



A comparative study between dissection and diathermy tonsillectomy

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Abstract

Background: Tonsillitis is a rapid onset inflammation of the tonsils. It is associated with sore throat, fever, enlargement of the tonsils, trouble swallowing and large lymph nodes around the neck. Dissection and diathermy tonsillectomy are two trusted methods in the treatment of tonsillitis. We have a few comparative information between these two methods.

Aim of the study: The aim of this study was to dig out a comparative evaluation between dissection and diathermy method in treating tonsillitis.

Materials and Methods: This prospective cross-sectional study was conducted in the Department of ENT Dhaka, in a tertiary care hospital of Dhaka, Bangladesh during the period from January 2017 to December 2019. In total 176 patients of several ages with tonsillitis required dissection and diathermy tonsillectomy were finalized as the study population. Among total participants in group I, in 109 dissection procedure were applied whereas in group II in the rest 67 diathermy method were applied. All the data were processed by using SPSS version 22.0

Results: In both the groups the mean hospital staying duration was the same and it was 1 day (SD± 0.31). Between both the groups 5% (n=9) participants of group I faced secondary infection and post-operative complication which was 38.89% in Group II. In this study per-operative blood loss for dissection method of tonsillectomy ranged from 50 ml to 100 ml, with the average being 65 ml. On the other hand, per-operative blood loss for diathermy tonsillectomies ranged from 10 to 30 ml, with the average being 10 ml. In dissection-method, needed average time was 26.6 minutes whereas in diathermy procedures it was 15.5 minutes.

Conclusion: Although post-operative bleeding, pain, fever and secondary infections are the complications of both techniques and have similar incidences the intra-operative blood loss and time are two important factors that can affect the outcome of both techniques. Considering these, we found that, the dissection is a more effective and safer method than diathermy technique regarding secondary infection.

Keywords: tonsillitis, dissection method, diathermy, tonsillectomy

Introduction

Tonsils are the first line of defense against illness of human bodies. They produce white blood cells that help body to fight against any type of infections. The tonsils combat bacteria and viruses that enter human body through mouth and nose. However, tonsils itself vulnerable to infection from these attackers. Tonsil works as a filters, trapping germs that could enter airways and cause infection. They also make antibodies to fight against infection. But sometimes, they get overwhelmed by bacteria or viruses. This can make them swollen and inflamed. This is called "Tonsillitis". Tonsillitis can be caused by a virus, such as the common cold, or by a bacterial infection, such as strep throat ^[1]. Tonsillitis is an inflammation of the tonsils, characteristically of rapid onset. Symptoms may include throat pain, enlargement of the tonsils, trouble swallowing, large lymph nodes around the neck and fever ^[2]. Rarely bacteria such as neisseria gonorrhoeae, corynebacterium diphtheriae, or haemophilus influenzae may be the cause. Typically, the infection is spread between people

through the air ^[3]. Confirmation may be throat swab or rapid strep test. Tonsillitis is most commonly caused by a viral infection with about 5% to 40% of cases caused by a bacterial infection ^[3, 4]. Despite the current availability of randomized clinical trials that have assessed the efficacy of the most common presumed indications for tonsillectomy, controversy still exists not only among physicians, but also among patients & their families ^[4]. Tonsillitis is common, especially in children. It can happen once in a while or come back again and again in a short period of time. There are three types of tonsillitis: Acute tonsillitis- These symptoms usually last 3 or 4 days but can last up to 2 weeks. Recurrent tonsillitis- This is when get tonsillitis several times in a year. Chronic tonsillitis- This is when have a long-term tonsil infection ^[5]. It is a type of pharyngitis ^[6]. Group A beta hemolytic streptococcal (GABHS) infections are responsible for 15%-30% of all cases of pharyngitis. Patients who have been exposed to GABHS may carry the organisms asymptotically, even after adequate anti- microbial therapy. Tonsillectomy as treatment of

