

Original Article

Comparison of Local application versus Infiltration of Bupivacaine for post Tonsillectomy pain in Adults

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Objective: To compare whether an individual can appreciate pain relief with local Bupivacaine applied to the tonsillar fossae following tonsillectomy, either topically or as a sub mucosal injection.

Study Design: Randomized Control trial.

Place and Duration: Department of ENT/ Head & Neck surgery, Combined Military Hospital Peshawar, from January 2007 to July 2008.

Materials and Methods: 128 patients of either gender, aged 18 to 40 years were randomized into two groups. Group (1) had, either tonsillar fossa randomly packed with a gauze piece soaked in 5 ml of 0.5% bupivacaine for 5 minutes, while group (2) was given a sub mucosal injection of 5 ml bupivacaine (2.5 mg/ml) randomly in either tonsillar fossa. The untreated fossae in all patients were taken as control.

Following tonsillectomy the pain intensity was documented by asking patients in both groups to express their pain on a visual analogue scale (VAS) (0- 100 mm) at 1, 2, 4 and 8 hours.

Results: A substantial number of the patients failed to experience pain relief on the side of local anaesthetic (bupivacaine) application.

Conclusion: Bupivacaine application provides no appreciable pain control in post tonsillectomy patients irrespective of the application method.

Key Words: Tonsillectomy, Bupivacaine, Pain Measurement, Local Anaesthetic, Pain perception.

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Introduction

Tonsillectomy currently remains one of the most commonly performed surgeries.¹ Apart from children the adult patients have also claimed an improvement in their quality of life, several months after surgery.² Conversely it is the severe pain in the immediate postoperative period which dictates the morbidity associated with this operation. Odynophagia leads to decreased oral intake, dehydration, infection and secondary hemorrhage. This in turn translates to extended hospital stay and increased expenses. There is an ongoing quest to find the most effective and safe modality of pain relief following tonsillectomy. In order to find the elusive ideal pain relief therapy, various combinations have been tried as an adjunct to general anaesthesia. These include acupuncture³, antibiotics⁴, local anaesthetics⁵, NSAIDs⁶, opioids⁷, speech therapy⁸ and steroids⁹ etc. Ironically none have been singularly effective nor has any specific combination therapy been accepted universally. Bupivacaine¹⁰ one of the most commonly used long acting local anaesthetic, has a safety profile better than

other similar anaesthetic agents.¹¹

The present study aimed to compare the effects of bupivacaine 0.5% administered after tonsillectomy either as a local pack or sub mucosal infiltration on post tonsillectomy pain in adults.

Materials and Methods

After obtaining approval of a protocol for this study from the local ethical committee, One hundred and twenty eight patients of either gender, aged 18 to 40 years, undergoing tonsillectomy for recurrent tonsillitis were enrolled for this randomized control trial. All patients were American Society of Anaesthesiologists (ASA) physical status I.

Exclusion criteria included known allergy to bupivacaine, inflammatory conditions of the oropharynx like peritonsillar abscess and peritonsillitis, age not less than 18 years, and patients not falling in ASA physical status I. Written informed consent was taken from all patients and prior to surgery they were briefed on how to score and rate their pain on the visual analogue scale (VAS). On the night prior to surgery no pre medication was administered to any patient. All the tonsillectomies were performed using a

standardized anaesthetic technique, i.e. induction with propofol, followed by Oxygen, nitrous oxide and isoflurane for maintenance. A senior ENT surgeon using the same dissection and snare technique performed surgery. Bipolar diathermy was used to control the bleeding.

At the termination of surgery, having secured haemostasis, these patients were randomized into two groups of 64 patients each. Group (1) had either tonsillar fossa randomly packed with a gauze piece soaked in 5 ml of 0.5% bupivacaine for 5 minutes, while Group (2) received a sub mucosal injection of 5 ml bupivacaine (2.5 mg/ml) randomly in either tonsillar fossa. Care was taken to avoid any intravascular penetration. The untreated fossae in all patients were taken as control.

After recovery from the general anaesthetic, the patients were asked to express their pain intensity, on a VAS.100 mm scale (0 mm: no pain; 100 mm: maximum imaginable pain). The following parameters were assessed; pain intensity in the throat at rest, difficulty while talking and odynophagia during intake of a soft diet.

The nursing staff of the recovery room/ward and an intern, blinded to the study documented these readings at 1, 2, 4 and 8 hours following surgery. Routine postoperative analgesia in the form of Injection Diclofenac Sodium 75 mg was given via intramuscular route, 4 hours following surgery. No additional analgesic supplement was given over the next 8 hours. The student's paired t-test was used to analyze the results.



Figure 1: Effect of bupivacaine (local swab/ injection) on the tonsillar fossae.

Table 1: Transient increase in pain during deglutition. Comparison of VAS mean scores $\pm$ SD.

