

Comparison between cold dissection and bipolar electro cautery techniques in tonsillectomy at Sarwari Hospital

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Abstract

Introduction: Tonsillectomy is one of the most common surgeries in the head and neck world-wide. This operation is carried out by different methods, the most frequent of which are the cold dissection and bipolar electro cautery techniques.

Objective: This study was conducted to assess and compare postoperative morbidity between cold dissection and bipolar electro cautery.

Methods: This study was performed on 86 patients who under-went tonsillectomy in Sarwari Hospital from 22nd, June, 2019 to 23rd December, 2019. They divided in to two groups by lottery method, Group A (43 patients) which was done Bipolar Electro cautery (Valleylab Electrocautery model 2010) technique and group B (43 patients) which was done Cold dissection (Instruments like Boyle Davis mouth gag, Tonsillar scissor, Dissector, pillar retractor, tonsillar snare and ligator). Time of surgery, amount of intraoperative blood loss, postoperative haemorrhage, the intensity of local pain 4 and 24 h after operation and nausea and/or vomiting were recorded and compared in the two groups to decide which technique is better. The data were analysed in SPSS software (ver-22). The p-value less than 0.05 was considered significant.

Results: This prospective randomized controlled clinical trial was performed on 86 patients who under-went tonsillectomy in Sarwari Hospital from 22nd, June, 2019 to 23rd December, 2019. 49 (56.97%) of them were male and 37 (43.03%) of them were female patients and they divided in to two groups by lottery method, Group A (43 patients) which was done Bipolar Electro cautery technique and group B (43 patients) which was done Cold dissection In this study, the average intraoperative blood loss was significantly lower ($p < 0.05$) in the bipolar electro-cautery technique group, while the intensity of local pain 4 and 24 h after the operation was significantly higher ($p < 0.05$). Other variables showed no significant differences between the two groups.

Conclusion: Based on the findings of the present investigation, the bipolar electro cautery technique is suggested for tonsillectomy in children, while the cold dissection technique is preferred for adult patients

Key Points: Tonsillectomy, Cold Dissection, Bipolar electro cautery

Introduction

The palatine tonsils are two lymphatic tissue masses located in the tonsillar fossae on the lateral side of throat ororopharynx.¹ They are part of the immune system col-laborating in the defence of the human body against respiratory infections.¹ They are prone to become inflamed and enlarged, in a clinical condition called tonsillitis. When these conditions become frequent and severe, or cause complications that affect the patients' breathing and swallowing, obstructing the upper airway, the physician usually suggests surgical removal of the tonsils.¹

Tonsillectomy is one of the oldest and most widespread surgical procedures in the field of otorhinolaryngology, and is carried out worldwide. It dates back to 3000 years ago with the first report referring to Hindu medicine about 1000 years B.C.² Cornelius Celsus a Roman surgeon, performed this operation for the first time using his fingernails in 40AD.^{3,4} He also described scraping the tonsils and cutting them out by a hook-like instrument.³ At the beginning of the twentieth century, Worthington (1907) and Waugh (1909) described the technique of tonsillectomy via a dissection method.^{5,6} In 1909, a surgeon named Cohen adopted ligation of bleeding vessels to control perioperative bleeding, and thereafter, tonsillectomy became a common and safe procedure in hospitals around the world.³ Remington-Hobbs in 1968⁷ and Haase and Noguera in 1969⁸ introduced the application of diathermy in this procedure. In 1982 Goycolea +Model Comparison of postoperative morbidity between dissection and tonsillectomy³ described electro dissection by using monopolar diathermy^{4,9} and Pang, 10 years later, reported the first tonsillectomy by bipolar electrocautery.¹⁰ Nowadays, tonsillectomy is performed with a variety of procedures and techniques such as: conventional cold dis-section, mono and bipolar electrocauterics,

cryosurgery, application of thermal welding system and ultrasonic scalpel, coblation excision, radiofrequency and laser.¹¹ Despite the different techniques available for tonsillectomy, there is no consensus and conclusive evidence in the literature to date on the optimum or the best method of performing the tonsillectomy, and none of the techniques has been accepted as the best one universally.¹²⁻¹⁴ Each of these techniques has advantages and also disadvantages. These methods have frequently been compared with each other by different investigators around the world, addressing especially the conventional cold dissection technique (CDT) versus the bipolar electrocautery technique (BET). However, findings vary in this regard, possibly due to differences of such parameters as: race, number of cases under study, ecological conditions, lifestyle, the skill of the surgeon, the time of investigation, etc. Hence, we decided to assess and compare the complications of the two different and most commonly used techniques of CDT and BET in admitted patients.