an asymptomatic carrier is desirable when the carrier family has a history of rheumatic fever, has a history of acute glomerulonephritis and the carrier family is having a, "PING PONG" spread of disease [7]. Tonsillectomy is frequently accomplished for recurring tonsillitis in young adults, but the opinions differ. A significant improvement in quality of life has been reported in adult patients with recurrent tonsillitis following tonsillectomy [8]. Tonsillectomy is as a part of the surgical management plan has been advocated by some for such pathologies [9]. In fact, tonsillectomy is one of the most frequently undertaken procedures in the otorhinolaryngology. Tonsillectomy is defined because the removal of the whole tonsil. The technique involved scraping the mucus membrane with a finger & enucleating the tonsil. One of the earliest attempts at removal of the entire tonsil was described by Edwin Pynchon in 1890. Ballenger established the capsule as an important surgical milestone in tonsil surgery and activists the elimination of the entire tonsil with the capsule intact [10]. The traditional technique of cold dissection was introduced about 100 years ago. In this method, the tonsils are dissected with metal instruments by blunt dissection. The bleeding could also be controlled by packing the tonsillar fossae with gauze dressings or ligating bleeding vessels [9]. Various advances during this surgical technique have developed with a target of reducing intra-operative bleeding, & subsequent post-operative morbidity. Diathermy technique was first introduced about 40 years ago. Importantly, while diathermy is often used for boot tonsillar dissection & hemostasis, its use may be reserved for hemostasis after a traditional cold steel dissection [11]. Diathermy is electrically induced heat or the utilization of high-frequency electromagnetic currents as a sort of physiotherapy and in surgical procedures. The path way of diathermy was pioneered in 1907 by German physician Karl Franz Nagelschmidt, who devised the term diathermy from the Greek words dia and therma, which means "heating through". French physician and biophysicist Jacques Arsene d'Arsonval and Serbian American engineer Tesla was explored the idea that high-frequency electromagnetic currents could have therapeutic effects independently around (1890-91). d'Arsonval in 1890 first performed of the effect of alternating current on the body and discovered that frequencies above 10 kHz did not cause the physiological reaction of electric shock, but warming [12, 17]. There are three unique techniques of diathermy: ultrasound (ultrasonic diathermy), short-wave radio frequencies in the range 1-100 MHz (shortwave diathermy) or microwaves typically in the 915 MHz or 2.45 GHz bands (microwave diathermy), the methods differing mainly in their penetration capability [15]. We have introduced this intervention to get a comparative assessment between dissection and diathermy methods in the treatment of tonsillitis.

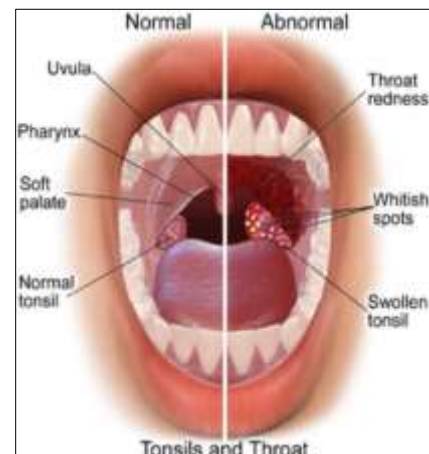
Materials and Methods

This prospective cross sectional study was conducted in the department of ENT of a tertiary care hospital, Dhaka, Bangladesh during the period from January 2018 to December 2019. A total 176 patients of several ages with tonsillitis required dissection and diathermy were finalized as the study population. This study was approved by the ethical committee of the mentioned hospital. Before starting the main intervention proper written consents were taken from all the participants. According to dissection &

diathermy procedures, total 176 patients had been divided in to two groups. In total 109 dissection method patients were in group I and 67 diathermy method patients were in group II. Patients included during this study had a tonsillectomy with either method during this point period, no matter any adjunctive procedures like adenoidectomies, grommet insertion, etc. simultaneously were included in this study. Besides this, the patients with a poor follow-up were excluded from the study. The tonsillectomy by electrocautery was defined as diathermy. These methods were performed with electrocautery dissection (Bipolar) and hemostasis also being achieved by this electrocautery. Dissection method tonsillectomy was distinct as tonsillectomy performed by sharp and dull dissection, hernostasis being acquired with ligature or minimal electrocautery (bipolar). The complications were divided into per-operative, postoperative and late status. Per-operative complications like, damage to lips tongue pharyngeal wall, TM joint dislocation and bleeding were those occurring during the operation and post-operative complications like bleeding, infections and otalgia occurred immediately after the operation up till 4 weeks. Any complications like, pharyngeal and palatal scarring, tonsillar remanants and voice changes, after 4 weeks were classified as late complications. All data were collected by a pre-designed questioner. Before starting the main intervention proper written consents were taken from all the participants. All the data were processed by using SPSS version 22.0



