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Role of Intraoperative Topical Application of 0.5% Bupivacaine in Tonsillar Fossa for Postopeartive Analgesia in Tonsillectomy Cases

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Abstract

Context: Tonsillectomy is the second most common surgical procedure performed in pediatric patients. Post-Tonsillectomy pain is regarded as a major morbidity in early post-operative period which delays the oral intake & discharge of patients. Topical application of Local Anesthetic like Bupivacaine at the site of trauma reduces post-operative pain resulting in early oral intake & early discharge unlike local infiltration in which complication rate is high for intravascular injection and convulsions. *Settings and Design*: Prospective randomized and comparative study of 40 ASA I and II patients of age group 6 to 15 years undergoing tonsillectomy under general anaesthesia. *Methods and Material:* Patients were divided into two groups randomly, group B (Bupivacaine group) – in which 2 cotton pledgets soaked in 0.1ml/kg of 0.5% Bupivacaine was kept in the tonsillar fossa for 5 minutes and group C (control group) which received 2 cotton pledgets soaked in 0.1ml/kg of 0.9% NaCl and kept in fossa for 5 mins. *Statistical Analysis Used*: One-way ANOVA was used for analyzing the data. For comparing binomial data like sex and ASA status, Chi square test was used. *Results*: The group with topical bupivacaine had less tonsillar fossa pain and requested post-operative analgesics very lately or not till discharge *Conclusion*: We conclude that topical application of cotton pledget soaked in 0.5% bupivacaine in tonsillar fossa for 5 minutes is effective in providing relief of post tonsillectomy pain and promote recovery.

Keywords: Post Tonsillectomy Pain; Topical 0.5% Bupivacaine; Intraoperative; Cotton Pledget; VAS Score.

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Introduction

Pain is the most significant obstacle to the rehabilitation of a patient following tonsillectomy. Despite advancement in anaesthetic and surgical techniques, the post-operative pain still remains a significant problem.Inadequate analgesia causes poor oral intake, which leads to lassitude, delayed recovery and occasionally requires overnight hospitalization in day care surgical practice. It may also prevent early return to school or work after surgery [1]. In the light of the problems associated with post-operative pain, various strategies for the management of post-tonsillectomy pain have been proposed like infiltration of local anaesthetics [2,3] non-steroidal anti-inflammatory drugs (NSAID) [4], narcotics and oral analgesics [5]. Application of sucralfate [6] as a protective barrier following tonsillectomy has been found to promote healing with significant pain

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reduction in the post-operative period. In spite of the various drugs being added to the Anaesthetist's armamentarium, post tonsillectomy pain in paediatric patients poses a real challenge to the anaesthetist. Bupivacaine is a local anaesthetic of the amide group. Because sensory nerve block is more marked than motor block, bupivacaine is especially useful in the relief of pain. Advantages of topical application of bupivacaine are no risk of intravascular injection and local anaesthetic toxicity. In our study, we have tried to show that application of local anaesthetic like bupivacaine at the site of trauma reduces post-operative pain resulting in early oral intake & early discharge.

Materials and Methods

After obtaining Institutional Ethics Committee approval and written informed parental consent,40 ASA I-II patients between 6 and 15 years of age, who were scheduled to undergo tonsillectomy were enrolled in this randomized, prospective and placebo-controlled study This is a Randomized Double blinded study conducted on 40 patients undergoing Tonsillectomy under General Anesthesia.

Inclusion Criteria

- Age group of 6-15 years,
- ASA physical status I and II patients

Exclusion Criteria

- Patients with history of acute tonsillitis within three weeks
- Bleeding diathesis
- Suspicious of malignancy,.
- Patients having history of febrile convulsion and epilepsy.
- Allergy to local anaesthetics excluded from this study.
- Patients with history of mental retardation or psychiatric illness
- Patients not willing to participate in the study.

All subjects were admitted a day before surgery. A written informed consent was obtained from their parents and they were briefed on how to score their pain on a 10-point visual analogue scale (VAS) where 0 represents no pain and 10 represents severe excruciating pain. Detailed otorhinolaryngological history and examination was carried out.The patients were randomly assigned to one of the 2 groups, group B (Bupivacaine group) and group C (control group) using the sealed envelope technique. The study medications were prepared by an anaesthesiologist who was not involved in anaesthesia management and postoperative follow-up. The anaesthesiologist who was involved in anaesthesia management and the postoperative followup, the surgeon, and the parents were all blinded.

