

Original Research Article

Comparative study of 0.5% bupivacaine infiltration versus sterile water infiltration in tonsillar fossa during tonsillectomy performed under general anaesthesia

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ABSTRACT

Background: Tonsillectomy is a treatment of choice when medical line treatment is failed in chronic tonsillitis. Post tonsillectomy pain is the most common problem of this surgery which may persists for weeks and affect normal daily activities. Use of opioids and non-steroidal anti-inflammatory drugs for relieving pain may leads to nausea, vomiting and post tonsillectomy haemorrhages. We renewed interest in infiltration of local anaesthetic drug in the tonsillar fossa during tonsillectomy. To evaluate the efficacy of 0.5% bupivacaine infiltration in tonsillar fossa during tonsillectomy under general anaesthesia in terms of post-operative pain relief.

Methods: It is double blinded prospective comparative study was carried out on 100 patients of either sex and age 5-40 years who diagnosed with chronic tonsillitis undergoing tonsillectomy and willing to participate in study were included. 50 patients were infiltrated with sterile water and other 50 patients were infiltrated with 0.5% bupivacaine in the tonsillar fossa during tonsillectomy performed under general anaesthesia. Postoperatively at 2nd, 6th, 24th hours and 7th day all patients were evaluated for pain score by using visual analogue scale.

Results: In our study, post-operative pain mean score 2nd, 6th, 24th hour and 7th day post-operative period for test and control group was “3.3 and 7.1”, “3.2 and 5.2”, “1.7 and 4.8” and “0.6 and 2.2” respectively which was found to be statistically significant ($p < 0.001$).

Conclusions: 0.5% bupivacaine infiltration in the tonsillar fossa during tonsillectomy had lower pain score in post-operative period compare to sterile water infiltration.

Keywords: 0.5% bupivacaine, Sterile water, Tonsillectomy, Post-operative pain relief

INTRODUCTION

Tonsillectomy is one of the most commonly performed surgical procedures and is often associated with postoperative pain. This pain can persist for days to weeks and can affect the discharge of the patient from the hospital, patient's nutrition, ability to return to normal routine work or school and overall satisfaction with the procedure. The oropharynx and tonsillar fossae are exquisitely sensitive because of innervations locally by the branches of the trigeminal and glossopharyngeal

nerves.¹ Traditionally post-operative pain if treated with opioid analgesics can cause sedation, depression of cough reflex, nausea, vomiting and respiratory depression. Non-steroidal anti-inflammatory drugs (NSAIDs) can cause increase in bleeding and GIT problems.² We renewed interest in local anaesthetic techniques as an effective means of postoperative pain control because of the absence of any respiratory depressant effect, nausea, vomiting and bleeding problems. Neural blockade with local anaesthetic prevents the nociceptive impulse from entering central nervous system and resulting in

depressed level of post-operative pain even after local anaesthetic disappeared from surgical field and provided preemptive analgesia.³ This is a unique study was designed to test hypothesis that blockade of nociceptive input with 0.5% Bupivacaine during tonsillectomy can prevent pain beyond the duration of direct action of local anesthetic.

Objectives

The objectives of the study were to evaluate the efficacy of 0.5% bupivacaine infiltration in tonsillar fossa during tonsillectomy under general anaesthesia in terms of post-operative pain relief.

METHODS

This is a double blinded prospective comparative study after taking the institutional ethical clearance, study was carried out on patients of either sex between age group (5-40) years willing to participate in study were included and underwent tonsillectomy in ENT Department in the Bapuji hospital and Chigateri district hospital attached to JJM Medical college, Davangere. This study done from August 2017 to February 2018 with a sample size of 100 and sampling method being convenience sampling. The patients underwent tonsillectomy using the dissection and snare method.

Inclusion criteria

Patients diagnosed with chronic tonsillitis, either sex, and age group between 5 to 40 years.

Exclusion criteria

Patients with co morbid condition and patients allergic to bupivacaine.

After detailed history and examination of the patients, pre-operative investigations were done and consent for surgery and study was taken and made two groups and each group consists of 50 patients and one group called control group, received sterile water infiltration in tonsillar fossa and other group called test group, received the 0.5% bupivacaine infiltration in tonsillar fossa. Pre-operative dosage for 0.5% bupivacaine (1 mg/kg) and sterile water was calculated (maximum 10 ml).