Picture 1: Tonsillitis



Picture 2: Illustration comparing normal tonsil anatomy and tonsillitis

Results

In this study after all exclusion according to the inclusion and exclusion criteria finally 176 subjects were finalized as the total study population. Among them on 109 participants, dissection method and on 67 participants, diathermy method were applied. In analyzing the age, we found the highest number of patients (26.70%) were from <1-10 years' age group. Then 22.73%, 19.32%, 15.34%, 10.80% and the rest 5.11% were from 11-20, 21-30, 31-40, 41-50 and >50 years' age group respectively. When we analyze the gender we found, in total 53.98% patients were male whereas 46.02% were female. We did not find any basic difference between the groups. In the treatment procedure in total 62% patients were treated with dissection method whereas the rest 38% were treated with diathermy method. Besides these, 7 patients had got both the methods but they were excluded from this study previously according to the exclusion criteria of this study. The mean hospital staying duration was same in both diathermy method and dissection tonsillectomy. In both the groups 1 day (SD±0.31). The commonest indication for tonsillectomy in these patients was recurrent tonsillitis. Other indications included quinsy, sleep disorders, tumor of the palate and tumor of the tonsils. Per-operative, post-operative and late complications were evaluated. Among total study population per-operative complications occurred in 2(1.14%) patients, both of them anesthesia-related. In total study people among 22% (n=40) participants several post-operative complications were found. Between both the groups 5.0% (n=9) participants of group I secondary infection and post-operative complication which was 38.89% in group II. All patients are affected by secondary infection on day 7 to day 11 in post operatively. They all managed conservatively. Except only 2 patients were set to Operation Theater for managing secondary infection which occurred following diathermy procedures. So considering the secondary infection of tonsillectomy safety profile, dissection method is better than that of diathermy method. A second generation cephalosporin and penicillin were given prophylactically. In comparing diathermy to dissection-method tonsillectomies, several differences were noted. In this study per-operative blood loss for dissection method of tonsillectomy ranged from 50 ml to 100 ml, with the average being 65 ml. On the other hand, per-operative blood loss for diathermy tonsillectomies ranged from 10 to 30 ml, with the average being 10 ml. Besides these, operative time also differed between the two procedures. In dissection-method the needed average time was 26.6 minutes whereas in diathermy procedures the average needed time was 15.5 minutes.

Table 1: Age distribution of patients (N=176)

Age (Year)	Group I		Group II		Total	
	n	%	n	%	n	%
1-10	28	25.69	19	28.36	47	26.70
11-20	25	22.94	15	22.39	40	22.73
21-30	21	19.27	13	19.40	34	19.32
31-40	17	15.60	10	14.92	27	15.34
41-50	12	11.00	7	10.45	19	10.80
>50	6	5.50	3	4.48	9	5.11
Total	109	100.00	67	100.00	176	100.00

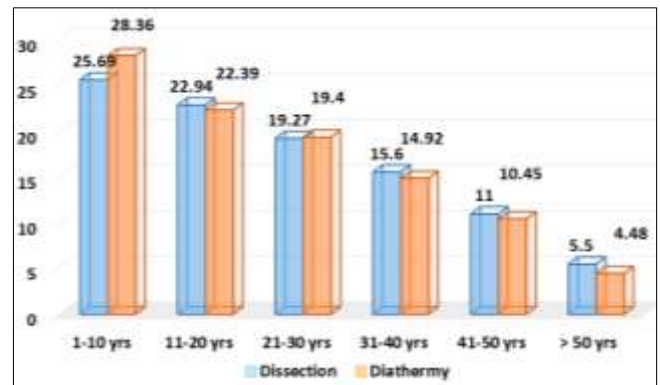


Fig 1: Group & Age wise Patients Distribution

Table 2: Gender distribution of patients (N=176)

