

Comparing Traditional Cold Knife Tonsillectomy with a New Technique Plasma Knife Tonsillectomy

Original Investigation

Gül Soylu Özler¹, Emel Cadallı Tatar², Güleser Saylam², Ali Özdek³, Hakan Korkmaz⁴

¹Department of Otolaryngology, Faculty of Medicine, Mustafa Kemal University, Hatay, Turkey

²Clinic of Otolaryngology, Ankara Dışkapı Yıldırım Beyazıt Training and Research Hospital, Ankara, Turkey

³Department of Otolaryngology, Karabük University, Karabük, Turkey

⁴Department of Otolaryngology, Faculty of Medicine, Yıldırım Beyazıt University, Ankara, Turkey

Abstract

Objective: The aim of this study is to compare traditional cold knife tonsillectomy and plasma knife tonsillectomy.

Methods: In this study, 15 patients underwent cold knife tonsillectomy, 15 patients underwent plasma knife tonsillectomy. The patients were then followed up in the postoperative days.

Results: The operation time and intraoperative blood loss in cold knife tonsillectomy group was significantly greater than the plasma knife group ($p < 0.001$). The mean pain scores in the plasma knife group was significantly higher than the dissection group ($p = 0.006$). Pain scores in each follow up time for each group was not statistically significant ($p > 0.05$). Postoperative compli-

cations were similar for both groups ($p = 0.224$). There was no significant correlation of complications and age ($p = 0.921$). Operation time of the patients who had complications was not different from the patients who did not have complications ($p = 0.086$). Pain scores in every follow up time for both groups was not significantly different ($p > 0.005$).

Conclusion: According to this data, plasma knife tonsillectomy was not found superior to cold knife tonsillectomy in the postoperative pain and complications but had positive effects on operation time and blood loss.

Key Words: Tonsillectomy, cold dissection, plasma knife, hemorrhage, pain scores

Introduction

Tonsillectomy is one of the most common procedures performed in ear nose throat practice (1). In recent years tonsillectomy numbers have declined with the definition of treatment criterias and antibiotic treatment, but tonsillectomy is still the leading surgical procedure in pediatric patients (2).

Tonsillectomy is one of the oldest operations and is first described by Celsus in the first century. Since that time, many surgical instruments and approaches have been described. Pain, hemorrhage, infection in the tonsillar area, otalgia, dysphagia and voice disorder are the complications of tonsillectomy (3).

Although the experiences of ear nose throat physicians in tonsil surgery is considerable, there is no consensus about optimal surgical procedure. There are various surgical procedures; cold knife tonsillectomy, monopolar and bipolar electrocautery excision, cryosurgery, diathermy, bipolar scissors tonsillectomy, KTP-532 laser, ultrasonic excision and the newest procedures of radiofrequency tonsil ablation and coblation. All these procedures are upgraded in the hope of reducing the morbidities such as pain, hemorrhage and postoperative dehydration (4). Still, the investigation of the most appropriate surgical procedure continues and this leads to new procedures.

In this study, the patients who had undergone cold knife tonsillectomy and plasma knife tonsillectomy were assessed and compared for intraoperative blood loss, operation time, postoperative pain, first oral intake time, return to normal activity duration and postoperative complications.



Address for Correspondence:

Gül Soylu Özler, Department of Otolaryngology,
 Faculty of Medicine, Mustafa Kemal University,
 Hatay, Turkey

Phone: +90 505 398 07 78

E-mail: soyluqul@yahoo.com

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Methods

Study Design

Thirty patients who had undergone cold knife tonsillectomy (CKT) and plasma knife tonsillectomy (PKT) between March and September 2009 were included in the study. Ethics committee approval was obtained from Ankara Dışkapı Yıldırım Beyazıt Research and Training Hospital in February 2009 and the study was conducted in accordance to the Declaration of Helsinki. Informed consent was obtained from all participants.

