



Contents lists available at ScienceDirect

International Journal of Pediatric Otorhinolaryngology

journal homepage: <http://www.ijporlonline.com/>

The comparison of bleeding and pain after tonsillectomy in bipolar electrocautery vs cold dissection



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ARTICLE INFO

Article history:

Received 1 June 2016

Received in revised form

20 July 2016

Accepted 21 July 2016

Available online 26 July 2016

Keywords:

Adenoidectomy

Bleeding

Tonsillectomy

Pain

Pediatrics

Sleep-disorder

Tonsillitis

ABSTRACT

Objective: Although tonsillectomy is one of the most common surgeries performed in pediatric, it has potential major complications such as pain and bleeding. This study aimed to compare the bleeding and pain after tonsillectomy in bipolar electrocautery tonsillectomy versus cold dissection.

Methods: This double blind clinical trial was conducted on 70 pediatric patients who were candidate of tonsillectomy. Patients were divided into two groups of including bipolar cautery (BC) and cold dissection (CD). operation time, intraoperative blood loss, and postoperative bleeding and pain were evaluated in the current study.

Results: In both of the CD and BC groups, no significant difference was found in terms of sex and age. The average amount of the intraoperative blood loss in BC group was 14.086 ± 5.013 ml and in CD group was 26.14 ± 4.46 ml ($p = 0.0001$). The mean time of operation in BC group was 19 ± 2.89 min and in CD group was 29.31 ± 5.29 min ($p = 0.0001$).

patients were evaluated in terms of pain on the first, third, fifth, and seventh days after the operation. No statistically significant difference was found between two groups.

Moreover, Compared pain scores in all times across two groups, no significant difference was found.

In terms of postoperative bleeding, none of the patients in both groups had bleeding during follow-up.

Conclusion: Our study showed that bipolar electrocautery tonsillectomy can significantly reduce the operation time and intraoperative blood loss; however, postoperative pain and blood loss were similar in both techniques. We recommend bipolar electrocautery as the most suitable alternative method for tonsillectomy, especially in children.

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1. Introduction

Although tonsillectomy is one of the most common surgeries performed in pediatric population, it has potential major complications such as pain and bleeding [1]. These complications lead to the development of different techniques in adenoid tonsillitis surgery. Tonsillectomy via cold dissection is a traditional technique and newly introduced techniques include bipolar cautery, plasma excision (coblation), harmonic scalpel, powered intracapsular tonsillectomy [2].

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Monopolar tonsillectomy is preferred during the past three decades due to less operation time and better homeostasis during surgery. However, postoperative pain limits its use [2]. Theoretically, bipolar cautery is preferred over monopolar electrocautery since it results in less tissue damage and consequently less postoperative pain while maintaining the benefits of using cautery for patients such as less intraoperative blood loss and operation time [3,4].

This study aimed to compare two techniques of bipolar electrocautery and cold dissection in terms of postoperative pain status, intraoperative bleeding, and postoperative bleeding in order to present a technique with least complication.

2. Methods

The study was conducted after being approved by the Research Ethics Committee of Shahid Sadoughi University of Medical Sciences Yazd, Iran and obtaining written informed consent from patients' parents. This double blind randomized clinical trial was conducted on 70 pediatric patients with a history of sleep-disordered breathing or recurrent tonsillitis who were candidate of tonsillectomy with or without adenoidectomy. Patients and researchers were unaware of operation technique. Patients with history of hemorrhagic disease, sickle cell anemia, patients who received anticoagulation drugs, and patients whose parents were uncooperative were excluded from the study. Patients were randomized into two groups using random number table including 35 patients in each group and only one surgeon performed the surgeries in the study.