A standardized anaesthetic protocol was followed for all patients. Atropine 0.02mg/kg and midazolam 0.1mg/kg were given intravenously as pre-medication to all patients. After giving calculated doses of propofol and atracurium, endotracheal intubation was done For Intraoperative analgesia intravenous fentanyl and paracetamol were used. Anaesthesia was maintained with sevoflurane, oxy-gen and nitrous oxide. Intravenous fluids were given as per individual requirement. Tonsillectomy was performed by sharp dissection snare technique in all the patients by the same surgeons. After securing haemostasis, both tonsillar fossae were packed with a gauze piece soaked in 3 ml of 0.5% bupivacaine solution for five minutes in Group B and group C (control group) received 2 cotton pledgets soaked in 0.1ml/kg of 0.9% NaCl kept in each fossa for 5 mins. Patients were reversed with inj. Atropine 0.02mg/kg plus inj. Neostigmine 0.05mg/kg and extubated after return of reflexes.

All the patients were asked to express the intensity of their pain on VAS (Visual Analogue Scale) at 0min(immediately after extubation), 30 minutes, 1 hour, 2 hours, 3 hours, 4 hours, 8 hours and 24 hours. The patients received suppository diclofenac sodium 2mg/kg as rescue analgesia in postoperative period.The time for first analgesic request was also noted.

Results

One-way ANOVA was used for intergroup comparisons of normally distributed data. For comparing binomial data like sex and ASA physical status, Chi square test was used. Data expressed as mean±SD. The two groups are comparable with respect to sex ratio and ASA physical status as shown in table 1. The mean age in Group B is 10±2.1yrs and in Group C 9±1.24 yrs.

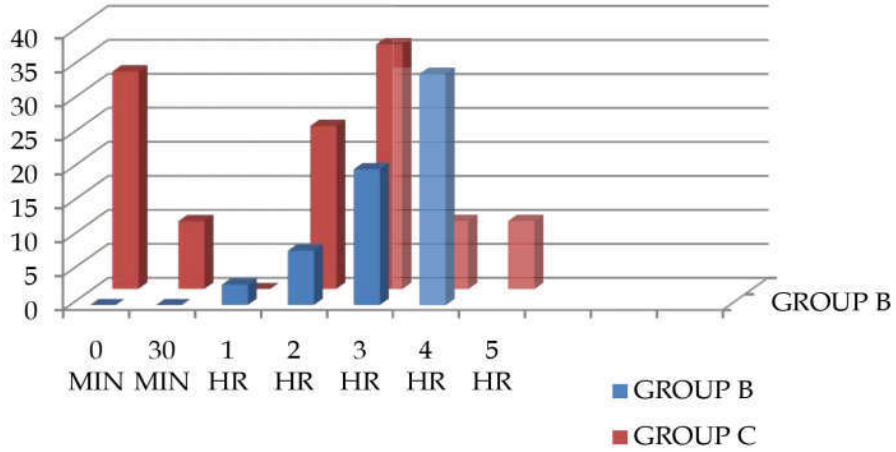
There was significant difference in the VAS scores at various time intervals,as shown in Table 2. The mean VAS scores in group C: 3.2±0.15, 1±0.24, 0±0.1, 2.4±0.25, 3.6±0.36, 1±0.5, 1±0.3, 1±0.4 where as in

Table 1: Demographic data

	Group B	Group C	p- value
Sex (M:F)	11:9	12:8	0.749
ASA status(I :II)	12:8	10:10	0.525

Table 2: VAS Scores in 2 groups

Time Interval	Group B	Group C
0 MIN	0+/-0	3.2+/-0.15
30 MIN	0+/-0.01	1+/-0.24
1 HOUR	0.3+/-0.105	0+/-0.1
2 HOURS	0.8+/-0.03	2.4+/-0.25
3 HOURS	2+/-0.05	3.6+/-0.36
4 HOURS	3.4+/-0.3	1+/-0.5



Graph 1: Showing time intervals for analgesic requirements in 2 group

group B: 0±0, 0±0.01, 0.3±0.105, 0.8±0.03, 2±0.05, 3.4±0.3, 1±0.2, 1±0.4 .

As shown in graph, there was significant difference in the time interval for analgesic requirement in the two groups with a P value of 0.000. In Group C, 32 patients required first dose of analgesia in immediate post-operative period within 30 mins, where as in Group B first dose requirement was after one hour in only 3 patients. The no: of repeated doses of analgesia is significantly less in Group B when compared to Group C.

