DOI: https://doi.org/10.53350/pjmhs2115123144

ORIGINAL ARTICLE

Efficacy of Bupivacaine Infiltration in Post Tonsillectomy Pain Relief

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ABSTRACT

Background: Tonsillectomy is a common surgical procedure required to prevent recurrent infection, inflammation and related distress to the patients. Intervention in this highly vascularized area results in inflammatory responses and subsequent pain. Due to inadequate management 30-70% patients suffer from post-operative pain. Post tonsillectomy pain has its impact on analgesic consumption, hospital stay and return to normal activity.
Methodology: This randomized control trial study design is a prospective randomized controlled including convenience sample of 32 patients of both genders, aged 4-30 years undergoing tonsillectomy.Tonsillectomy was performed by standard dissection method after giving general anesthesia to the patients. After completing the tonsillectomy on right side, surgeon infiltrated 6ml of 0.25 % bupivacaine in the tonsillar fossa on the right side. The surgeon did not infiltrate into the left side being observed as control. Postoperative pain score was recorded by asking patients on a VAS graded 1-10 scale (0= no pain and 10= maximum pain) after half an hour in recovery, 2 hours, 4 hours and 6 hours after the operation.
Results: The mean age of the study patients was 14.08±7.32 years which included 20 (62.5%) females and 12(37.5%) males. The mean of duration of operation was 42.03±14.75 minutes. There was statistically significant difference between pain scores on VAS in infiltrated bupivacaine (right side) and control (left side) after ½, 2,4 and 6 hours respectively.
Conclusion: Infiltration of 0.25% bupivacaine significantly reduces post tonsillectomy pain.
Keywords: Tonsillectomy, Bupivacaine infiltration, Pain

INTRODUCTION

Tonsillectomy is a common surgical procedure required to prevent recurrent infection, inflammation and related distress to the patients[1,2]. Tonsillectomy includes complete removal of palatine tonsils. Tonsillar fossa is supplied by tonsillar branches of the trigeminal and glossopharyngeal nerves[3]. Intervention in this highly vascularized area results in inflammatory responses and subsequent pain. Edema of surrounding tissue due to trauma delays healing[4,5,6]. Post tonsillectomy pain has its impact on analgesic consumption, hospital stay and return to normal activity.

Various modes have been tried to reduce post-tonsillectomy pain including intravenous Paracetamol, tramadol, morphine, ketamine, corticosteroids[7,8]. Infiltration of local anesthetic by inhibiting sensory pathways responsible for release of inflammatory factors prevents transmission of nociceptive impulses to spinal cord[8].

Bupivacaine inhibits voltage gated sodium channels, block the afferent nerve endings and reduces the intensity of post tonsillectomy pain. Bupivacaine also act as anti-inflammatory agent by inhibiting N methyl D aspartate receptors, inhibiting signaling of Ca^{2+} ion, interleukin-1β release in astrocytes and by interacting with 5-hydroxytryptamine, opioid and glutamate receptors[1].

Postoperative pain is not satisfactorily managed in remarkable proportion of patients resulting in unfavorable consequences which includes increased morbidity, impaired function and quality of life, delayed recovery from surgery, prolonged opioid use, increased medical costs and development of chronic postoperative pain[9].

The benefits of adequate postoperative pain management include patient comfort and contentment, early mobilization, reduced respiratory and cardiac complications, low risk of deep vein thrombosis, early recovery with decreased development of neuropathic pain and low cost of care[10].

Some researchers concluded that infiltration with local anesthetics could effectively reduce postoperative pain severity and it could promote recovery after surgery.[11] Other researchers found that infiltration of local anesthetics is not effective in reducing post operative pain.[12] As the role of infiltration of local anesthetics in postoperative pain is not yet established, more clinical trials are required to find the truth. Hence the current study was done to find out the efficacy of bupivacaine infiltration in post tonsillectomy pain relief.

The objective of our study is to determine the efficacy of bupivacaine infiltration in relieving post tonsillectomy pain.

Received on 12-06-2021
Accepted on 24-11-2021

MATERIAL AND METHODOLOGY

After permission from Ethical Review Board, this randomized controlled study was conducted in Department of Anesthesia, Sughra Shafi Medical Complex / Sahara Medical College Narowal in patients aged 4 to 30 years of either sex with ASA I & II status scheduled to undergo tonsillectomy were included in the study.

