

# Cauterization tonsillectomy as compared to traditional tonsillectomy technique

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## ABSTRACT

**Background:** Tonsillectomy is one of the most frequently applied and oldest surgical procedures in otorhinolaryngology. Various surgical techniques are used to perform this operation including traditional and cauterization techniques. **Objectives:** To assess morbidity and efficacy and compare objectively the techniques in tonsillectomy, i.e., traditional technique and cauterization technique. This study compares the traditional and cauterization tonsillectomy techniques in view of their advantages and complications. **Methods:** This is a retrospective study and comparative study, conducted during the period from January 2017 to March 2018 from the patients attending to Alnamas General Hospital, Aseer Region, Saudi Arabia. The questionnaire was designed to compare the traditional and cauterization tonsillectomy. Fifty patients underwent traditional technique and fifty patients underwent cauterization method. The data analyzed using SPSS V.16.0 (SPSS Inc; Chicago, IL, USA). **Results:** A total of 100 patients, 62 males and 38 females, aged 8 to 16 years were included in the study. A total of 100 patients were enrolled in the study. Traditional and cauterization tonsillectomy were performed. 50 (27 male and 23 female) patients, whose ages ranged from 9 to 16 years old underwent the traditional tonsillectomy, 50 (35 male and 15 female) patients whose ages ranged from 8 to 16 years underwent cauterization. The two groups were similar for demographic parameters. The difference between mean operative times of the two methods was statistically significant. Postoperative bleeding is significantly higher in the traditional technique compared to cauterization method. Postoperative pain is significantly less in cauterization method. Only a few patients experienced fever, bleeding, and other complications related to anesthesia. The bleeding severity is significantly lower in the cauterization technique. Postoperative pain was less in cauterization technique on day 1 and day 5. Postoperative pain was from mild to severe. **Conclusion:** This study revealed significantly less postoperative complications in traditional tonsillectomy in comparison with the cauterization method. Healing time was significantly faster in cauterization technique than in traditional method.

**Keywords:** Bleeding, cauterization, pain, postoperative, tonsillectomy, traditional

## Introduction

Tonsillectomy is one of the most common surgical procedures

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performed worldwide. Over the years, various techniques and instruments have evolved to accomplish this operation and have a long history; in fact, the first description of tonsillar removal as a medical procedure is from the first century AD.<sup>[1,2]</sup> Recent advancements in equipment technology have used in several new tonsillectomy techniques. Various surgical techniques are used to perform this operation including classic

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blunt dissection, guillotine excision, electrocautery, cryosurgery, coblation, ultrasonic removal, laser removal, monopolar and bipolar dissection, thermal welding tonsillectomy, and ligature tonsillectomy.<sup>[3]</sup> Studies comparing various techniques are also increasing at the rate in parallel with these developments (Krishna *et al.*, 2004).<sup>[4]</sup> There is still controversy over which is the optimal technique of tonsillectomy with the lowest morbidity rates.<sup>[5]</sup> All the techniques have certain advantages and disadvantages. Any improvement of this procedure should decrease operating time, blood loss, postoperative hemorrhage, and particularly the postoperative morbidity. With the growing interest in day-case surgery, quick techniques with rapid recovery are favored. It should preferably if possible, be a painless surgery and allow a more early return to normal diet and daily activities as early as possible.<sup>[6,7]</sup> In this study, we will compare the two techniques; the traditional and cauterization technique. Unlike most operative procedures, which are closed primarily, tonsillectomy produces an open wound that heals by secondary intention. The major postoperative morbidity problems are pain and hemorrhage. The pain is the result of disruption of mucosa and glossopharyngeal and/or vagal nerve fibers followed by inflammation and spasm of the pharyngeal muscles that lead to ischemia and a protracted cycle of pain; it does not completely subside until the muscles are covered with mucosa 14 to 21 days after surgery. Postoperative pain makes the recovery process more difficult and slow in time. The patients cannot start to eat and drink early after the surgery especially children. The postoperative delayed hemorrhage is due to secondary intention of the tonsillar fossa resulting in the disruption of vessels and bleeding.<sup>[8]</sup> Removal of the tonsils by use of a scalpel is the most common method practiced by otolaryngologists today.<sup>[9]</sup> This procedure requires the young patient to undergo general anesthesia; the tonsils are completely removed with minimal postoperative bleeding. General, spinal, or local anesthesia can be used in tonsillectomy in children, whereas local or general anesthesia can be used in adult patients. Local anesthesia is regarded as safer than general anesthesia. In the electrocautery technique we use the cauterization to burn the tonsillar tissue, which assists in reducing blood loss. Research has shown that the heat of electrocautery (400°C) results in thermal injury to surrounding tissue.<sup>[10,11]</sup> During recent decades, electrocautery tonsillectomy has been used widely compared to other surgical methods based on the reduced intraoperative blood loss and shorter operative time. However, electrocautery surgery is associated with increased postoperative pain.<sup>[12,13]</sup>

Traditional tonsillectomy leaves the wound open to heal by secondary intention, thus causes pain and bleeding as two major postoperative complications. This is the reason surgeons usually concentrate to decrease these two problems by comparing various techniques.<sup>[14]</sup>

Available techniques used to improve the outcome with less postoperative pain and short recovery period include guillotine excision, electrocautery, cryosurgery, the harmonic scalpel, laser tonsillectomy, bipolar diathermy dissection, and radiofrequency.<sup>[15]</sup>

Therefore, the study was designed to evaluate the postoperative outcomes between traditional and cauterization tonsillectomy procedures in patients aged 8 to 16 years of age.