Tonsillectomy indications were; tonsil infections (recurrent acute tonsillitis, chronic tonsillitis, acute tonsillitis complications - peritonsillar abscess, arthritis, nephritis), chronic tonsillar hypertrophy, snoring and apnea (OSAS). Patients with mental retardation, hemorrhagic diathesis, systemic diseases, central nervous system diseases or peripheral nerve paralysis were excluded (Table 1).

Surgical Procedure

All operations were performed under general anesthesia by the same surgical team.

In CDT; the anterior plica of the tonsil was incised with a blade and the tonsil capsule was revealed by separating the anterior plica from the tonsil by dissection. Then the tonsil was grasped by the tonsil clamp and dissection was done from the superior to inferior pole through the tonsillar area. Finally, the tonsil was separated by wire snare. Hemorrhage control was done with a compress, if a hemorrhagic focus had been seen, suturation was performed.

In PKT; plasma knife probe (Tonsil Plasma Knife J prob, Gyrus G3) was used. The device was used in 10% cut 90% coagulation mode. The probe was used to incise the anterior plica, enter the peritonsillar space and dissect the tonsil from the superior to inferior pole. Hemorrhage control was done with the coagulation mode of the same device.

Patients were assessed for intraoperative blood loss, operation time, postoperative pain, first oral intake time, return to normal activity duration and postoperative complications.

Intraoperative blood loss was assessed by the surgeon up to the tonsillar area and the blood volume in the aspirator. Operation time was the duration between the tonsillar incision and hemorrhage control time.

Patients were also followed for first oral intake time and return to normal activity duration.

Pain intensity was assessed by faces scala in children under 8 years old. In adults visual analogue scala was used. The assess-

Table 1. Inclusion and exclusion criterias of the study

| Inclusion Criteria | Exclusion Criteria |
|------------------------------------|------------------------------------|
| 1. Tonsil infections | 1. Mental retardation |
| a. Recurrent acute tonsillitis | 2. Hemorrhagic diathesis |
| b. Chronic tonsillitis | 3. Systemic diseases |
| c. Acute tonsillitis complications | 4. Central nervous system diseases |
| 2. Chronic tonsillar hypertrophy | 5. Peripheral nerve paralysis |
| 3. Snoring and apnea (OSAS) | |

ment in the postoperative 1st hour, 4th hour, 24th hour, 3rd and 7th day was done by the surgeon, after discharge they were requested to fill follow -up forms on the 2nd, 4th, 5th and 6th day.

Statistical analysis

Statistical analysis was performed using the SPSS (Statistical Package for the Social Sciences) 11.5 Evaluation for Windows. Statistical significance was set as $p < 0.05$ and the statistically significant results were evaluated with the Bonferroni test.

Results

Fifteen patients in the CDT group, 15 patients in the PKT group completed the study.

Indications

In the CDT group, indications for tonsillectomy were chronic tonsillitis for 8 patients, apnea for 5 patients, chronic tonsillitis and apnea for 2 patients; In the PKT group these indications were, chronic tonsillitis for 11 patients, apnea for 2 patients, chronic tonsillitis and apnea for 2 patients.

Demographic Properties

Mean age in the CDT and PKT groups were 13 ± 13.6 , and 10.8 ± 7 respectively. 60% of the CDT group and 46.7% of the PKT group were males. There were no significant differences for age and gender among the groups ($p > 0.05$).

Operation Time and Intraoperative Blood Loss

Mean operation time was 33.6 ± 10.9 min for the CDT group, 18.3 ± 9.7 min for the PKT group. Operation time in the CDT group was significantly longer when compared with the PKT group ($p < 0.001$).

Mean intraoperative blood loss was 133.3 ± 72.5 mL for the CDT group, and 39.6 ± 18.9 mL for the PKT group. Intraoperative blood loss in the CDT group was significantly more compared to the PKT group ($p < 0.001$).

First Oral Intake Time - Return to Normal Activity Time

First oral intake time for the CDT and PKT groups were 3.8 ± 1.1 days and 4.5 ± 1 days respectively. There were no significant differences for first oral intake time among the two groups ($p = 0.061$).