Patients with known hypersensitivity or contraindications to study drug, Patients with mental illness (history/medical record), Patients with communication difficulties, patients with severe systemic illness and patients with bleeding disorders were excluded from study.

On the basis of previous related study 32 patients were included in our study.Routine preoperative assessment was done one day before the operation. Patient was educated about pain and visual analogue scale and written informed consent was taken. With non-invasive monitoring (Heart rate, systolic and diastolic blood pressure, Mean arterial pressure, oxygen saturation, Electrocardiogram) pre-operative vital signs were recorded in operation theatre. Intravenous line with 18 G cannula was passed. Ringer Lactate intravenous infusion was started. After adequate pre-oxygenation, induction was accomplished by using intravenous injection nalbuphine 0.1mg/kg, injection Propofol 2mg/kg and injection suxamethonium 1-1.5mg/kg or atracurium 0.5mg/kg in both the groups. Endotracheal tube of suitable size was passed and patient maintained on intermittent positive pressure ventilation with tidal volume 7ml/kg and respiratory rate of 12-15 breaths per minute. General anesthesia was maintained with 40% O2, 60% N2O and 1-2MAC Isoflorane. Intravenous paracetamol 15mg/kg was given to all patients.

Tonsillectomy was performed by standard dissection method. After completing the tonsillectomy on right side, surgeon

infiltrated 6ml of 0.25 % bupivacaine in the tonsillar fossa on the right side. The surgeon did not infiltrate into the left side being observed as control. At the end of surgery Injection neostigmine 0.04mg/kg and atropine 0.02mg/kg were given to reverse the neuromuscular blockade. After maintaining adequate spontaneous ventilation patients were extubated and shifted to Post Anaesthesia Care Unit. Postoperative pain score was recorded by asking patients on a VAS graded 1-10 scale (0= no pain and 10= maximum pain) after half an hour in recovery, 2 hours, 4 hours and 6 hours of operation.

The sample size was calculated from OpenEpi, Version 3, open source calculator—SS Mean by taking post tonsillectomy total mean Visual Analogue pain Score as 2.24±1.18 in control side versus 1.01±0.64 in infiltration side in previous study[13] keeping the power of the test 95 % and level of significance 95 %. Sample size for this study calculated was 32 patients.

Data was entered in statistical package for social sciences (SPSS) 23. Categorical data like gender and ASA physical status were presented by using frequencies and percentages. Numeric data like age, pain score and duration of procedure were presented by mean and standard deviation. Paired sample t –test was used to compare the visual analogue score on both sides. A p-value of ≤0.05 was considered significant.

RESULTS

The total number of patients were 32, comprising of 12 (37.5%) males and 20 (62.5%) females. The mean age of patients was 14.08 ±7.32 years. The mean duration of operation was 42.03±14.75 minutes (Table 1).

There was statistically significant difference between pain scores on VAS in infiltrated bupivacaine (right side) and control (left side) after ½, 2,4 and 6 hours respectively.The mean visual analogue pain score of infiltrated bupivacaine (right side) and control (left)side in recovery room after 30 minutes was 5.34±2.36 and 6.16±1.90 (p value=0.029).The mean visual analogue pain score of infiltrated bupivacaine right and control left side at 2 hours postoperatively was 4.34±2.03 and 5.28±2.20 (p value=0.022).The mean visual analogue pain score of infiltrated bupivacaine right and control left side at 4 hours postoperatively was 3.22±1.45 and 4.28±2.08 (p value=0.011).The mean visual analogue pain score of infiltrated bupivacaine right and control left side at 6 hours postoperatively was 2.19±1.33 and 3.56±2.23 (p value=0.001). The means of visual analogue pain scores during all observed periods on both sides were statistically significant (Table 2).