All patients underwent surgery in general anaesthesia. The tonsillectomy was performed under aseptic precautions with a standardized dissection and snare technique, to remove the tonsils, with complete haemostasis achieved. At the end of the operation, control group patients were locally infiltrated, with preoperatively calculated sterile water in the tonsillar fossa and test group patients were locally infiltrated with 0.5% bupivacaine on the tonsillar fossa. The sites of the injection were superior (lateral base of the uvula), inferior, medial and lateral of tonsillar fossa. Surgery was

done by a single surgeon to maintain uniformity. Our data was analyzed with IBM SPSS version 22.0 for windows.



Figure 1: Intraoperative infiltration into the tonsillar fossa after achieving the complete haemostasis.

Patient's pain scores were assessed by means of a VAS at 2nd, 6th, 24th hours and 7th day post-operative period.

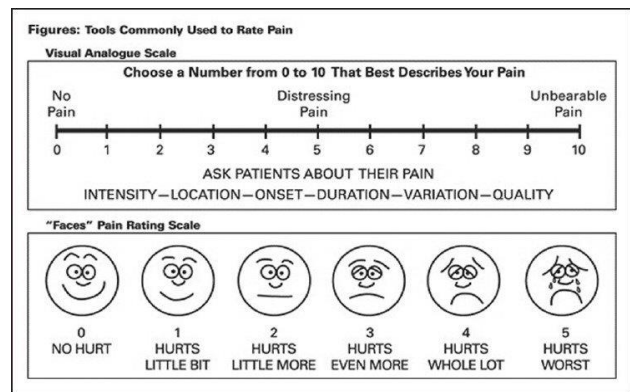


Figure 2: Visual analogue scale.

RESULTS

In our study, mean age group for test group is 17.1 among that 18 patients were males and 32 patients were females and that of control group, mean age was 17.2 among that 24 patients were males and 26 patients were females which was not showing any statistical significance.

Pain score

We found that test group were having better postoperative pain relief at 2nd, 6th, 24th hours and 7th day compare that of control group which was found to be statistically significant.

At 2nd hour post-operative period, test group: 78% patients were having moderate pain score and 2% patients were having severe pain score and 20% patients were having mild pain score. Control group: 58% and 42% moderate and severe pain score respectively and no patients were having mild pain score.

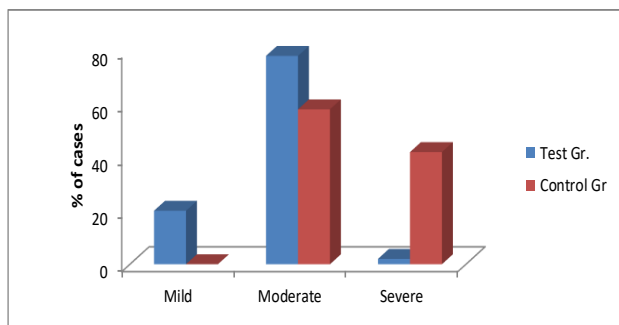
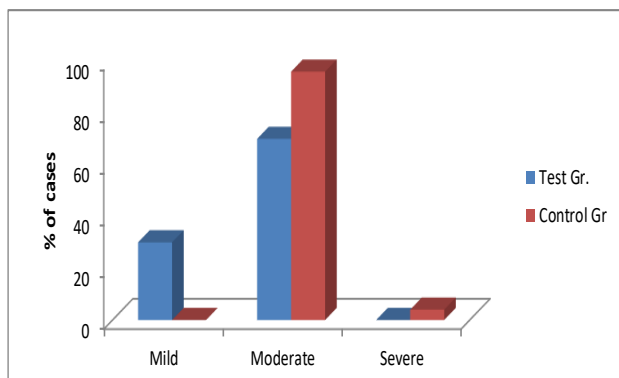
Table 1: Descriptive information on study subjects.

