The Efficacy of Anterior and Posterior Archs Sutation at Inferior Tonsillar Pole for Posttonsillectomy Pain Control

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Abstract The aim of our study was to investigate the efficacy of the sutation technique after completing the tonsillectomy procedure for posttonsillectomy pain control in adult patients. August 2010–February 2011, 44 adult patients, ages ranged from 16 to 41 years old who underwent tonsillectomy at Elazığ Training and Research Hospital Otorhinolaryngology Clinic were included to the study. After tonsillectomy procedure, anterior and posterior tonsillar archs were sutured each other and so, the area of tonsillectomy lodges which covered with mucosa were increased. Twenty two patients who applied posttonsillectomy sutation were used as study group and remnant 22 patients who did not applied posttonsillectomy sutation were used as control group. The visual analogue score (VAS) was used to evaluate the postoperative pain degree (0 no pain, 10 worst pain). ANOVA test (two ways classification with repeated measures) was used for statistical analysis of VAS values. $P < 0.05$ was accepted as statistically significant. The effect of time (each post-operative day) on VAS values was significant. The mean VAS values between study and control group on post-operative day 1st, 3rd, 7th, and 10th were statistically significant ($P < 0.05$). The severity of posttonsillectomy pain was less in study group patients than control group patients. The sutation

of anterior and posterior tonsillar archs after tonsillectomy procedure was found effective to alleviate the posttonsillectomy pain in adult patients.

Keywords Tonsillectomy · Postoperative pain · Suture technique

Introduction

Tonsillectomy is one of the most commonly performed surgery in otorhinolaryngology practice and generally associated with postoperative severe pain [1]. The pain after tonsillectomy is seen more intense in adults than children. The reasons of posttonsillectomy pain are as follows: physical and chemical irritations, the irritation of nervus vagus and nervus glossopharyngeus, the nerve tension due to edema, the infection of tonsillectomy lodge, pharyngeal muscle spasm, mucosal disruption, posterior tonsillar arch injury, and ischemia. Dehydration and postoperative bleeding possibility may increase because of oral intake is restricted due to pain. The less usage of electrocautery and performing the tonsillectomy operation at the correct surgical plain decrease the posttonsillectomy pain degree [2].

In posttonsillectomy term, especially adult patients usually suffer from severe pain during several days and the pain decreases step by step in following 4 days [3]. There are various analgesic medications for pain management, the spectrum of which varies from acetaminophen to narcotic analgesics. Peritonsillar local anesthetic infiltrations, like bupivacaine, ropivacaine, and lidocaine spray are used for posttonsillectomy pain treatment [4–6]. Besides postoperative medication, various surgical techniques can be used for pain control. For example, classical cold knife

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dissection, laser assisted tonsillectomy, the fibrin sealing to the operation site [7]. In addition, covering the tonsillectomy field with mucosal palatopharyngeal arch flap is effective to alleviate the posttonsillectomy pain [8].

The purpose of this study is to evaluate the efficacy of our surgical method for posttonsillectomy pain control in adult patients.

Methods

Between August 2010 and February 2011, 44 adult patients underwent tonsillectomy at Otorhinolaryngology Clinic of Elazığ Training and Research Hospital were included to the study. There were 23 female and 21 male patients. The ages ranged from 16 to 41 with a mean age of 29.1 years. The informed consents were obtained from all patients and followed the guidelines of Declaration of Helsinki. Tonsillectomy indications were tonsillar hypertrophy with chronic infection, obstructive symptoms, and recurrent tonsillitis. The sharp dissection with snare technique was used as standard surgical procedure. Hemostasis was applied by gauze compression, electrocautery, and catgut sutures, if required.

All tonsillectomy procedures were performed by Öner under general anesthesia as follows: 0.0007 mg/kg atropine, 4 mg/kg pentobarbital sodium, and 0.5 mg/kg atracurium besylate for muscular relaxation. After completing the tonsillectomy procedure and achieving the hemostasis, bilaterally either on left or on right side, anterior and posterior tonsillar archs were attached to each other with only one suture at inferior tonsillar pole which closest settling to the tongue base by using 4–0 polyglactin 910 suture. So, the uncovered surface of tonsillectomy lodge decreased, despite the surface that covered with tonsillar arch mucosa increased (Fig. 1).