Discussion

Pain control continues to be a challenge for tonsillectomy patients and is a leading cause of dehydration and unanticipated hospital admissions in post tonsillectomy patients especially in children. Colclasure and Graham noted a 1% readmission rate for patients undergoing tonsillectomy because of odynophagia and dehydration [7]. Anaesthesiologists and otolaryngologists have focused primarily on anaesthetic technique with maximal analgesic potential in the post-operative period.

The raw area left after tonsillectomy operation is a source of pain postoperatively through the release of certain chemicals and enzymes. The peripheral biochemical mechanism at the site of operation with arachidonic acid metabolites to mediate pain and inflammation may explain the post-tonsillectomy pain [8]. Here, local analgesic drug in our study that is bupivacaine 0. 5% proved itself to be effective in relieving post-tonsillectomy pain when applied locally. This protracted pain relief resulting by single use of bupivacaine cannot be explained by prolonged presence of the local anesthetic in the area of the surgery. An explanation for this long acting pain relief might be that the neural blockade prevents nociceptive impulses from entering the central nervous system

immediately after the surgery when applied to raw area and this suppresses formation of the sustained hyper excitable state responsible for the maintenance of post-operative pain. Local anesthetics induce the anti-nociceptive effect by acting on the nerve membrane. They can inhibit the release and action of agents like (prostaglandin, lysosomal enzymes, etc.) which sensitize and stimulate the nociceptors participating in inflammation [9]. Whether pre or post-operative topical anaesthetic or injection of bupivacaine affects the outcome has been studied by Molliex et al, who concluded that pre or post-operative timing has no clinical significance [10].

In our study we found that 0.5% bupivicaine soaked cotton pledgets kept in tonsillar fossa for 5 mins provided good postoperative analgesia. These results commensurate with study conducted by T. Hung et al. in 3-16yrs age group in Department of Otolaryngology, St George's Hospital, London, UK who concluded that topical bupivacaine soaked swabs on comparing with saline soaked swabs has a role in facilitating recovery in daycare tonsillectomy in children. They demonstrated that eating and drinking were started sooner and postoperative pain was lower at 1, 3, and 6 hours postoperatively in the case group [11]. Similar results were obtained in a study conducted by Ehsan-ul-Haq et al. in 205 patients in age group of 3 to 30yrs. In this study, right side is considered as test side and left side as control and post-operative pain was assessed on two sides separately, on VAS score [12].

Contrary to above findings, in a study done by Khan MI et al., they demonstrated that Topical application of 0.5% bupivacaine provides no significant pain relief in post-tonsillectomy patients in first 8 hours [13]. Similarly the results of another two studies suggest that topical application of bupivacaine pack in tonsillar fossa is not an effective method to reduce pain after tonsillectomy in the immediate post-operative period [14,15].

There are some studies on infiltration of bupivacaine in tonsillar fossa. We preferred topical bupivacaine application instead of local infiltration in our study because of the serious and life threatening complications associated with inadvertent intravascular bupivacaine like, cardiac arrhythmias, airway obstruction, cervical osteomyelitis, facial nerve paralysis [16], Horner's syndrome [17] and vocal cord paralysis [18].

Many other drugs have been studied for topical application in tonsillar fossa. In one study by Akbay et al. that investigated the analgesic efficacy of topical tramadol in the control of postoperative pain in children after tonsillectomy, they concluded that topical 5% tramadol with its local anesthetic effect seems to be an easy, safe, and comfortable approach for pain management in children undergoing tonsillectomy [19]. Similarly, topical ropivaicaine has been studied by Hanna Kaisa Tolska et al., for post tonsillectomy pain relief [20].

Finally the evaluation of pain was carried out on VAS as it is deemed one of the most accurate and reproducible pain scales. Although validated for children as young as 3 years, the VAS scale for pain can be confusing for children to use. No complication occurred in this study due to use of bupivacaine.

Conclusion

Tonsillectomy is a very common day care procedure that is associated with significant postoperative pain, which leads to delay in oral intake of patients, resulting in dehydration, extended stays and increased costs. Topical Application of Bupivacaine to the tonsillar fossa reduces post-tonsillectomy pain and facilitates faster initiation of feeding and decreasing hospital stay, thereby decreasing psychological and financial burden over the family.

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