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Natural course of tonsillectomy pain: A prospective patient cohort study

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ABSTRACT

Objective: The aim of this study was to determine the natural course of pain after tonsillectomy.
Methods: This study included 119 patients that underwent tonsillectomy between November 2013 and November 2015. After undergoing tonsillectomy, patients scored their pain using the visual analogue scale three times daily (morning, midday, and evening) for 2 weeks. A linear mixed model was used for statistical analyses.
Results: Increasing postoperative days was negatively associated with pain following tonsillectomy surgery (estimated value [EV] of visual analogue score [VAS]/day = −0.42, 95% confidence interval [CI] = −0.43 to −0.41, $P < 0.001$); the post-tonsillectomy pain curve illustrated this negative correlation. Postoperative pain was less in children and adolescents (≤18 years old) than in adults (>18 years old) (EV = −0.81, 95% CI = −1.56 to −0.08, P = 0.031). Mean tonsillectomy-associated pain on postoperative day 1 was 6.4 VAS. It decreased slightly to 5.3 VAS until postoperative day 7, after which it reduced sharply to 3.7 VAS within 3 days; on postoperative day 14 it had decreased to 1.6 VAS. Pain assessments were higher in the morning (EV = 0.59, 95% CI = 0.50 to 0.69, $P < 0.001$) compared with assessments conducted in the evening.
Conclusion: The natural course of postoperative tonsillectomy pain follows a gradual decline for 1 week after surgery, but decreases more rapidly after this period.

1. Introduction

Tonsillectomy is a common surgical procedure. More than 500,000 ambulatory tonsillectomies are performed annually in the United States alone [1]. Over 50,000 tonsillectomies are performed annually in Korea [2]. The indications for this procedure include recurrent tonsillitis, peritonsillar abscess, and obstructive sleep-disordered breathing. It is a surgical procedure that causes trauma to the oropharynx, with subsequent postoperative pain [3]. Inevitable pain following

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tonsillectomy can reduce oral intake, and therefore cause stasis of slough and an increased tendency to develop secondary infections.

A variety of methods have been attempted, with the aim of to reducing the postoperative pain associated with tonsillectomy. Coblation is a relatively new technique in otolaryngology that is becoming increasingly popular and accepted due to the associated faster recovery for patients [4,5]. In 2001, Temple and Timms introduced coblation for tonsillectomy with reports of reduced postoperative pain and lower rates of postoperative bleeding compared with cautery surgery [6]. In 2002, Koltai et al. published a study on partial intracapsular tonsillectomy and adenoidectomy (PITA) for tonsillar hypertrophy, and since then there have been studies indicating the advantages of PITA over conventional electrocautery total tonsillectomy in terms of reduced postoperative pain and hemorrhage [7,8]. Some authors suggested that the extent of pain and analgesic consumption reduction was significantly higher in patients who received laser tonsillectomy [9]. Furthermore, several studies have reported that dexamethasone can offer some benefits for tonsillectomy patients, and it can be administered during or after elective tonsillectomy to reduce postoperative emesis and reduce postoperative use of pain medications. However, there is no consensus on whether an orally administered steroid should be used routinely after tonsillectomy, and few studies have assessed its effect on tonsillectomy patients [10]. One meta-analysis has shown that postoperative administration of honey after tonsillectomy significantly reduces pain [11]. While another meta-analysis demonstrated that preoperative administration of gabapentinoids could provide pain relief without side effects in patients undergoing tonsillectomy [12]. Peritonsillar infiltration of tramadol in combination with ketamine was reported as a useful and safe pain control method [13]. In pediatric tonsillectomy, ice-lollies can be used as a cheap, effective, and safe method of reducing postoperative pain up to 1 h following surgery [14]. Additionally, some authors have suggested that educating parents on the deliberative use of distraction for pain medication decreased pain behavior in 3–7-year-old children after tonsillectomy [15]. Although various methods have been introduced, there is not a perfect way to solve the problem of pain after tonsillectomy.

To the best of our knowledge, few studies have evaluated the natural course of post-tonsillectomy pain over time. Therefore, a clear understanding of the pain course for this surgery is necessary for postoperative management, to provide adequate relief from postoperative pain. The purpose of this study was to determine the natural course of pain after tonsillectomy. This information will help to moderate post-tonsillectomy pain appropriately by oral medication or injection.

2. Materials and methods

2.1. Data acquisition

This study was approved by the Institutional Review Board of the Hallym University Hospital (2013-I122). Written informed consent was obtained from all participants prior to the survey.

This was a prospective patient cohort study. Participants who underwent tonsillectomy for chronic tonsillitis, snoring, and obstructive sleep apnea between November, 2013 and November, 2015 were enrolled in the study. Participants younger than the age of 8 were excluded to record the exact pain scores. Participants with diabetes, hypertension, arthritis, cerebral stroke, heart disease, and a history of depression were excluded because they may have been taking additional nonsteroidal anti-inflammatory drugs (NSAID) without our prescription. In addition, participants taking nonsteroidal anti-inflammatory drugs, opioids, or anti-depressants were also excluded since these medications can affect post-operative pain and drug interaction. A total of 150 participants were enrolled in this study. Out of the 150 participants, cases with postoperative bleeding (n = 5), self-medication of analgesics (n = 12), and follow-up absence or incomplete records (n = 14) were excluded. Therefore, a final total of 119 participants were included in this study.

2.2. Study design

All participants underwent a bilateral palatine tonsillectomy. After applying a McIvor tongue retractor, 1% lidocaine mixed with 1:100,000 epinephrine was injected at the subcapsular plane. Pulling the tonsil medially, the anterior pillar mucosa was incised with a cold knife and the exposed tonsillar capsule was dissected and cauterized by bipolar devices (Valleylab, Inc., Boulder, CO, USA) with conventional methods. Participants younger than 16 years old (n = 37) also underwent an adenoidectomy.

After tonsillectomy, patients scored their pain using the visual analogue scale (VAS) from 0 (no pain) to 10 (worst possible pain). Pain was recorded three times daily at 6 AM (morning), 12 PM (midday), and 6 PM (evening) for 14 days (postoperative day 1–14). The VAS was recorded from postoperative 1 day (the day after surgery); it was recorded using the diary and returned to outpatient clinics on postoperative 15 day. We explained the purpose of this study to each participant and encouraged them to record in the pain diary via the use of a telephone every 3 or 4 days. The participants with incomplete records of VAS were excluded. Adult patients, or children (<15 years) weighing more than 40 kg, were prescribed acetaminophen 600 mg (McNeil, Philadelphia, Pennsylvania, USA, tablet), three times daily just after the recording of the pain score. Whereas children (>7 years) weighing less than 40 kg, were administered acetaminophen 300 mg, three times daily at the same times. In the measurement of the natural pain course and associated factors of post-tonsillectomy pain, analgesics may have been a potential source of bias. However, it would have been unethical to not prescribe analgesics, despite patient agreement after full understanding of study. Therefore, we did not prohibit patients from taking additional analgesics on their own accord. Participants who requested more analgesics were prescribed hydrocodone bitatrate/acetaminophen (Cipla, Mumbai, India, tablet). However, participants taking any additional analgesics were excluded from this study. Those only taking routine acetaminophen were included in this study. Participants were

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