## Methods

This study was conducted during the period from January 2017 to March 2018. The sample collected all over 15 months from the patient's files attending to Alnamas General Hospital, Aseer region in the period of the study. The study compared two different surgical techniques for tonsillectomy, i.e., traditional dissection techniques (TDTs) and cauterization technique. 100 case files in total 100 patients in the age of 8–16 years old, the samples were separated into two groups, one of them (50 cases) had the tonsillectomy with the traditional dissection technique, and the other (50 cases) with cauterization technique. The data was analyzed using SPSS V.16.0 (SPSS Inc; Chicago, IL, USA). The Chi-square test was used to examine the association between different variables.  $P < 0.05$  was considered as statistically significant. The research approved by the Research Ethical Committee of College of Medicine, King Khalid University, Abha, Saudi Arabia (REC# 2018-05041). Data was gathered from the parents of patients by using a questionnaire. The patients were divided on an equal basis according to the surgical technique. fifty patients with traditional tonsillectomy and the other fifty with cauterization method. All surgeries in this study were performed with the patients under general anesthesia. The study compared the two groups in terms of the type of operation, operative time, chronic diseases, bleeding severity, degree or level of pain during and after the operation, healing time, and its complications.

## Research instruments

A predesigned questionnaire was used to collect the data. The questionnaire consisted of information regarding age, gender, marital status, any chronic diseases, type of the operation, type of anesthesia used, operative time, bleeding severity (severe, moderate, or mild), degree/level of pain during and after the procedure (severe, moderate, or mild), healing time, and complications of the procedure. The questionnaire was designed to compare traditional and cauterization tonsillectomy.

## Results

A total of 100 patients were enrolled in the study. TDT and cauterization were performed. 50 (27 male and 23 female) patients, whose ages ranged from 9 to 16 years old underwent traditional tonsillectomy, 50 (35 male and 15 female) patients whose ages ranged from 8 to 16 years old underwent thorough cauterization. The two groups were similar for demographic parameters. No statistically significant difference was noted for age and gender. There were no adverse events during surgery [Table 1].

## Operation time

The median time spent for the traditional tonsillectomy was 21.5 min (range, 18–25 min) compared to cauterization method

**Table 1: Descriptive Data of the study patients**

Variable	Traditional	Cauterization	Total	P
Sex				
Male	27	35	62	.074
Female	23	15	38	
Mean Age				
Male	11.78	11.54	11.65	.421
Female	12.26	12.00	12.16	
Chronic Disease				
Yes	4	3	7	.500
No	46	47	93	

that has a median time of 9 min (range, 5–13 min). The difference between mean operative times of the two methods was statistically significant [Table 2].

### Bleeding severity

Severe bleeding was seen in 6 patients who underwent traditional tonsillectomy. Majority of the patients who underwent the traditional method experienced moderate bleeding (44 out of 50). No patient who underwent cauterization experienced severe bleeding. Two patients who had the cauterization method experienced moderate bleeding and most of the patients had mild bleeding (48 out of 50). Postoperative bleeding is significantly higher in traditional technique compared to the cauterization method [Table 2].

### Degree of pain

Postoperative pain after the operation was the same for both traditional and cauterization method. All the patients experienced severe pain after the procedure. Postoperative pain at day 1 is more significant in traditional technique compared to cauterization method. 33 out of 50 patients who underwent traditional method experienced severe pain compared to cauterization method that had 14 patients who experienced severe pain after a day. Postoperative pain in 5 days was decreased for both traditional and cauterization technique. Most of the patients experienced moderate pain five days after the procedure for both methods. Postoperative pain is significantly less in cauterization method [Table 2].

### Complications after the operation

There are complications experienced by the patients after undergoing tonsillectomy such as fever, bleeding, and anesthetic complications. There were only a few patients who had fever, bleeding, and other complications related to anesthesia [Table 2].

### Healing time

In our study, the healing time whether it was done by traditional or cautery method was two weeks mostly. One patient who underwent cautery method had a one week healing time and four patients of the same procedure healed within three weeks. All the patients who underwent cauterization method healed in two weeks time [Table 2].

