
Infiltrative Technique in Post-Tonsillectomy Pain Reduction with 0.5% Bupivacaine & 1/200000 Adrenaline.

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Abstract:

Background

Tonsillectomy is one of the commonly performed surgical procedures in otolaryngology. Postoperative morbidity, including pain, bleeding, inadequate oral intake and dehydration can create problems. Pain after tonsillectomy still remains to be a frequent problem. In an effort to reduce post-tonsillectomy morbidity, numerous modifications and adjuncts to standard surgical technique have been proposed.

Objective: To determine the effectiveness of 0.5% bupivacaine and 1/200000 adrenaline in post tonsillectomy pain using an intra-individual design.

Methods: 47 patients aged 8-35 years were included in a prospective study, diagnosed clinically as chronic tonsillitis in Karama teaching hospital. Patients received a local infiltration of 0.5% bupivacaine and 1/200000 adrenaline solution on the right tonsillar bed, and received a local infiltration of normal saline on the left tonsillar bed as control, at the end of the operation in the theatre. Postoperative pain was assessed with a visual analog scale at 4,6,8,12,24 hours after the procedure.

Result: According to visual analog scale results, the severity of pain was less in the site infiltrated with 0.5 bupivacaine and 1/200000 adrenaline than the site infiltrated the normal saline.

Conclusion: local 0.5% bupivacaine and 1/200000 adrenaline infiltration in tonsillar bed can reduce post tonsillectomy pain.

Key word: Bupivacaine, Tonsillectomy Pain, Local anesthesia.

Introduction:

Infiltration technique with bupivacaine can be used to provide anesthesia for minor surgical procedures. It has a long duration of action, which can be further prolonged by the addition of adrenaline 1 in 200000 ^[1].

Adrenaline is added to local anaesthetics to reduce the rate of absorption, reduce toxicity and extend their duration of action. This is most effective during infiltration anaesthesia and nerve blocks ^[2,3].

There is also a complex interrelation with the inherent vasoactivity of local anaesthetics, all of which, apart from cocaine, a potent vasoconstrictor, demonstrate biphasic activity.

At very low concentrations all enhance vascular smooth muscle activity and cause vasoconstriction. At clinical doses they demonstrate vasodilator activity that is dose dependent and which varies for each drug ^[4].

Vasoconstriction may increase the neuronal uptake of a local anaesthetic drug ^[5]. Local anaesthetics disrupt ion channel function within the neuron cell membrane preventing the transmission of the neuronal action potential. This is thought to occur via specific binding of the local anaesthetic molecules (in their ionized form) to sodium channels.

A second mechanism is also thought to operate, involving the disruption of ion channel function by the incorporation of local anaesthetic molecules into the cell membrane (the membrane expansion theory).

This is thought to be mediated mainly by the unionized form acting from outside the neuron ^[6]. Tonsillectomy is one of the most commonly

performed surgical procedures and is often associated with postoperative pain ^[7]. It produces severe pain on the first postoperative day ^[8]. This pain can affect the patient's nutrition, ability to return to work or school, discharge from the hospital, and overall satisfaction with the procedure ^[9].

Patients & Methods:

This intra-individual study design, controlled clinical trial was conducted at Karama teaching hospital, Baghdad- Iraq, between March 1, 2009, and October 30, 2009. 47 patients, aged (8 to 35) years, were included for the study. Patients above 8 years were included to ensure that participants could understand and complete a visual analog scale (VAS). All patients had attended an otolaryngology outpatient clinic with a history of recurrent tonsillitis.

All patients were instructed on how to complete a visual analog scale (VAS) before surgery.

A 100-mm horizontal-line, where 0 mm represented no pain and 100 mm, the worst pain imaginable. Patients were given a new VAS at each testing interval and were instructed to mark on the line the approximate level of their pain at that moment and then seek a difference of 20 mm between the means of the 2 groups, whereas others accept a difference of 15 mm ^[10].

