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A Prospective Self Controlled Trial to Evaluate Post Operative Pain After Tonsillectomy by Suturing Plica Tonsillaris

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Abstract

To measure post operative pain levels in patients undergoing cold dissection tonsillectomy with or without suturing of plica tonsillaris. The hypothesis is that the suturing of the plica tonsillaris may be associated with less post operative pain. In this prospective and self controlled trial thirty-eight patients between 6 and 46 years of age (mean age 17.25±12.32) underwent tonsillectomy, or adeno-tonsillectomy were included to the study. The patients who had a chronic disease or bleeding disorder, patients who did not approve this surgical procedure, and children under age of 6 were excluded from the study. We compared post operative throat pain during the first 20 days. This was assessed by using a visual analog pain scale and the Wong-Baker faces pain rating scale. Comparison of mean pain scores revealed statistically significant less pain in the sutured side during the first 10 days ($p<0.05$). After the first ten days of the follow-up no statistically significant difference was observed. Suturing technique of plica tonsillaris for reducing post tonsillectomy throat pain is useful for adult and pediatric patients undergoing tonsillectomy.

Key words: Tonsillectomy, plica suturation, pain controle.

Introduction

Pain management and patient's convenience are becoming an important issue in modern medicine. Post-operative pain after tonsillectomy is a prominent problem. Several studies have been done to reduce the intensity of post operative pain (1,2). Using the comparison between different various operative techniques including radiofrequency, laser, monopolar cauter, harmonic scalpel, cold dissection, etc., the efficacies of these techniques for the reduction of post-operative pain have been evaluated (3-6). But there are controversial references about their effectiveness on the postoperative pain control (7).

Lack of a definitive conclusion, despite all these surgical treatments, directed the researchers on suturation of tonsil areas which remained exposed in order to control post-operative pain. In a study it was shown that pain was decreased via grafting using acellular dermal graft (8). However, there was a few trial related to analysis of suturing technique on post tonsillectomy pain relief in the literatüre (7,9,10). Nandapalan et al. tracked the only

pediatric patient's pain score who were above 12 years-old for postoperative ten days (10). In our study, both pediatric and adult patients were tracked for postoperative 20 days. However we designed the present study to evaluate the course post-operative pain with enrolment of adults as well as children aged 6 years or older and a follow-up period of 20 days. Unlike to our study, in the study by Genc et al. only pediatrics patients were included to study and post-operative pain were recorded for first 10 days after surgery.
The goal of this prospective self controlled trial was to evaluate the potential benefits of suturing technique for post tonsillectomy pain relief in pediatric and adult patients during postoperative first 20 days.

Materials and Methods

Thirty-eight patients (21 male, 17 female) from 6 to 46 years of age (mean age 17.25±12.32) were included in the study between November 2010 and April 2011. The patients who accepted to participate in the study were informed that one side would be left without suturation as usual in traditional tonsillectomy but the other side would be sutured after the surgery. Afterwards, the volunteers were included in the study. The informed consent forms from adult patients or parents of the children were collected and submitted to the ethical council. The design of this trial has been approved by the ethical committee of Mustafa Kemal University Medical Faculty.
Patients with tonsillar hypertrophy and obstructive symptoms, recurrent tonsillitis were included in the study. The patients with systemic chronic disease or bleeding disorder, patients who did not approve this surgical procedure, and children under age of 6 were excluded.

The severities of pain were determined by using a validated visual analog scale (VAS). Pain scores for sutured side ranged from 0 to 100 points on the self-reporting (VAS) which is considered to be the best method, in comparison to unsutured other tonsillectomy side. But the evaluation of pain for the patients under 12 years of age, the Wong-Baker faces pain scale was used, which is well understood by children. Pediatric patients have rated pain in 10 different levels by marking either a face corresponding to the numbers:0-2-4-6-8-10 or a space between numbers on the Wong-Baker faces pain scale. Then, mean pain score was calculated after converting the observed scores into a 0-100 scale by multiplying the each of the scores by 10. After the mean pain scores were computed, they were combined with the data gained from adult patients using the 0-100 pain scale. In fact, Wong-Baker scale is based on the graphical representation of the scale which was divided into 10 points (11). A comparative study was published by Jaywant et al, which indicates similar results by VAS, Wong-Baker and other pain scales (12). Thus, we appropriately combined Wong-Baker scale used in pediatric patients to adult VAS scale.