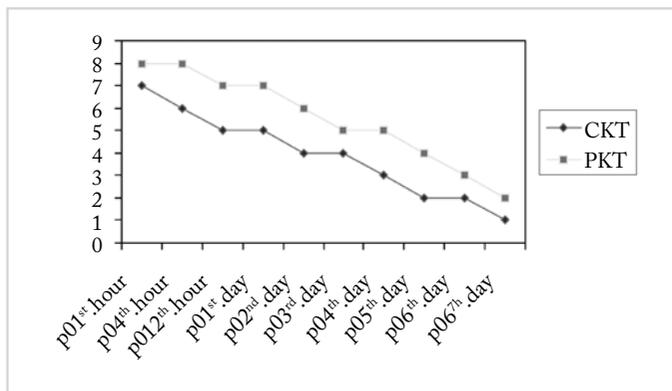


Figure 1. Postoperative pain scores

CKT: cold knife tonsillectomy; PKT: picuma knife tonsillectomy

Return to normal activity time in the CDT and PKT groups were 3.0 ± 1.5 days and 4.8 ± 1.4 days respectively and return to normal activity in the PKT group was significantly later ($p=0.002$).

Postoperative Pain Follow-up

Mean pain scores in postoperative period in the CDT and PKT groups were 4.1 ± 1.5 and 5.5 ± 1.1 respectively. Mean pain scores in the PKT group was significantly higher than the CDT group ($p=0.006$). When both groups were assessed for pain scores for every follow up time, there was no statistically significant difference ($p>0.005$) (Figure 1).

Pain scores in both groups were highest in the postoperative 1. hour and the pain decreased stepwise at every follow up time ($p>0.0006$).

When we compared the mean pain score of patients under and over 8 years old, this was 4.1 ± 1.1 and 5.5 ± 1.5 respectively. There was a significantly difference for mean pain scores between the two groups and mean pain scores was higher in the group over 8 years old ($p=0.033$). However, there were no significant difference for pain scores at every follow up time between the groups ($p>0.005$).

Complications

No complication was seen in the CDT group whereas 2 oral intake in sufficiency and 1 hemorrhage in the postoperative 3rd day were seen in the PKT group. Complication ratios in both groups showed no significant difference ($p=0.224$).

Mean age of the patients who had a complication and who had no complication were 11.33 ± 7.5 and 12.00 ± 11.1 respectively. There was no statistical association between age and complication ($p=0.921$).

The operation time in the patients who had complications and who had no complication were 15.6 ± 12.4 minutes and

27.1 ± 12.5 minutes respectively. No statistical difference was found between the groups ($p=0.086$).

The mean pain scores of the patients who had a complication and who had no complication were 6.06 ± 1.5 and 4.68 ± 1.49 . No statistically significant difference was found for average mean pain scores ($p=0.100$) and pain scores at every follow up time ($p>0.005$).

Discussion

Tonsillectomy is an extremely successful procedure in the treatment of upper airway obstruction and recurrent tonsillitis, performed by any technique. For this reason it is still the leading operation in ear nose throat practice (4).

In our study, the operation time in the PKT group was statistically shorter than the CDT group. Intraoperative blood loss was statistically less in the PKT group. The mean pain scores in the PKT group was significantly higher than the CDT group. There were no significant differences for first oral intake time among the two groups but return to normal activity time in the PKT group was significantly later. The groups had no statistically significant difference for the complication ratios.

In hot techniques, dissection and hemostasis are performed simultaneously and this makes these procedures faster compared to cold techniques (5-7). PKT is a type of hot technique and, consistent with the literature, operation time in the PKT group was faster than the CDT group in our study.

An ideal tonsillectomy technique should also be the technique with minimal intraoperative blood loss. Di Rienzo et al. (8) reported less intraoperative blood loss in the PKT group where as Hasan et al. (9) found more blood loss in the PKT group. In our study we observed less intraoperative blood loss in the PKT group.