Marcaïn (AstraZeneca) was used, contains the active ingredient bupivacaine hydrochloride, with strength of 5mg of bupivacaine hydrochloride per milliliter of solution.

The tonsillectomy was performed with a standardized cold dissection technique, to remove the

tonsils, with hemostasis achieved with silk ligatures only, at the end of the operation in the theatre, patients received a local infiltration of 0.5% bupivacaine and 1/200000 adrenaline solution on the right tonsillar bed with use of aspiration-injection technique, and received a local infiltration of normal saline on the left tonsillar bed as control. (3-5) milliliters of solution were injected.

The sites of the injection were superior (lateral base of the uvula), inferior, medial and lateral of tonsillar fossa. We explained this procedure to the patients and we took their agreement.

The patients did not identify which of the injected solution they received on the right and left side.

Table 1: characteristics of patients

Parameter	No	%	P-value
Age in years	>15	31	65.95
	<15	16	34.05
Sex	Male	19	40.43
	Female	28	59.57
Total	47	100	

Two types of pain (constant pain at rest and pain caused by swallowing, drinking 50-100 ml of water). (Fig. 1, 2&3).

Patients older than 15 years old had more pain than less than 15 years individuals (Fig. 1 & 2).

Patients' pain scores were assessed by means of a VAS at fixed intervals after the end of the procedure. These times were 4, 6, 8, 12, and 24 hours after extubation. All the patients received antibiotics and acetaminophen.

Results:

28 females and 19 males for a total of 47 patients (age 8-35 years) entered the study (table. 1). According to visual analog scale results, the severity of pain was less in the site infiltrated with 0.5% bupivacaine and 1/200000 adrenaline than the site infiltrated with the normal saline.