PATIENTS AND METHODS

After written informed consent from the patients, a prospective study of 86 patients randomly selected and divided into two equal groups; group A (43 patients) who underwent elective bilateral tonsillectomy by cold steel method and group B (43 patients) by bipolar diathermy method was conducted over a period of six months at Azadi Teaching Hospital /Duhok-Iraq, Department of Otolaryngology to evaluate the post-operative pain between the two methods of tonsillectomy, the cold steel and the bipolar diathermy technique.

Patients included in the study are patients with recurrent acute tonsillitis and patient with obstructive sleep apnea with ages between (6-15) years.

Exclusion criteria were; informed consent refusal, bleeding tendency and acute infection.

Preoperatively patients had routine hematological investigation (CBC and clotting profile) that should be within normal ranges. Patient should be admitted in the early morning at the day of surgery and fasting for at least 6 h.

All patients were operated under general anesthesia with endotracheal intubation and some of them are under local anaesthesia. All patients have a standard anesthetic given by a specialist anaesthesiologist. The diathermy dissection tonsillectomy was performed using a guarded-point electrode handle with foot-controlled cutting and coagulation switches attached to a diathermy machine (Valleylab Electrocautery model 2010). Dissection was performed in coagulation mode to divide the attachments of the tonsil to the tonsillar bed close to the tonsil at 40 Watts. Great care was exercised to ensure minimal contact between the diathermy needle and the tonsil bed to reduce unnecessary charring. Vessels visualized were cauterized before division.

The tonsil was separated from the lower pole and the posterior tonsillar pillar with the diathermy dissector. Minimal hemorrhage was noted in most cases, but a tonsil swab was left in bed while the other tonsil was being removed. A diathermy coagulation forceps at 30 W was used to coagulate any significant bleeding points in the tonsillar fossa; this was not usually necessary.

Tonsillectomy in the cold dissection group was performed by applying mouth gag then incising the mucosa of anterior tonsillar pillar with the pointed end of a Gwynne- Evans tonsillar dissector. The tonsil was then dissected from the fossa with the blunt end. By Negus forceps, the lower pole of the tonsil was clamped then excision of the tonsil done after that we ligate the tonsil with 1/0 silk suture. A swab was placed in the fossa and the other tonsil in the same way removed. The swabs were removed in the order in which they were placed; Bleeding points in the tonsillar fossae were controlled by ligature technique.

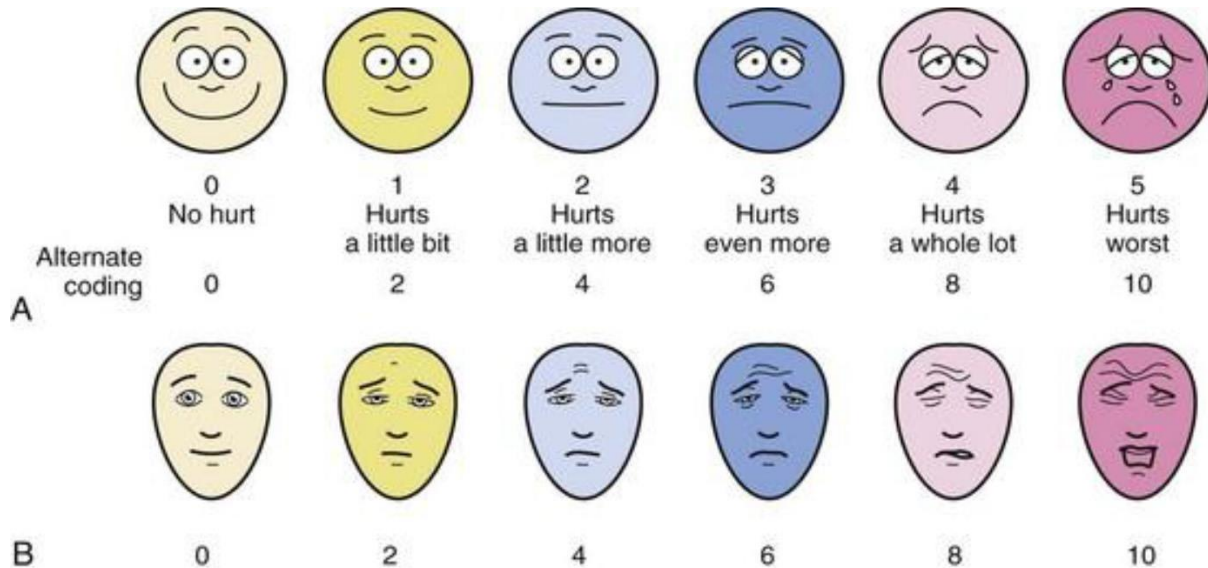
Postoperatively patients were observed in the ENT department at Sarwari Hospital 4 h postoperatively for the assessment of bleeding, airway, nausea and vomiting. Early oral intake were encouraged, most of them resumed early oral feeding starting with ice cold food then semisolid food. They were given antibiotics in the form of amoxiclavate for those not allergic to Penicillin, and analgesia in the form of acetaminophen alone in the zero, first and second days post-operative day and acetaminophen plus Ibuprofen in the third day and on.