Postoperative pain is one of the most important factors in deciding the tonsillectomy technique. There are many studies in the literature comparing techniques for pain. Some authors report less pain in the PKT group (7, 8); some authors report more pain in the PKT group (9) and moreover some authors report no significant difference in terms of postoperative pain between the groups (10). In our study, the mean pain scores in the PKT group was significantly higher than the CDT group.

There were very few studies found in the literature concerning first oral intake time and return to normal activity time. First oral intake time is reported earlier in the PKT group in the literature (7, 8, 10). In our study, there was no significant difference for first oral intake time among the two groups.

Return to normal activity time is reported later by Hasan et al. (9) and earlier by Di Rienzo et al. (8) in the PKT group. In

our study, return to normal activity time in the PKT group was significantly later. The groups had no statistically significant difference for the complication ratios.

The limitation of this study is the number of cases we investigated. Further studies with larger groups will be beneficial.

Conclusion

PKT is favourable for shorter operation time and less intraoperative blood loss compared to CDT. This technique can be used for the patients who must take anesthesia for a shorter time. However, the high postoperative pain scores and late return to normal activity limits the use of this technique.

Conflict of Interest: No conflict of interest was declared by the authors.

Peer-review: Externally peer-reviewed.

Ethics Committee Approval: Ethics committee approval was received for this study from the Ethics Committee of Dışkapı Eğitim ve Araştırma Hastanesi in 2009.

Informed Consent: Written informed consent was obtained from patients who participated in this study.

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Review - G.O., A.O.; Writing - G.O., E.T.; Critical Review - E.T., H.K.; Other - A.O., G.S.

References

1. Nunez DA, Provan J, Crawford M. Postoperative tonsillectomy pain in pediatric patients. *Arch Otolaryngol Head Neck Surg* 2000; 126: 837-41. [\[CrossRef\]](#)
2. Wiatrak BJ, Woolley AL. Pharyngitis and adenotonsillar disease. In: Cummings CW, Fredrickson JM, Schuller DE, eds. *Otolaryngology Head and Neck Surgery*, ed 3. Mosby; 1998. p. 188-215.
3. Curtin JM. The history of tonsil and adenoid surgery. *Otolaryngol Clin North Am* 1987; 20: 415-9.
4. Younis R. T, Lazar R. H. History and Current Practice of tonsillectomy. *Laryngoscope* 2002; 112: 3-5. [\[CrossRef\]](#)
5. Pang YT. Paediatric tonsillectomy: bipolar electrodissection and dissection/snare Compared. *J Laryngol Otol* 1995; 109: 733-6. [\[CrossRef\]](#)
6. Kirazli T, Bilgen C, Midilli R, Ogüt F, Uyar M, Kedek A. Bipolar electrodissection tonsillectomy in children. *Eur Arch Otorhinolaryngol* 2005; 262: 716-8. [\[CrossRef\]](#)
7. Temple RH, Timms MS. Pediatric coblation tonsillectomy. *Int J Pediatr Otolrhinolaryngol* 2001; 61: 195-8. [\[CrossRef\]](#)
8. Di Rienzo Businco L, Coen Tirelli G. Paediatric tonsillectomy: radiofrequency-based plasma dissection compared to cold dissection with sutures. *Acta Otorhinolaryngol Ital* 2008; 28: 67-72.
9. Hanna Hasan, Hannu Raitiola. Randomized study comparing postoperative pain between coblation and bipolar scissor tonsillectomy. *Eur Arch Otorhinolaryngol*. 2008; 265: 817-20. [\[CrossRef\]](#)
10. Philpott CM, Wild DC, Mehta D, Daniel M, Banerjee AR. A double-blinded randomized controlled trial of coblation versus conventional dissection tonsillectomy on postoperative symptoms. *Clin Otolaryngol* 2005; 30: 143-8. [\[CrossRef\]](#)