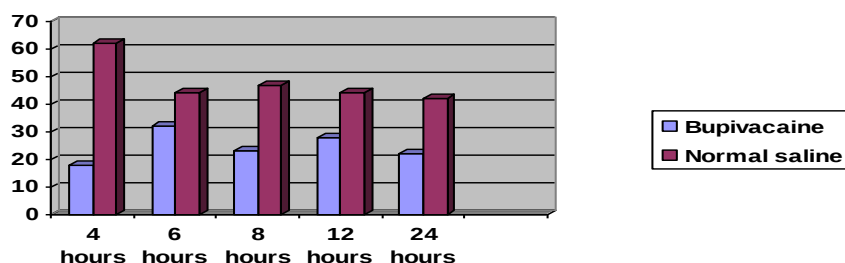


Fig. VAS scores mm

Fig. 1: Pain score (at rest) after surgery less than 15 years' patients

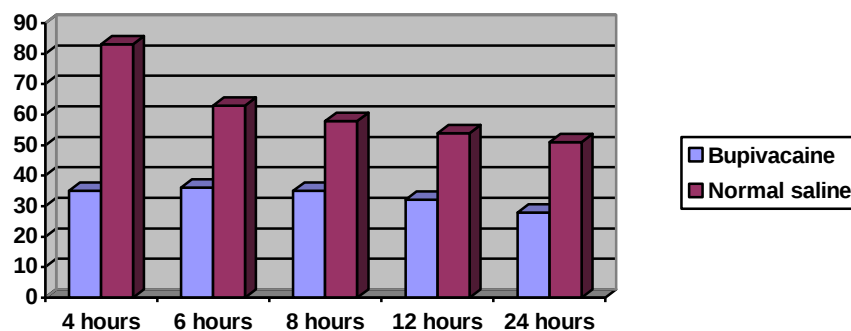


Fig. 2: Pain score (at rest) after surgery among older than 15 years patients

VAS scores mm

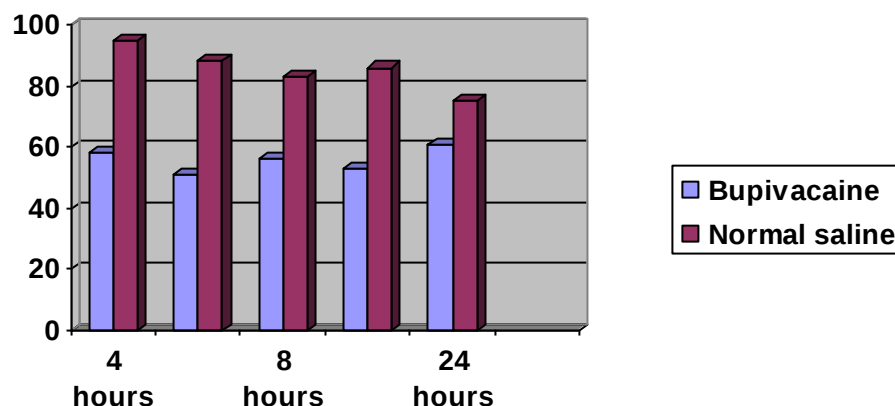


Fig. 3: Pain score (at swallowing) for all patients.

Discussion:

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^[11].

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^[10]. Several techniques have been described for the alleviation of this pain, including the use of opioids, steroids, and nonsteroidal anti-inflammatory drugs and glossopharyngeal nerve block^[9]. As well as local anesthetic sprays or swab soaked^[11] and infiltration with local anaesthetics around the tonsillar bed^[12-18].

Local anaesthetics have been injected into the tonsillar fossa to provide long acting analgesia. Jeebles et al found that infiltration of the tonsils with bupivacaine markedly decreased the intensity of pain following tonsillectomy^[12]. According to visual analogue scale results, the severity of pain was less in the site infiltrated with 0.5% bupivacaine and 1/200000 adrenaline than the site infiltrated with the normal saline and has less pain than saline group after oral liquid intake^[13]. Stuart et al conclude that peritonsillar Infiltration with bupivacaine is only moderately useful as analgesia for children having tonsillectomy^[14].

While peritonsillar infiltration of bupivacaine 0.5% with 1:200000 epinephrine provides better post-tonsillectomy pain control in the immediate postoperative period, with Wong et al^[15].

Postoperative local bupivacaine infiltration in tonsillectomy patients was effective, Somdas^[16] and

Stelter^[17]. A notably lower score on the visual analogue scale was found in the bupivacaine group,^[18]

While a trend toward less pain in the immediate postoperative period in the group receiving bupivacaine was noted, the difference between groups was not statistically significant^{[10],[19]}.

In our study, the severity of pain was less in the site infiltrated with 0.5% bupivacaine and 1/200000 adrenaline than the site infiltrated with the normal saline, at 4, 6, 8, 12, and 24 hours after the end of operation.

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 nonreceptive neuromediators may contribute to the elimination of the hyper excitable state responsible for the maintenance of postoperative pain^[15].

At very low concentrations bupivacaine enhances vascular smooth muscle activity and cause vasoconstriction. At clinical doses they demonstrate vasodilator activity^[4].

In current study, 0.5% bupivacaine caused some vasodilation around tonsillar fossa and this decreased after addition of 1/200000 adrenaline.

The peritonsillar region is innervated by fibers from the glossopharyngeal nerve, the lesser palatine nerves, and the lingual nerve and the descriptions of injection technique and amount of solution injected have been variable^[10]. The recommended upper limit of safe dosage of bupivacaine is 2mg/kg body weight^[11].

In this study, (3-5) milliliters of solution was injected, 1/2 of the infiltrated solution of 0.5% bupivacaine and 1/200000 adrenaline was infiltrated

into superior peritonsillar space, and the other 1/2 of the solution infiltrated around tonsillar fossa. Naja et al concluded that the nerve stimulator confirmed the histo-anatomic findings by strong contractions of the superior constrictor muscle, soft palate and uvula when the needle is mainly in the middle part of the peritonsillar area where the glossopharyngeal nerve branches predominate^[20].

According to the result found in our study post-tonsillectomy infiltration with 0.5% bupivacaine and 1/200000 adrenaline:

1-Is safe medication and there were no complications related to bupivacaine.

2-Reduce first 24 hours postoperative pain.

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