine in decreasing post-tonsillectomy pain and to assess the onset and duration of action in ropivacaine and levobupivacaine. Between august 2020 and march 2021, 120 patients between ages 6 to 40 years were randomly allocated in three groups of 40 each included in this study. In Group I Ropivacaine was applied to tonsillar fossa following tonsillectomy. In Group II and Group III levobupivacaine and Normal Saline was applied respectively. The postoperative pain, time of onset and duration of action were assessed. Using visual analogue scale the intensity of pain will be scored during postoperative 24 h at 1, 2, 4 and 8 hour interval. The duration of action is higher among group II than group I study participants with the mean difference of 1.475 ($p < 0.001$). The onset of anaesthesia was significantly lower among group I than II with the mean difference of 6.200($p < 0.001$).The mean pain score between ropovacaine and levobupivacaine groups was statistically significant ($p < 0.001$). For Tonsillectomy pain management Topical Levobupivacaine is as efficiant as ropivacaine. The onset of action is significantly lower in topical ropivacaine. In view of longer duration of action, levobupivacaine is a safer and drug of choice, for post-tonsillectomy analgesia.

KEYWORDS : Tonsillectomy, Levobupivacaine, Ropivacaine, Postoperative analgesia

INTRODUCTION

In childhood, Tonsillectomy is one of the more frequently performed surgical procedures. It is often associated with complication like intraoperative bleeding and postoperative pain. The major and common complaint is post tonsillectomy pain, which is a commonsequel after tonsillectomy. Nausea, vomiting are the another reason for prolonged hospitalization (1). An adequate postoperative analgesia is essential after tonsillectomy, as pain affects swallowing, causes bleeding, dehydration and increases the risk of secondary infection. This results in immediate hospitalization in same-day or need for prolonged hospitalization. Post tonsillectomy pain has maximum intensity immediately after operation and hence the pain control should be achieved adequately.

Ropivacaine is a local anesthetics agent belongs to the amino amide group that blocks the conduction and generation of nerve impulses (2,3). Systemic analgesics and opioids provide pain relief, but also produce undesirable side effects. The alternative is to use a local anaesthetic agent along with general anaesthesia. Infiltration of local anaesthetic agents like ropivacaine and levobupivacaine have been carried out either pre or post operatively in the tonsillar fossa with conflicting results.

The paucity of literature on the effect of topical application of levobupivacaine and ropivacaine on post tonsillectomy pain relief, has led us to design this study and thereby evaluate the post operative analgesia produced by local application of ropivacaine and lignocaine. Topical application of local anesthesia to the tonsillar fossa results in analgesia with minimal side effects is an excellent solution to the difficulty faced in post tonsillectomy pain relief.

MATERIALS AND METHODS

This study was conducted in the Department of Otorhinolaryngology of our hospital, after approval from the human ethical committee 120 patients between the age of 6 - 40 with chronic tonsillitis were included in this study. All study participants were informed and consent obtained.

All patients had been divided into the three groups (each 40 patients) by randomized method to determine which local anaesthetic agent was required before the surgery. Group I (40 patients) received 2-3mg/kg of topical ropivacaine, Group II (40 patients) received 2mg/kg of topical levobupivacaine and normal saline for Group III (40 patients). All patients underwent general anesthesia and operating procedure was the same for all of the patients. The solutions used were blinded from the patients, attenders and anesthetist. Under general anesthesia, patient was placed in the sister Rose position and a Boyle-Davis mouth gag was inserted into the mouth and fixed using Draffin bipods stand. Tonsillectomy was done by using dissection and snare method. Cotton balls soaked with the solutions will be kept in tonsillar fossa by operating surgeon post operatively for 2-4 mins and removed. During surgery period none of the patients received any analgesic.

Using a visual analog scale patients were assessed for their pain levels postoperatively at 1, 2, 4 and 8 hour interval. The pain score were graded from 0 - 10 points in which zero denotes no pain, and ten points denotes severe pain. For childrens the score were assessed under the supervision of parents. The onset and duration of action of the solutions were noted. Patients who had pain score more than 6 received oral paracetamol medication postoperatively. And patients get discharged 24 hours after surgery.

RESULTS

The study conducted in 120 patients consists of both males and females divided into the three groups(40 each) by randomized method with average age of16.50 (6 to 33 range)in Group I, 17.50 (6 to 40 range) in Group II and 14.50 (7 to 40 range) in Group III respectively. The mean weight of the study participants are 52.50(21-64), 50.50(23-64) and 47.00(25-64) in group I, group II and group III respectively(table 1).