Twenty two sutured patients were used as study group and the other 22 unsutured patients were used as control group. The patients were evaluated about the efficacy of anterior and posterior archs suture at inferior tonsillar pole for posttonsillectomy pain control on postoperative 1st, 3rd, 7th, and 10th days. The postoperative pain was assessed by VAS (0, no pain; 10, worst pain).

All statistical analyzes were performed by SPSS 15.0 version. Continuous data were displayed mean $\pm$ SD. ANOVA test (two ways classification with repeated measures) was used for statistical analysis of visual analogue score (VAS) values. $P < 0.05$ value was accepted as statistically significant.

All patients were given postoperatively the same oral acetaminophen suspension (250 ml) four times daily as analgesic regimen, and amoxicillin + clavulanic acid (45 mg/kg) twice daily as antibiotic regimen (Table 1).

Fig. 1 The anterior and posterior tonsillar arch suture with one suture at inferior tonsillar pole close to the tongue base

Table 1 The characteristics of 44 patients

Patients (<i>N</i> = 44)	Study group (<i>N</i> = 22)	Control group (<i>N</i> = 22)
Age (mean year, S.D.)	29.0 $\pm$ 3.4	29.3 $\pm$ 3.4
Gender (male/female)	11 M/11 F	10 M/12F
Indications for surgery		
Recurrent tonsillitis	5 M/6 F	5 M/6 F
Obstructive tonsillar hypertrophy	2 M/2 F	1 M/3 F
Chronic tonsillitis	4 M/3 F	4 M/3 F

Results

The effect of time (postoperative days) on VAS values was significant. There was a statistical significance between mean VAS values of study group and control group on postoperative 1st, 3rd, 7th, and 10th days ($P < 0.05$). We commented these statistical data as follow: the severity of posttonsillectomy pain in study group patients was less seen than control group patients on postoperative 1st, 3rd, 7th, and 10th days (Fig. 2; Table 2).

In study group patients, the differences of VAS values between postoperative 1st and 10th day and between postoperative 3rd and 10th day were statistically significant ($P < 0.05$). Namely, the severity of posttonsillectomy pain was less seen on postoperative 10th than 3rd and 1st days (Tables 3, 4, 5).

Fig. 2 The mean VAS values of study group and control group on postoperative day 1st, 3rd, 7th, and 10th

Table 2 The comparison of VAS scores between study and control group for each postoperative days (1st, 3rd, 7th, and 10th)

Postoperative day	Groups	Mean VAS score ($\pm$) SD	<i>P</i> -value
1st	Study group	6.4545 $\pm$ 1.81861	<0.05*
	Control group	8.2727 $\pm$ 1.54863	
3rd	Study group	6.0000 $\pm$ 2.13809	<0.05*
	Control group	7.6818 $\pm$ 1.72892	
7th	Study group	5.3182 $\pm$ 2.10184	<0.05*
	Control group	7.0455 $\pm$ 2.08115	
10th	Study group	4.2727 $\pm$ 2.02794	<0.05*
	Control group	6.0909 $\pm$ 2.09100	

* *P*-value < 0.05 is statistically significant

Table 3 The comparison of VAS values for different postoperative days in study group

Postoperative day	Mean VAS score	SD ($\pm$)	<i>N</i>
<i>Descriptive statistics for study group</i>			
1st	6.4545	1.81861	22
3rd	6.0000	2.13809	22
7th	5.3182	2.10184	22
10th	4.2727	2.02794	22

Discussion

Even if, the pain is a subjective sensation, it is a boring situation for especially adult patients in posttonsillectomy term. At the same time, posttonsillectomy pain can cause important postoperative morbidity as secondary hemorrhage due to dehydration because of decreased oral intake [9]. Therefore, it is important to alleviate the pain associated with tonsillectomy in adult patients for decreasing the postoperative morbidity and probable complications.