	1 hour	2 hours	4 hours	8 hours
Group 1	6.48 $\pm$ 0.50	7.56 $\pm$ 1.22	8.80 $\pm$ 0.50	6.90 $\pm$ 0.50
Group 2	6.48 $\pm$ 1.02	7.68 $\pm$ 0.50	8.60 $\pm$ 0.50	6.84 $\pm$ 0.50
Control	6.48 $\pm$ 0.50	6.90 $\pm$ 0.50	7.82 $\pm$ 0.50	6.20 $\pm$ 0.50

Results

The mean age was 23 years. Majority of the patients (47%) were between the ages of 18-20 years, 43% in their 3rd decade, while only 10% were in their fourth decade. Male: female ratio was 1:1.2.

Mean pain scores with standard deviation at rest for the control expressed on a VAS 100 mm scale, estimated at 1, 2, 4 and 8 hours following surgery were: 6.48 $\pm$ 0.50, 6.50 $\pm$ 0.50, 7.52 $\pm$ 0.50 and 5.48 $\pm$ 0.52. The corresponding scores for group (1) were 6.48 $\pm$ 0.50, 7.20 $\pm$ 0.50, 7.60 $\pm$ 0.50 and 5.62 $\pm$ 1.02 respectively. Group (2) had the following scores: 6.48 $\pm$ 1.02, 7.46 $\pm$ 0.50, 7.88 $\pm$ 0.50 and 5.60 $\pm$ 0.46.

In both groups as well as the control, there was a progressive increase in pain intensity in both tonsillar fossae over the first 4 postoperative hours which receded after Injection Diclofenac Sodium 75 mg was given via intramuscular route, 4 hours post operatively. Only a minority of patients 16% (n=20) experienced an appreciable pain relief on the side of local anaesthetic (bupivacaine) application, 12 in group 1 and 8 in group 2 (Fig 1). $P < 0.05$.

The difference in pain intensity between group 1 and 2 was not statistically significant ($P = 0.6352$). Compared to pain at rest, a slight increase in pain intensity was noticed during deglutition (Table I). The pain intensity while speaking was higher than at rest but almost similar to that of deglutition.

Gender and age hardly affected the pain scores. Three cases (4.68%) of mild reactionary haemorrhage occurred in group 2, which were treated conservatively, while there was no readmission for secondary haemorrhage.

Discussion

With the intention of providing pain relief to post tonsillectomy patients, bupivacaine has been applied peri-operatively in three different ways (1) pre-incisional peritonsillar (2) post-tonsillectomy wound infiltration and (3) post-tonsillectomy packing with soaked gauze.

Whether pre or post operative application / injection of bupivacaine affects the outcome has been studied by Molliex et al, who conclude that pre or post operative timing has no clinical significance.¹²

Consensus on the effectiveness or otherwise of the method of application of bupivacaine has still not been reached. Majority of the studies have paradoxical results due to various reasons. Most have a small sample size, the sides to be treated are pre-determined and the fossae are not randomly selected. A thorough review of the Internet revealed only three studies that also have an intra-individual design. This is the only way to logically document the difference in pain perception after intervention in the same

individual.

Stelter¹³ claims superiority of post-tonsillectomy infiltration of the wounds with bupivacaine compared to the other two techniques but the accuracy of VAS scores in the younger patients (age 3-45 years) in their study must have been compromised due to their lack of understanding and the desires of their parents. It was for this reason that only adults were included in our study, as they could clearly understand and interpret the pain threshold.

Somdas¹⁴ also claims that bupivacaine confers effective pain relief in children (patients aged 5-15). These findings differ from the results of our study. In this study again the tonsillar fossae were not randomly selected and considering the age group, most of the patients were too young to localize the side of maximum pain and appreciate its severity on a VAS scale.

On the contrary, in the most recent study, Hydri¹⁵ concludes that post tonsillectomy bupivacaine impregnated swabs provide no substantial pain relief. This study was double blinded and the fossae were randomly selected. The results are commensurate with our study.

Another study by Nordahl¹⁶ concludes that bupivacaine is ineffective in relieving post tonsillectomy pain in females and older patients who reported more pain and used more analgesics than males and younger patients. On the other hand we found no relation in our study implicating gender or age with an altered pain threshold.

Regarding the choice of an injection versus application of a bupivacaine impregnated gauze in the tonsillar fossae, a review of Cochrane database reveals shortcomings of similar multiple trials. They had a small size and several involved the perioperative co-administration of intravenous opiates which may have shrouded any beneficial effect of the local anaesthetic. They failed to find any evidence linking peri operative local anaesthetics to post-operative pain control¹⁷. This is commensurate with the findings of our study, which essentially has an intra individual design and a reasonable sample size; the patients are adults and the tonsillar fossae were randomly allotted.

Conclusion

There is no evidence that Bupivacaine application provides appreciable pain relief in post tonsillectomy adult patients irrespective of the application method employed.

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