Table 1: Demographic data of the study participants

S no	Profile	Group I	Group II	Group III	P value
1	Age (years)	16.50 (6-33)	17.50(6-40)	14.50(7-40)	0.466
2	Weight (Kg)	52.50(21-64)	50.50(23-64)	47.00(25-64)	0.421

The analysis of data regarding demographic features such as age and body weight showed no significant difference between the three groups. The mean VAS score of the study participants are 3.78, 3.05 and 4.93 in group I, group II and group II respectively (table 2).

Table 2: Distribution of VAS score among the study participants

S no	Group	VAS		P value
		Mean	SD	
1	I	3.78	1.86	0.000
2	II	3.05	1.33	
3	III	4.93	1.42	

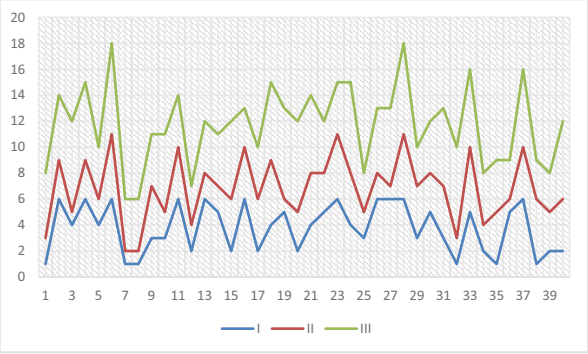

Figure 1 VAS score among study participants

The VAS score showed significant difference in both groups against saline group.The VAS score was significantly higher among the group I than group II with ($p < 0.001$). In addition, the onset of anesthesia was significantly lower among group I than II with the mean difference of 6.200 (table 3) (fig 2).

Table 3: Distribution of onset among the study participants

S no	Group	Onset (minutes)		P value
		Mean	SD	
1	I	6.75	1.56	0.000
2	II	12.95	1.63	
3	III	NA	NA	

The duration of action of the local anesthetic agents was significantly higher among group II than group I study participants with the mean difference of 1.475 (table 4) (fig 3).

Table 4: Distribution of study participants according to duration of anaesthesia

S no	Group	Duration (hours)		P value
		Mean	SD	
1	I	4.63	2.48	0.000
2	II	6.10	1.98	
3	III	NA	NA	

Similarly, the differences between group I , group II and group III regarding pain scores at 1hr, 2hr, 4hr and 8hr time intervals were also significant (fig 1). During first 24 h, we found out that there was a sustained decrease at pain score for group I and group II. Significantly, none of the patients experience any major complications like bleeding, vomiting, fever, nausea, otalgia and halitosis postoperatively.

DISCUSSION

Tonsillectomy is the frequently performed procedure by otolaryngologists and it cause severe postoperative pain. In most of the literature on tonsillectomy were aimed to reduce postoperative pain either applying various anesthetic drugs or using different surgical techniques. During surgery, in spite of general anesthesia the pain impulses create a hyperexcitable state while entering the central nervous system. These impulses can be blocked by local anesthetic agents either by preoperative infiltration or topical administration (4). After tonsillectomy, pain is most intense in postoperative period during swallowing. Also, on the first post operative day, the pain can be expected to be more severe when effects of the anesthetic agents have worn off (5).

Ropivacaine is two to three times less lipid soluble than bupivacaine with reduced volume of distribution, greater clearance, and shorter half-life period in humans (6). Compared to bupivacaine, ropivacaine produce lesser side effects. Levobupivacaine is the S-enantiomer of bupivacaine and and it has some advantages like less motor blockade and longer postoperative analgesic period compared with bupivacaine (7,8). For pediatric age group Levobupivacaine may be preferred.

Apostolopoulos et al. reported that ropivacaine was effective with longer onset-time, and significant post-operative analgesia than lidocaine (9). In contrary to this Park et al. found no significant postoperative analgesia when ropivacaine infiltrated with epinephrine postoperatively (10). Because of lack of data in the literature, we preferred topical levobupivacaine in our study for postoperative analgesia in tonsillectomy patients. The infiltration technique of topical anaesthetic agents cause higher risk factor like convulsions and cardiac arrhythmias hence we preferred the topical application method over infiltration technique for safer side.

CONCLUSION

Our study demonstrates that levobupivacaine improves throat pain postoperatively when compared with ropivacaine. Also none of the study participants experienced any postoperative complications like bleeding, vomiting, fever, nausea, otalgia and halitosis. The onset of action is significantly lower in topical ropivacaine. The duration of anaesthesia was significantly higher in topical levobupivacaine. Hence we conclude that topical levobupivacaine seems to be effective and significant when compared with ropivacaine due to longer duration of action for postoperative analgesia in post-tonsillectomy patients.

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