The operations were performed by the same surgeons using a standardized general anesthesia protocol: induction with intravenous propofol (2 mg/kg), fentanyl (1 mic gr/kg), esmeron (0.6 mg/kg) and maintenance was achieved by sevoflouran (%2).
The patients were in supine position and the neck was extended with a roll pillow placed under the shoulders. All tonsillectomies were done by cold dissection technique. This technique was preferred because the other techniques may have increasing or decreasing effect on postoperative pain. After maintaining the

hemostasis, on the right side palatoglossus and palatopharengeus muscles were stitched up by 2 or 3 sutures depending on the length of the tonsillar fossa and the left side was left unsutured (figure 1).

The SPSS 13.0 commercial software program was used for statistical analysis. Mean and standard deviation of the sample were calculated as 45.00 and 10.00 respectively. The sample size was 36 (n=36). Fixing the Type I error rate to the 5 percent ($\alpha = 0.05$), the calculated statistical power was 85.1 percent (85.1%). Wilcoxon test was applied to compare the left side and right side pain scores, and the difference was statistically significant ($p<0.05$).

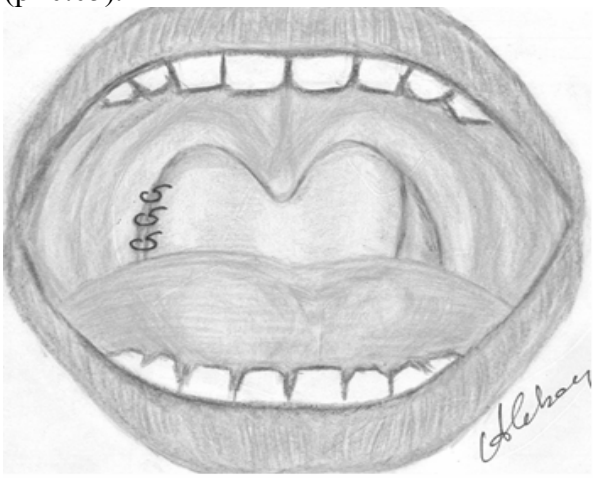

Figure 1: Illustration of surgical procedure: Surgery region was closed by suturing the right post operative tonsil plicas, and left tonsillectomy region left open.

Results

Thirty-eight patiens (21 male and 17 female; age range: 6-46 years) were included in the study. In patients who are younger than 12 years of age the Wong-Baker faces pain scale were used and the elder patients were evaluated by using the visual analog scale. Pain scores at each of the time intervals for each of the sides ranged from 0 to 100 mm on the VAS in order to maximize the evaluation of the pain by patient. On every day of the long follow-up of 20 days, the mean scores of pain on the right sides were calculated in all patients with minimum and maximum pain scores. The same calculations were taken place for the left side pain scores. The mean scores of the left side was compared day-by-day to the mean scores of the right side. Maximum and minimum mean pain scores for the right side were 49.58 and 4.44; and for the left side the scores were 54.72 and 5.69 points respectively (figure 2). For the first 10-days of the follow-up, a statistically significant decrease in pain scores for sutured side was found ($p<0.05$). After the end of the second week of the follow-up no statistically significant difference was observed. Only 6 patients felt much more pain on the right side. But these findings did not affected conclusion aspect to average pain scores.