Variables		Test group	Control group	Test v/s control
No. of cases		50	50	-
Age (years)	Mean \pm SD	17.1 \pm 11.0	17.2 \pm 12.5	t=0.04, p=0.97, NS
	Range	5-44 years	5-45 years	-
Gender	Male	18	24	$\chi^2=1.48$, p=0.22, NS
	Female	32	26	

Table 2: Distribution of subjects with corresponding pain severity and their comparison between two groups.

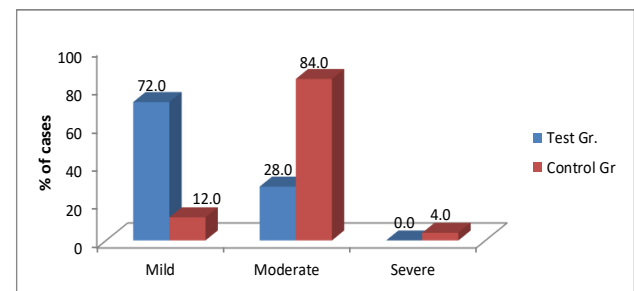
Pain score	Pain severity	Post-operative pain							
		2nd		6th		24th		7th day	
		Test group N (%)	Control group N (%)	Test group N (%)	Control group N (%)	Test group N (%)	Control group N (%)	Test group N (%)	Control group N (%)
0-2	Mild	10 (20)	0 (0)	15 (30)	0 (0)	36 (72)	6 (12)	50 (100)	30 (60)
3-7	Moderate	39 (78)	29 (58)	35 (70)	48 (96)	14 (28)	42 (84)	0 (0)	20 (40)
8-12	Severe	1 (2)	21 (42)	0 (0)	2 (4)	0 (0)	2 (4)	0 (0)	0 (0)
Total		50 (100)	50 (100)	50 (100)	50 (100)	50 (100)	50 (100)	50 (100)	50 (100)
Test v/s control	χ^2	29.65		19.04		37.25		25.00	
	P value	<0.001, HS		<0.001, HS		<0.001, HS		<0.001, HS	

HS= highly significant.

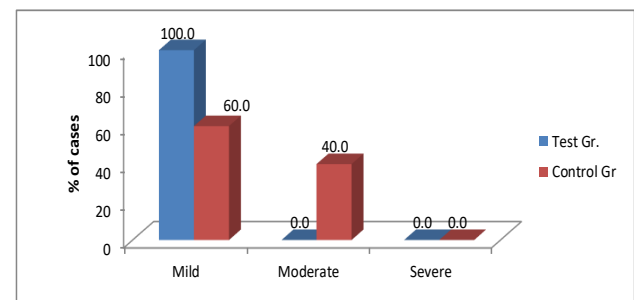
**Figure 3: Post-operative pain at 2nd hour.****Figure 4: Post-operative pain at 6th hour.**

At 6th hour post-operative period, test group: 30% and 70% were having mild and moderate pain score and no patients were having severe pain score. Control group: 96% and 4% were having moderate pain score and severe

pain score respectively and no patients were having mild pain score.

**Figure 5: Post-operative pain score at 24th hour.**

At 24th hour, test group 72% and 28% patients were having mild and moderate pain score. Control group: 12% and 84 % patients were having mild and moderate pain score were respectively and 4% patients were severe pain score.

**Figure 6: Post-operative pain score at 7th day.**

At 7th day, test group: 100% patients were having mild pain score. Control group: 40% were having moderate pain score.

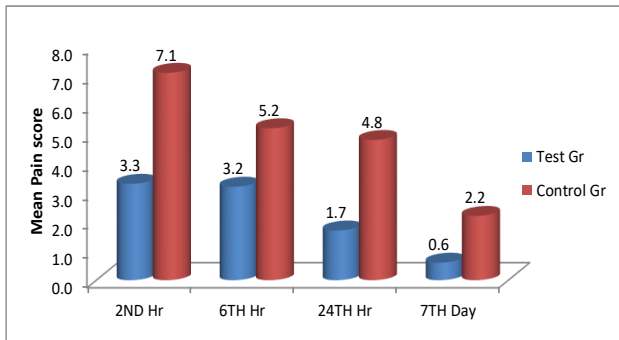


Figure 7: Comparison of mean pain score between test group and control group.