**Table 2: Comparison between traditional and cauterization techniques after operation**

Variable	Traditional	Cauterization	Total	P
Operative Time (In Minute)				
5-10	0	36	38	.000
11-20	32	14	46	
21-25	18	0	18	
Mean Operative Time (In Minute)				
Male	20.30	10.00	14.48	.444
Female	20.70	9.27	16.18	
Bleeding Severity				
Severe	6	0	6	.000
Moderate	44	2	46	
Mild	0	48	48	
Degree of pain after the Operation				
Severe	50	50	100	-
Degree of pain after the Operation in a day				
Severe	33	14	47	.000
Moderate	17	36	53	
Degree of pain after the Operation in 5 days				
Severe	1	1	2	.069
Moderate	46	38	84	
Mild	3	11	14	
Complication after the operation				
Fever	1	2	3	.498
Bleeding	3	1	4	
Anesthetic complication	1	0	1	
Other	47	45	92	
Healing Time (days)				
8	0	2	2	
9	4	5	12	
10	13	23	40	
11	9	10	19	.036
12	6	6	20	
13	12	2	3	
14	6	2	4	

## Discussion

Tonsillectomy is one of the most common surgical procedures performed in the world.<sup>[1,2]</sup> Allford and Guruswamy<sup>[16]</sup> stated that it is the most common surgical operations in otorhinolaryngology clinics and constitutes 20% of the operations. Many techniques are applied in surgery. Sargi and Younis<sup>[17]</sup> mentioned that the tonsillectomy surgery is commonly the first surgery ever in childhood. The comparison of different parameters of tonsillectomy techniques had been conducted in pediatric or adult age group in many studies, the ideal technique should be fast, reliable, with less pain and bleeding, and a quick recovery period. Several studies<sup>[2,18,19]</sup> noted that, each method has its advantages and disadvantages. However, the main target is to establish a method, which can reduce operative time, minimize pre and postoperative risk of

bleeding, decrease the number of complications, and enhance the postoperative comfort of the patient as well. Traditional and cauterization tonsillectomy are the two most commonly used techniques.

The present study sought to compare the clinical advantages of cauterization technique compared to traditional method. The most common serious complication of tonsillectomy is delayed hemorrhage, which occurs in 2%–4% of all patients. Most of these bleeds are primary.<sup>[20]</sup> Windfuhr<sup>[21]</sup> stated that primary bleeding is reported to be seen in the first 24 h after the operation and be more dangerous. Secondary hemorrhage is seen after the first 24 h postoperatively and early measures should be taken, as both bleedings are life-threatening particularly in children. Secondary bleeds can occur at any time during the first two postoperative weeks.<sup>[20]</sup> As reported herein, there was no significant benefit in the traditional group compared to cauterization group except that bleeding is lesser in the cauterization method. Most previous studies have shown no significant difference in the postoperative hemorrhage rates. Postoperative bleeding did not influence postoperative pain.<sup>[22,23]</sup>

Pizzuto MP *et al.*<sup>[24]</sup> concluded in his study that during a tonsillectomy, surrounding tissue undergoes mechanical or thermal damage that results in severe pain due to inflammation, spasm of the exposed pharyngeal muscles, and nerve irritation, our findings also supported this study outcome. As our observation shows that all the patients were healed within two weeks period of time, cauterization method was found more effective in speedy healing. Karatzias GT *et al.*<sup>[19]</sup> demonstrated that pain is reported to be the main cause for seeking outpatient medical attention in the first two weeks after surgery. Polites *et al.*<sup>[25]</sup> stated that postoperative pain after tonsillectomy is one of the most important causes of morbidity restricting oral intake, causing dehydration, and daily activity limitation, our study also revealed the similar outcome resulted due to traditional tonsillectomy procedure. Beloso *et al.*<sup>[26]</sup> reported, in addition, the restriction of the pharyngeal muscle activity due to pain leads to the reduction in the clearance of the tonsil bed and as a result may cause infection and bleeding. Sezen *et al.*<sup>[27]</sup> mentioned the follow-up pain scores tended to be lower in cauterization method compared to traditional method. The mean operative time was longer in the traditional method. Operation time and anesthesia time associated with it affects morbidity associated with tonsillectomy, as it was in our study. Operation time has been identified as the time starting from the placement of mouth opener to the end of the operation. In a systemic review by Leinbach *et al.*<sup>[28]</sup>, electrocauterization caused less pain in comparison to traditional and cold dissection techniques. Though operative time and blood loss have been decreased with electrocautery technique, postoperative pain is a significant cause of morbidity. Nunez *et al.*<sup>[29]</sup> reported the thermal welding method is a variant of bipolar electrocautery and uses thermal energy instead of electricity for coagulating and dissecting soft tissue and blood vessels again supported the cauterization method. Parsons *et al.*<sup>[30]</sup> added that a few new tonsillectomy techniques such as

harmonic ultrasonic knife, coblator, laser, or radiofrequency excisions that aim to reduce bleeding, postoperative pain, and operation time have been proposed. Rawlison *et al.*<sup>[31]</sup> stated that local or systemic steroid administration, local anesthesia, and analgesia applications besides new surgical techniques generating low heat and temperature take place in postoperative pain relief. In our study, postoperative pain is significantly less in cauterization method.

## Conclusion

In our study, two tonsillectomy techniques were performed for our patients. When all parameters were compared, traditional technique in terms of postoperative pain and cautery method in terms of operation time and bleeding severity have been determined to be more appropriate. Cauterization method reduces the postoperative pain, leads to better postoperative life quality, and faster recovery and healing of the postoperative wound.

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## Conflicts of interest

There are no conflicts of interest.

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