Table 1: Demographic data (n=32)

Age (years)	14.08±7.32
Gender	
Males	12 (37.5%)
Females	20 (62.5%)
Duration of operation (Minutes)	42.03±14.75

Table 2: Visual analogue pain score (paired sample t –test)

Postoperative time	**Infiltrated bupivacaine(right side)**	**Control (left side)**	**P-value**
VAS after 30 minutes in recovery	5.34±2.36	6.16±1.90	0.029
VAS after 2 Hours	4.34 ± 2.03	5.28±2.20	0.022
VAS after 4 Hours	3.22 ± 1.45	4.28±2.08	0.011
VAS after 6 Hours	2.19 ±1.33	3.56±2.23	0.001

DISCUSSION

Adequate postoperative analgesia is an essential requirement by patients and can also enhance the clinical outcome. Local anesthetic wound infiltration is simple and economical means of administering good analgesia. In our study there was statistically significant difference between pain scores on VAS in infiltrated bupivacaine (right) side and control (left) side.

Tonsillectomy is a day case surgery and is very common. It results in severe postoperative pain.[14]postoperative pain control after tonsillectomy results in decreased morbidity and increased parent satisfaction.

Our study results have been favored by some studies while other studies concluded that infiltration of bupivacaine was not effective for post tonsillectomy pain control.

Fikret and his associates found that bupivacaine and levobupivacaine were good in decreasing early post tonsillectomy pain and has longer effect than levobupivacaine which favoured our study[15].

ebeles et al concluded that peri tonsillar infiltration of bupivacaine and epinephrine resulted in decreased post tonsillectomy pain. The results of this study were similar to our study[16,17].

Bameshki and his colleagues demonstrated that bupivacaine and epinephrine injection into peri tonsillar area pre or post operatively reduces patients pain in recovery and reduces swallowing pain in first 6 hours.so this study was identical to our study[18].

Peyvandi et al stated that bupivacaine infiltration before tonsillectomy is effectual in reduction of postoperative pain on first day after surgery and was statistically significant in males, hence favouring our study[3].

A meta-analysis was conducted by sun et al which demonstrated that peri tonsillar infiltration of bupivacaine is a safe and beneficial technique for post tonsillectomy pain control. The results were alike our study[19].

Ozkiris et al found that bupivacaine and ropivacaine administration were effective in reducing post tonsillectomy pain. This study results were same as our study[20].

Inanoglu and associates found that analgesic regimen including intravenous ketamine, Paracetamol and peri tonsillar infiltration of bupivacaine is safe and productive means of reducing post operative pain during early post operative period in children undergoing tonsillectomy, therefore supporting our study[21].

Grainger and saravanappa found that local anaesthetic provide a moderate decrease in post tonsillectomy pain, hence favouring our study[22]

Hydri and his colleagues reported that peri tonsillar infiltration of bupivacaine is not effective for post tonsillectomy pain control which is opposite to our study.[23] The difference may be due to large sample size (64 versus 32) as compared to our study.

Kountakis in his study found no significant decrease in post operative pain between the two study groups in which one group was infiltrated with 10ml of 0.5% bupivacaine and other with 10ml of normal saline which is against our study[24].

Amani and his associates demonstrated that severity of pain in gabapentin group was significantly reduced than that in bupivacaine group in recovery and 6 & 12 hours after tonsillectomy which is opposite to our study[25]. The disparity may be either due to the decrease volume of bupivacaine used (2.5ml 0.25%) as compared to our study (6ml 0.25%) or different approach for determination of pain score.

Solanki et al found that diclofenac suppository is effective as compared to bupivacaine because of longer duration of analgesia and its convenience which is in contrast to our sudy[26].

Nikandish and his colleagues demonstrated that bupivacaine and pethidine significantly reduced the analgesic demand at 4,6,8,12 & 24 hrs post operatively but does not reduce the pain during swallowing which is against our study[27]. The difference may be due to use of large volume and concentration of bupivacaine (0.5% 1mg/ml) and use of adrenaline as compared to our study.

Nordahl et al found that bupivacaine is not effective in decreasing post tonsillectomy pain in females and elderly patients than the males and young patients. However we stated no relation in our study regarding the gender or age[28].

The limitations of our study include small sample size, conducted only at a single center. for evaluation of the efficacy of this intervention further clinical trials are required on larger population. Second limitation was side effects associated with

bupivacaine infiltration were not noted. We suggest clinical trials on large number of patients at multiple centers. .

CONCLUSION

Infiltration of 0.25% bupivacaine significantly reduces post tonsillectomy pain.

Conflicting interests: The authors declare no conflicting interests.

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