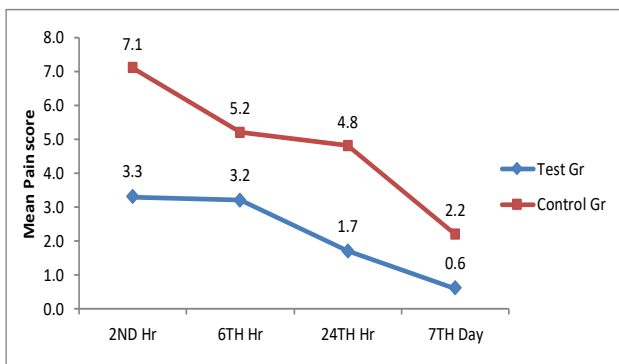


Figure 8: Mean pain scores at different intervals.

Graphical representation of the mean pain scores at different intervals were showing intraoperative infiltration into the tonsillar fossa gives better post-operative pain relief compare to sterile water infiltration.

DISCUSSION

Tissue injury induced acute inflammation; nerve irritation and muscle spasm are the most common cause for pain in the post-operative phase. The reduction of post-tonsillectomy pain is important not only for the patient comfort, but also because reducing pain improves oral intake, reduces the risk of dehydration, infection and post-surgical haemorrhage.⁴ Pain is a subjective and complex expression and its assessment depends on personal experience, social and ethnic factors, and anxiety level as well as the patient's ability to describe the type and degree of pain on the basis of some frame of reference. Several techniques have been described for the alleviation of this pain, including the use of opioids, steroids and non-steroidal anti-inflammatory drugs and glossopharyngeal nerve block. As well as local anesthetic sprays or swab soaked and infiltration with local anaesthetics around the tonsillar fossa. Infiltration technique with 0.5% bupivacaine can be used to provide anesthesia for minor surgical procedures. It has a long

duration of action. The duration of action of bupivacaine is usually limited to a few hours, it was suggested that this long-lasting pain relief might have been related to the phenomenon of neuroplasticity. This theory proposes that the pre-emptive blockade of the release of non-receptive neuro mediators may contribute to the elimination of the hyper excitable state responsible for the maintenance of postoperative pain relief.

Somdas et al, this study was pre emptive peritonsillar infiltration with bupivacaine in combination with tramadol improves paediatric post-tonsillectomy pain better than using bupivacaine or tramadol alone: A randomized, placebo-controlled, double blind clinical trial and it showed that postoperative local bupivacaine infiltration in tonsillectomy patients was effective in children.⁴

Shamendra et al, this study conducted on 28 patients (age group 5 to 35 years) assigned for tonsillectomy to evaluate the post-operative analgesic requirement after pre tonsillectomy peritonsillar infiltration using tramadol, ketamine alone and in combination with bupivacaine, xylocaine-adrenaline and normal saline as a control shows that the requirement of 1st dose of analgesic is ranging from 3 hours to more than one and half day.⁵

Sharifian et al, this study showed that injection of bupivacaine during tonsillectomy reduced the post-operative pain. Mean intensity of pain 4, 8 and 24 hours after operation showed significant difference between the case and control group. Therefore, injection of 5cc of 0.5% bupivacaine solution just 5 min before surgery can reduce the pain after tonsillectomy. The cause of this reduction in pain 1 week after surgery in women in comparison with men may be related to difference in perception of pain between men and women. Men feel the pain physically and women perceive it emotionally; thus, perception of pain in women is more severe than in men. One week after surgery, there was no effect of bupivacaine. Therefore, there was no significant difference in men regarding the intensity of pain between incision sites (physical perception). Women had a better memory of perception of pain in the site of bupivacaine injection; thus, one week after surgery they had less pain at the injection site.⁶

Above studies, they used 0.5% bupivacaine with adrenaline and adrenaline as a carrier agent. But it is a unique study, used plain 0.5% bupivacaine for infiltration in tonsillar fossa and got successful results in terms of post-operative pain relief.

CONCLUSION

We conclude that 0.5% bupivacaine infiltration in tonsillar fossa gives better post-operative relief at 2nd, 6th, 24th and 7th day of post-operative period compare to sterile water infiltration.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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