Criteria for discharge included those patients who resumed early oral intake, those without bleeding, those with stable vital signs, those living within 20 min distance from hospital and those whose parents were educated enough to be aware of any complication occurring after discharge.

After discharge from hospital, a pain questionnaire was given to record the level of pain. Using Wong-Baker faces pain rating scale (Figure 1) which is recommended in assessing pain in children older than 3 years old, patients have been observed on day 1,2,3, after one week and after two weeks, and pain has been assessed at rest and

during swallowing a piece of bread. A numerical grading from 0 to 10 using the above scale has been documented on pain questionnaires which have already been designed for this purpose.

The Wong-Baker faces pain scale used self-report of pain to assess a patient’s experience of pain. It can be used in children aged between 3 and 18 years of age, depending upon their cognitive ability.



Each face helps us understand how much pain the patient has, and how this makes them feel. Face 0 is very happy because he doesn’t hurt at all (i.e. has no pain). Face 2 hurts just a little bit. Face 4 hurts a little more. Face 6 hurts even more. Face 8 hurts a whole lot. Face 10 hurts as much as you can imagine, although you don’t have to be crying to feel this bad, and the score were recorded according to these faces.

The results were analysed using SPSS version 22 for Microsoft pack to manage and analyse the data included in the study. Fisher exact tests were used to calculate the P-value, value of < 0.05 considered significant.

Results

This study was performed on 86 patients who under-went tonsillectomy in Sarwari Hospital from 22nd, June, 2019 to 23rd December, 2019. They divided in to two groups by lottery method, Group A (43 patients) which was done Bipolar Electro cautery (Valleylab Electrocautery model 2010) technique and group B (43 patients) which was done Cold dissection (Instruments like Boyle Davis mouth gag, Tonsillar scissor, Dissector, pillar retractor, tonsillar snare and ligator). Time of surgery, amount of intraoperative blood loss, postoperative haemorrhage, the intensity of local pain 4 and 24 h after operation and nausea and/or vomiting were recorded and compared in the two groups to decide which technique is better. The data were analysed in SPSS software (ver-22). The p-value less than 0.05 was considered significant.

This study was carried out on 86 patients who were scheduled for elective tonsillectomy by the cold dissection or bipolar electrocautery methods. A total of 43 patients were operated with the CDT and 43 patients with the BET. The mean age of the patients were 11.7 ± 8.8 and 11.87 ± 8.8 years in the CDT and the BET groups, respectively (p = 0.59). Furthermore, 43 patients(50.00%) in the CDT group and 43 patients (50.00%) in the BET group were males (p = 0.81). No significant differences were found in these demographic characteristics between the patients of the two groups

(Table 1)

	Total	BET group	CDT group	P value
Number of patients	86	43	43	
Age range	3-45 years	8,5-11.5	8.3 – 11.40.	0.81 %
Male	49 (56.97%)	24 (27.90%)	25 (29.06%)	0.05
Female	37 43.3%)	18 (29.93%)	19 (22.09%)	

The main indications for surgery were recurrent tonsillitis (34.3%), upper airway obstruction (27.5%), both concurrently (34.5%) and other (3.7%). While the mean duration time of operation was greater in the BET group (11.14 ± 3 min) than the CDT group (12 ± 4.7 min), the difference was not statically significant ($p = 0.32$). The mean amount of intra-operative blood loss was significantly higher in the CDT group when compared with that of the BET group ($p < 0.05$) (Table 2).

