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Modified infiltration technique in tonsillectomy: expanded case report of 25 children

M.Z. Naja[a,*], M. El-Rajab[b], H. Sidani[c], W. Kabalan[d], M.F. Ziade[e], M.A. Al-Tannir[f]

[a]*Anesthesia and Pain Medicine Department, Makassed General Hospital, P.O. Box 11-6301, Riad El-Solh, Beirut 11072210, Lebanon*
[b]*Department of Pediatrics, Makassed General Hospital, Beirut, Lebanon*
[c]*Department of Anatomy Pathology at Makassed General Hospital, Beirut, Lebanon*
[d]*Ear—Nose—Throat Department at Makassed General Hospital, Beirut, Lebanon*
[e]*Faculty of Public Health, Lebanese University, Beirut, Lebanon*
[f]*Research Department at Makassed General Hospital, Beirut, Lebanon*

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Summary

Objective: To introduce a modified infiltration technique of anesthetic mixture in order to reduce post-tonsillectomy pain based on histo-anatomic observations and tonsil's innervation detection.
Design: Histo-anatomic, expanded case report.
Setting: Tertiary care facility in Beirut, Lebanon.
Patients: One hundred and seven patients who underwent tonsillectomy allocated in three groups.
Interventions: Histo-anatomic observations were studied in 62 patients (group I). Nerve-stimulator detection was performed in group II (20 children). An expanded case report of 25 children (group III) was conducted using a modified infiltration technique based on the findings of the histo-anatomic observations and nerve detection.
Outcome measures: Post-operative pain at 0, 6, 12 h and once daily for the 10-day follow-up period, hemodynamic stability, hospital stay, patient satisfaction and analgesics consumption were assessed.
Results: 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. No visual analogue scale median exceeded 1 for any child at any predetermined time interval, only three children (12%) required opoiods during

* Corresponding author. Tel.: +961 1 655 466; fax: +961 1 646 589.
E-mail address: zouhnaja@yahoo.com (M.Z. Naja).

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the follow-up period. All children (100%) were discharged the same day, only 4% of parents were unsatisfied. Hemodynamic stability was maintained during pre- and post-operation.
Conclusion: This modified technique with minimal volume of anesthetic mixture seems to reduce post-operative pain in tonsillectomy patients; a randomized double-blinded prospective study was designed based on the findings in this initial series of children.

1. Introduction

Tonsillectomy is usually accompanied with post-operative pain [1,2], which is independent of the performed surgical technique [3,4], and remains a significant problem that leads to poor oral intake and results in prolonged hospitalization [5,6].

Local anesthesia (LA) has been used in conjunction with general anesthesia in tonsillectomy to control post-operative pain [7,8]. However, the results are conflicting and remain debatable [9—18].

Infiltration of LA may result in rare serious complications such as upper airway obstruction [19], vocal cord paralysis [20] and taste disturbance [21], which may be due to the infiltration technique or to the extra volume of LA [19—21].

Several studies underscored the need for an adjustable technique of infiltration with a minimal volume of mixture anesthetic to improve the post-tonsillectomy pain based on a histo-anatomical approach [7,9,11].

The objective of this paper is to introduce a modified injection technique of LA based on anatomic and histological observations of dissected tonsils and on detection of tonsil's innervation using a nerve-stimulator in order to manage post-tonsillectomy pain and minimize potential complications.

2. Materials and methods

Ethical Committee approval and parental written fully explained consent for all children who participated in the study were obtained.

One hundred and seven patients scheduled for elective tonsillectomy, at our institution, from January 2003 until July 2003, were selected and allocated in three different groups as follows:

Group 1: Histological and anatomic observations were studied in 62 patients in purpose to better understand the histo-anatomy of the tonsil and the peritonsillar area.

Group 2: Nerve-stimulator was used in 20 children to detect the tonsil and peritonsil innervations in order to confirm the tonsil's innervation obtained from our histo-anatomic observations.

Group 3: Expanded case report of 25 children to illustrate a modified infiltration technique of LA in tonsillectomy based on histo-anatomic observations and nerve-stimulator detection performed on groups 1 and 2, respectively.

2.1. Histo-anatomic observations

A total of 124 dissected tonsils from 62 patients undergoing tonsillectomy were used for the histo-anatomical part of this study in order to account for the anatomic variability that is known to occur in the pattern of nerve trajectory. The participants (30 males, 32 females) were 3—35 years old.

The dissection was carried between the capsule of the palatine tonsil and the underlying muscle layer. Each dissected tonsil was fixed with sutures on a piece of cardboard where the superior pole and the inferior one were marked, then placed in a 10% formaldehyde solution. Four-micron sections from 62 tonsils at median and transversal levels were performed. The other 62 tonsils were randomly assigned to receive either transversal or longitudinal section at 1/4, 1/2 and 3/4 level with regard to the organ itself. No sagittal section was performed because the underlying muscle layer was very thin. All sections were submitted to a routine hematoxylin and eosin stain and immunostaining using S100 protein monoclonal antibody and were examined by one anatomo-pathologist in order to visualize the nerves.

Photographs were obtained using a Japanese Nikon Labophot microscope (magnification 4, 10, 40×).

2.2. Nerve-stimulator detection

Twenty children (12 boys and 8 girls) aged between 3 and 14 years undergoing tonsillectomy were selected to apply a nerve-stimulator into the tonsil and at the peritonsillar area in order to detect their innervations. Induction of sevoflurane 8% and fentanyl 1.5 μg/kg was followed by tracheal intubation without muscular relaxant, GA was maintained with 3% sevoflurane, nitrous oxide 70% and oxygen 30%. At that moment a nerve-stimulator connected to a 22G nerve needle was used