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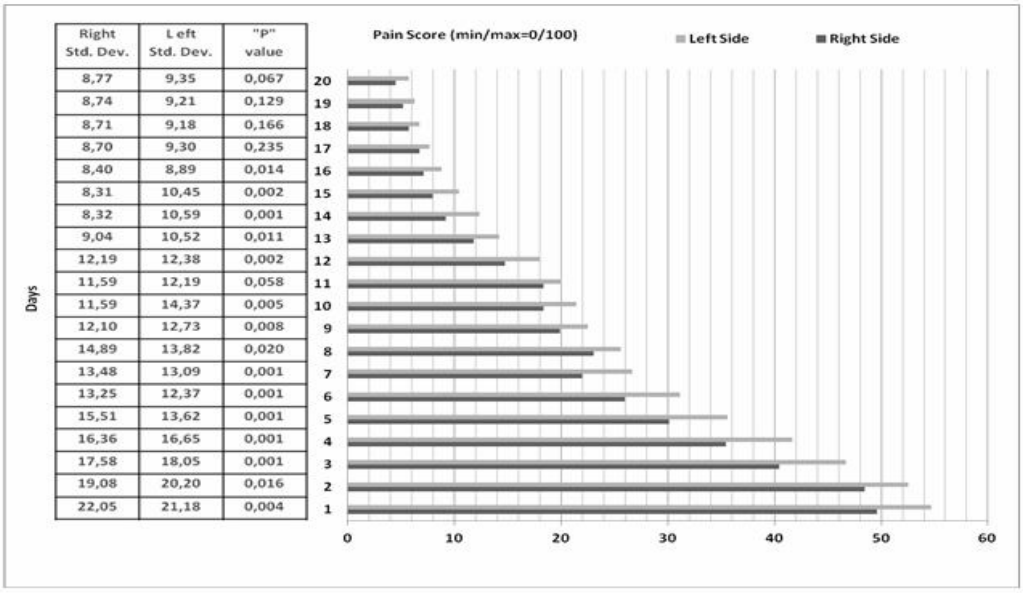

Right Std. Dev.	Left Std. Dev.	"P" value
8,77	9,35	0,067
8,74	9,21	0,129
8,71	9,18	0,166
8,70	9,30	0,235
8,40	8,89	0,014
8,31	10,45	0,002
8,32	10,59	0,001
9,04	10,52	0,011
12,19	12,38	0,002
11,59	12,19	0,058
11,59	14,37	0,005
12,10	12,73	0,008
14,89	13,82	0,020
13,48	13,09	0,001
13,25	12,37	0,001
15,51	13,62	0,001
16,36	16,65	0,001
17,58	18,05	0,001
19,08	20,20	0,016
22,05	21,18	0,004

Figure 2: Mean pain scores for both sides of 38 patients on follow up: A significant decrease in pain for the sutured side was determined during the early post-operative period; in addition to this, the significant difference vanishes in time

Discussion

Tonsillectomy is probably the most frequent surgical procedure which is associated with significant post operative throat pain. This significant throat pain may be caused from irritation of nerve endings, muscle spasm, excessive dissection, or cautery-haemostasis of the tonsillar fossa. Finally this may lead to dehydration due to decreased oral intake, sleep disturbances, behavioral changes, emesis and late hemorrhage.

Various surgical and pharmacologic strategies have been undertaken in an effort to reduce this prominent problem (1,2). Opioids have been used to provide sufficient analgesia. Although opioids may manage this problem they are associated with respiratory depression, nausea and vomiting in children (13,14). However, anti-inflammatory drugs may be insufficient in some patients for pain relief and they also inhibit the synthesis of prostaglandins at both the cyclo-oxygenase (COX)-1 and COX-2 sites and their usage has been associated with post operative bleeding (15).

Also by using various surgical devices, the post tonsillectomy pain may be reduced. For this purpose Parker at al. took part in a prospective - randomized double blind trial and they have done their tonsillectomies by two different techniques: cold steel dissection and coblator dissection. No statistical difference was identified between the two groups following discharge except on the postoperative day 6 in which the coblator group had lower pain scores. Their findings did not confirmed their hypothesis that the coblator device is associated with lower levels of postoperative pain but indicated that less analgesic is required by the coblator patients in the first 12 h postoperatively (16).

Researchers focused on the obliteration of tonsilar fossa with the studies suggesting that surgical dissection techniques are insufficient in the pain control. Studies were planned including drug administration into fossa, grafting or saturation of fossa. A study performed with an acellular dermal graft proposed that having a sealed tissue over the naked nerve endings has more positive effect on the control of postoperative pain (8).