Table 4 The comparison of different postoperative days with Bonferroni multiple significance test in study group

Postoperative day (study group)	Postoperative day (study group)	<i>P</i> -value
1st	3rd	>0.05
1st	7th	>0.05
1st	10th	<0.05*
3rd	7th	>0.05
3rd	10th	<0.05*
7th	10th	>0.05

* *P*-value < 0.05 is statistically significant

Table 5 The comparison of VAS values for different postoperative days in control group

Postoperative day	Mean VAS score	SD ($\pm$)	<i>N</i>
<i>Descriptive statistics for control group</i>			
1st	8.2727	1.54863	22
3rd	7.6818	1.72892	22
7th	7.0455	2.08115	22
10th	6.0909	2.09100	22

It is stated that posttonsillectomy pain is caused by inflammation, nerve irritation, and pharyngeal muscle spasm. The pain does not alleviate until the muscle is covered with mucosal epithelium 14–20 days after the operation [10]. In this study, we observed the decrease of posttonsillectomy pain as a result of preventing the irritation of naked nerve endings and supplying more epithelization of tonsillectomy lodges by attaching the anterior and posterior tonsillar archs to each other with a suture. There are another studies about how to control the pain after tonsillectomy in the literature besides our suturation technique. Leach et al. [11] compared the sharp dissection technique with electrocautery surgery. They found that the electrocautery surgery may cause more pain than sharp dissection alone. Genc et al. [8] stated that covering the tonsillectomy field with mucosal palatopharyngeal arch plap significantly reduces pain after third postoperative day. In another study performed with allograft dermal material proposes that having a sealed tissue over the naked nerve endings has more positive effect on the control of posttonsillectomy pain [12]. Mixson et al. [13] concluded that microdebrider subcapsular tonsillectomy is valuable in treatment of children with tonsillar hypertrophy because of decreased pain medicine when compared to harmonic scalpel and electrocautery total tonsillectomy. Chang et al. [14] concluded that children with obstructive sleep apnea undergoing tonsillectomy and adenoidectomy demonstrated significantly better postoperative recovery and less postoperative pain after coblation-assisted intracapsular tonsillectomy versus

electrocautery tonsillectomy. In another study, Chang et al. [15] observed that intracapsular tonsillectomy patients had similar levels of pain to subcapsular tonsillectomy patients on day 1 or 2. But, at day 5 or 6, intracapsular tonsillectomy patients had significantly less pain than subcapsular tonsillectomy patients. We observed that posttonsillectomy pain decreased either on postoperative 1st day or postoperative 3rd, 7th, 10th days in study group patients.

Besides surgical managements, there are some studies about the non-surgical (medication and drug treatment) studies in the literature, too. Susaman et al. [16] were performed the tonsillectomy procedure under local anesthesia in 60 adult patients between 16 and 35 years of age, then 10% lidocaine HCl aerosol was applied to the tonsillectomy fossa and they stated that lidocaine HCl aerosol exerts a therapeutic effect on postoperative pain control in tonsillectomy patients. In a resemble study, bupivacaine and dexamethasone were infiltrated to the tonsil surrounding tissue before tonsillectomy and lidocaine nasal aerosol was sprayed onto tonsillectomy and the posttonsillectomy pain decreased significantly in the first postoperative day [4]. Johansen et al. [17] investigated the value of preincisional peritonsillar infiltration of bupivacaine hydrochloride before tonsillectomy under general anesthesia in 19 adult patients between 18 and 40 years of age. They observed that preoperative blocking of nociceptive impulses reduces prolonged postoperative pain, but no reduction in the intake of analgesics. But Hydri et al. [18] observed that topical application of local anesthetic (bupivacaine) has no evident pain control in patients after tonsillectomy. Oghan et al. [19] observed that locally 1.0% ropivacaine administration significantly relieves the pain of pediatric tonsillectomy.

In posttonsillectomy term, there is often excess edema and inflammation. The mechanism of action of corticosteroids can decrease local inflammation by blocking the chemical mediators of inflammation. Stewart et al. [20] observed that patients received both dexamethasone and piroxicam reduces postoperative pain and analgesic requirements after adult tonsillectomy. On the contrary, Ohlms et al. [9] reported that a single intraoperative dose of IV dexamethasone did not change the postoperative course in children underwent tonsillectomy.

Posttonsillectomy pain is an important problem in especially adults. Older patients are more affected than younger patients [21]. As a result of postoperative pain, the oral intake decreases and the rate of complication and morbidity may increase, and the postoperative healing may affects negatively [19]. Therefore, it is important to subside the pain after tonsillectomy in especially adult patients. There are many management to overcome the pain problem. But, neither surgical techniques nor medications completely cease the pain perception after the tonsillectomy. As a result

of our performed surgical technique, we observed clinically significant decrease of posttonsillectomy pain beginning from postoperative 1st until 10th day in study group patients compared to control patients. So, we think that the inferior suturation of tonsillar archs technique can be useful for control and subside the posttonsillectomy pain in adult patients.

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