(Table 2) Comparison of the means \pm SD of studied variables in the two groups operated with cold dissection (CDT) and bipolar electrocautery (BET).

Mann---Whitney(p -value)	CDT group ($n = 43$)SD \pm X	BET group ($n = 43$)SD \pm X	Studied groups variables
Duration of surgery(min)	12 ± 4.74	11.14 ± 3	$p = 0.32$
Intra-operative blood loss (gram)	35.48 ± 11.15	43.84 ± 8.48	$p < 0.001$
<12 years old	38.12 ± 11.92	48.10 ± 11.65	$p < 0.001$
>12 years old	36.26 ± 11.43	42.2 ± 9.8	$p < 0.001$
Total			
4 h postoperative pain score	1.81 ± 0.92	1.52 ± 0.55	$p < 0.001$
<12 years old	2.23 ± 1.09	1.74 ± 0.59	$p = 0.002$
>12 years old	1.93 ± 0.99	1.59 ± 0.57	$p < 0.001$
Total			
24 h postoperative pain	2.53 ± 0.91	2.53 ± 0.91	$p < 0.001$
<12 years old	3.15 ± 1.06	1.86 ± 0.83	$p < 0.001$
>12 years old	2.72 ± 1	1.93 ± 0.78	$p < 0.001$
Total			
Nausea and/or vomiting	64 (18)	25 (14)	$\chi^2 = 1.32$
Yes	292 (82)	153 (86)	$p = 0.25$
No			
Postoperative haemorrhage	1 (0.28%)	1 (0.56%)	---

The intensity of local pain 4 and 24 h after operation increased significantly in both time points in the BET group than the CDT group ($p < 0.001$) (Table 2). Nausea and/or vomiting showed no significant differences in comparison between the two groups

DISCUSSION

Tonsillectomy is a commonly used procedure with relatively low risks and over time multiple techniques have been used in the search to reduce postoperative complication and morbidity like pain, hemorrhage and dysphagia. However, until now no technique has proved to be superior over others and the results are still contradictory.¹⁵ Cold dissection tonsillectomy till date is the most commonly used technique in Iraq, and most of the published papers are talking around this technique.¹⁶ However, over the last few years we have started to use the bipolar electrocautery in our department in Duhok. Using the electrocautery to remove tonsils has been the most public method in the United States since 1930. The monopolar and bipolar electrocautery may be used for tonsillectomy. Yet, the bipolar electrocautery transfers to a smaller part of the tissue. Therefore, the spread of heat to the tissue and its environment is less. It was believed that cold dissection was favored to other methods because of more protection and less damage to surrounding tissue which leads to fast recovery and less pain in the mechanical method. In contrast, tissue damage and heating injury of the electrocautery causes delay in epithelization of tonsillar bed and may leads to more postoperative pain.¹⁶

According to Table 1. There was no significant difference in pain score between classical dissection and diathermy in day zero and day one postoperatively. Firstly; because in diathermy penetration of local tissue energy is not high enough to cause pain and, secondly; diathermy requires less stretching and trauma of muscle fiber in the tonsillar bed, while the difference started to appear in day two and on where the pain score little bit became more than that of the cold steel method due to the formation of scar which usually starts after the second day.¹⁷

This sequential variation in pain severity has also been labeled after various study of electro dissection tonsillectomy. Tay matched electro dissection tonsillectomy with the cold dissection and ligation technique,

patients sensed less pain on the first postoperative day but more pain at the end of the first and the second week on the electro dissection side, this clinically necessitate more analgesia at day two and on.¹⁸ On the other hand patients experience more pain in electrocautery in a study conducted by Kirazli.¹⁹ but differ from Kousha²⁰ where pain was more in classical dissection method. Equal pain was perceived in a study by Raut with significant less time and intraoperative blood loss with diathermy technique ²⁰.

In our study, pain was significantly more in patients have tonsillectomy for recurrent tonsillitis regardless of which technique was adapted for removal (Table 2); this could be explained because the dissection of the tonsils from the surrounding scared tissue could have been associated with great intraoperative trauma which may lead to more oropharyngeal muscles stretching with subsequent spasm and pain. Our results was different from Zagolski when he found that postoperative pain was less with patient with recurrent tonsillitis, although, he stated that it should be more logically and he reasoned that because he used different techniques for removal of the tonsils.²¹

Conclusion: Based on the findings of the present investigation, the bipolar electro cautery technique is suggested for tonsillectomy in children, while the cold dissection technique is preferred for adult patients

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