In a study on 50 patients older than 15 years of age, tonsilar fossa at one side was sutured while contralateral side remained unsutured

(10). Pain was assessed by VAS within 10 days after surgery. The pain was greater at obliterated side in first days after surgery, while more than 80% of the patients observed less pain at the obliterated side by time. No complication related to obliteration of tonsillar fossa was observed. Unlike this study, follow-up period was specified as 20 days in our study. On the contrary to above-mentioned study, we observed less pain at the obliterated side throughout first ten days in our study. In addition, we included children aged 6 to 12 years and used Wong-Baker scale in this age group, which is considered as more appropriate. We observed no incompliance to this scale in children. Also, we obtained data in parallel to those obtained in adult patients by using VAS. We previously performed a study (6) to make clearer and more objective comparisons between bipolar electrodissection tonsillectomy (BET) and traditional cold dissection tonsillectomy (TCT) by comparing the results of both techniques performed on the same patient. TCT was applied to the right-side of each of the participants, while BET was performed to the left-side. When the results were compared in postoperative pain, we found BET is more painful than TCT for shorter-terms; however as time passes, such as the next day, experienced postoperative pain for BET is significantly less than the pain for TCT ($p<0.05$). This study set us think that the severe pain in the patients underwent BET had felt on first-day was due to the pain in neural crests caused by the burn on the tonsillar fossa. Therefore; it can be assumed that, the pain can be alleviated by preventing the neural crests (which uncovered due to the suturing of the tonsillar fossa) from contacting with the air, food, and other irritants.

Cushing et al. compared postoperative pain between monopolar cautery tonsillectomy and harmonic scalpel tonsillectomy (HST) (3). Validated visual analog pain scales (VAS) were used to quantify pain at rest and with swallowing for each side and were completed daily for 14 days. Pairwise comparisons of pain scores revealed no significant difference between monopolar cautery tonsillectomy and HST ($p>0.05$). Thus, subjects undergoing monopolar cautery tonsillectomy did not experience increased postoperative pain in comparison to HST.

To our knowledge, there are a few studies related with suturing tonsillary bed. In one of this studies which was evaluating the effect of suturating plica tonsillaris on postoperative pain two different patients groups had been used. In one group of patient both plica tonsillaris were suturated and in the other group they were left unsuturated (9). In that study, both tonsillary beds were sutured in a group, while both tonsillary beds left unsutured in control group. Threshold of individual pain perception may have misleading effects on results. Our study was designed as a self controlled study for a better evaluation. Genç et al. were performed a self controlled study like our study but their participants were pediatric patients (7). Unlike our study, they excluded adult patients. Also, they have evaluated the pain scale in postoperative 1, 3, 5, 7, 10.days and they have found no difference in day one. However, pain severity was significantly lower in suturation side in postoperative day 3 and 10. Our study population was composed of pediatric and adult patients and we evaluated the pain severity daily for 20 days. The pain severity was statistically significantly lower in suturated side upto postoperative day 10 but, there was no difference between days 10 and 20. We have hypothesized that primary closure of the tonsillary bed wound after surgery may reduce the post operative pain by reducing the contact with swallowed foreign materials to the open wound bed and helping the healing phase depending by the personal experience of the first author. In order to evaluate this, we have planned a self controlled trial. In our self controlled prospective trial, tonsillectomies were done by cold dissection technique. After obtaining the hemostasis, on the right side, the palatoglossus and the palatopharengeus muscles were stitched up by 2 or 3 sutures depending on the length of the tonsillar fossa.

After we have compared the two sides day by day with Wong-Baker faces pain scale and with VAS post operative throat pain on the

right side was lesser than the left side for the first 10 days on follow up. At the last ten days of follow up patients felt less pain on the right side but this was not statistically significant.
Opposite to our hypothesis 6 patients felt much more pain on the right side, but these findings did not affected conclusion aspect to average pain scores. This may be a result of surgical trauma of suturing depending on the less experience of the trainee. This also may be associated with the same foreign body reaction. So this deserves to investigate further. In order to prove our hypothesis, studies with larger groups must be conducted.

Conclusion

Several dissection technigues are used for pain control after tonsillectomy. However, there are studies suggesting that these dissection technigues are insufficient in alleviating pain in the literature. The use of medical treatments is limited due to side effects. In recent years, grafting or obliterating tonsillar fossa is being discussed. For this reason, suturing technique of plica tonsillaris for reducing post tonsillectomy throat pain in adult and pediatric patients is helpful for the patients undergoing tonsillectomy. This may also cause early recovery of normal diet and so the wound healing may result much more earlier.

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