Patients were submitted to the general anesthesia by the same protocol. One of the group underwent tonsillectomy via bipolar cautery (BC) and the other group via cold dissection (CD). The incision of tonsil superior pole was done using bipolar cautery forceps in BC method to find tonsil capsule. Therefore, the avascular plane between the capsule and the tonsillar bed were carefully separated. Using bipolar cautery, tonsil was amputated at the inferior pole. Homeostasis was also done with bipolar cautery. In CD group, the superior mucosal incision was made with scalpel (No.12) and blunt dissection was used to remove tonsil from the tonsillar bed. Then, tonsil Snare was applied to amputate the tonsil at the inferior pole. In order to control bleeding and establish homeostasis, ligation by sutures and packing were used without any Hot methods (electrocautery, Coblation, Harmonic Scalpel). A nurse was measured operation time (from placement of Davis mouth gag up to its removal by the surgeon) in minutes from tonsillectomy onset up to homeostasis establishment. Blood loss was estimated through measuring suctioned blood in the suction chamber (minus serum used for washing) and cotton weight in throat before and after tonsillectomy. Adenoidectomy was performed in all patients with adenoid curette (adenoidectomy duration and bleeding amount were not considered). All patients were hospitalized on the day of the operation and they were discharged the day after surgery with postoperative orders of amoxicillin (20 Mg/kg/day-divided q 8 h) and acetaminophen syrup (10 Mg/kg q 6 h). The pain was rated based on Wong-Baker Faces Pain Rating Scale [5] (Fig. 1) on the first, third, fifth and seventh days following the surgery by questioning parents via the phone. Postoperative bleeding within a week was also recorded for each patient.

3. Results

This double blind randomized clinical trial was performed on 70 patients. Data distribution was assessed using Kolmogorov-Smirnov test which showed a normal distribution. T-test, Mann Whitney, and chi-square test were also used for data analysis (in SPSS software, version 20). P value < 0.05 was considered

significant. In CD group, 54.3% were female and 45.7% were male. In BC group, 37.1% were female and 62.9% were male. No significant difference was found between two groups in terms of sex and mean age. The average amount of the intraoperative blood loss and the mean time of operation between two groups were statistically significant ($P.v = 0.0001$ and $P.v = 0.0001$, respectively). Demographic information and study data are shown in Table 1.

Considering pain, the patients were evaluated on the first, third, fifth, and seventh day following the operation. Running Mann Whitney test, no statistically significant difference was found between two groups regarding pain on specified days (Table 2).

Moreover, pain scores were compared in all times between two groups using Repeated Measures Anova and no significant difference was observed ($P.v = 0.890$).

Both groups were evaluated in terms of postoperative bleeding and none of the patients in both groups had bleeding during one-week follow-up.

4. Discussion

various surgical techniques were developed to achieve less blood loss and pain after Adenotonsillectomy. The cold dissection tonsillectomy is a traditional technique of surgery; meanwhile, monopolar electrocautery tonsillectomy is a preferred technique due to better homeostasis during surgery, less operation time, and less intraoperative blood loss, but it is associated with more pain and slower healing. Attempts are made to find an ideal tonsillectomy surgical method with shorter operation time, less intraoperative blood loss, and quick recovery and less pain [6]. Despite the frequency of tonsillectomy, no universally accepted "ideal" method is discovered yet [7]. This study was conducted to compare traditional cold dissection method with bipolar electrocautery tonsillectomy as a newly introduced technique of surgery.

No significant difference was observed between two groups regarding means of age and sex both groups were comparable in terms of age and sex. The operation time was significantly reduced in BC method in comparison with CD, which can be due to coincidence of dissection and coagulation in BC method which confirms the results of the previous studies [6,8–13]. Less operation time reduces patient anesthesia duration, which is especially useful in children and can result in reduction of morbidity rate [14].

Comparing the two methods in this study, BC method showed a less amount of bleeding and it also led to significant difference which confirms the results of the previous studies [15,16]. The observed differences in terms of bleeding amount during surgery are especially noteworthy in young children who have limited blood volume and are at a higher risk of hypovolemic shock. Moreover, a less bleeding field increases the surgeon's vision and consequently reduces operation time and complications. In this study, none of the patients in both groups had postoperative blood loss during one-week follow-up. Various studies revealed different results considering postoperative bleeding. Some of the studies indicate that the risk of postoperative bleeding is higher in Hot



Fig. 1. The Wong-Baker FACES pain rating scale.

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