Age (Year)	Group I		Group II		Total	
	n	%	n	%	n	%
Male	57	52.29	38	56.72	95	53.98
Female	52	47.7	29	43.28	81	46.02
Total	109	100	67	100	176	100

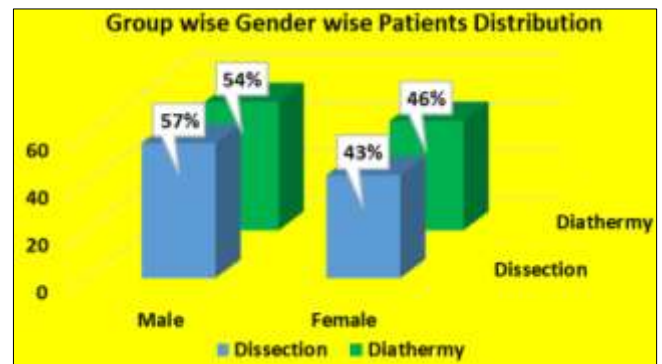


Fig 2: Group & Gender wise Patients Distribution

Table 3: Post-operative complications among the participants (N=176)

Post-operative Complication	Group I		Group II		Total	
	n	%	n	%	n	%
Otalgia	4	3.5	11	15.43	15	10.52
Infections	2	1.75	9	12.94	11	7.25
Hemorrhage	2	1.75	8	11.45	10	6.68
Vomiting	1	0.83	3	3.99	4	3.27
Total	9	7.83	31	43.81	40	27.72



Fig 3: Patients post-operative complications (N=176)

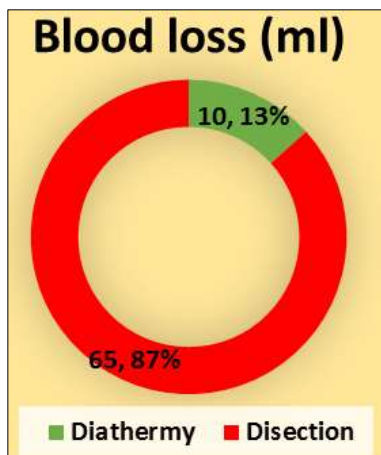


Fig 4: The average blood loss of patient (N=176)



Fig 5: The average operative time of patient (N=176)

Discussion

The aim of this study was to dig out a comparative evaluation between dissection and diathermy methods in tonsillectomy. Tonsillectomy has been a standard operation in otolaryngology, with over 1 million tonsillectomies being performed annually in UK within the 1960's and 70's. Although the tonsillectomy may be a quick operation, morbidity could also be significant. Hemorrhage, apnea, pain, fever and poor oral fluid intake are all possible effects of surgery. In this study, the average operative time was 15.5 minutes for electrocautery and 26.6 minutes for dissection. The reported intra-operative blood loss with electrocautery ranges from 26.5 ml - 34 ml, while for dissection method it ranges from 76.4-104 ml [18, 19]. The operative time is less with electrocautery, ranging from 11.2-13.5 minutes [19], while it ranges from 12.4-19.9 minutes for the dissection method [20]. All these effects can be minimized in experienced hands and by improving proper techniques. In fact, dissection tonsillectomy is one of several frequently practiced techniques. Dissection tonsillectomy are accomplished by blunt or sharp method, while other modifications of this technique include dissection with electrocautery and laser. These modifications are described the morbidity of the operation. In this study, per-operative, post-operative and late complications were evaluated. According to the study, per-operative complications occurred in 2(1.14%) patients, both of them anesthesia-related. Several post-operative complications were found 22 % (n=40) participants. Between both the groups 38.89% (n=26) participants of group I (dissection method) had any type of post-operative complication, which was only 12.84% in group II (diathermy method). So the safety profile

of diathermy method is significantly higher than that of dissection method. The conventional techniques are commonly utilized in most hospitals worldwide because they are doing not require any expensive machines. In experienced hands, both techniques have a negligible incidence of post-operative bleeding. In generally 6-7% postoperative bleedings within 24 hours are found in this mechanical dissection. In the electrocautery technique, post-operative bleeding rates have been reported at between 0-033% [21]. In this study, pen-operative blood loss for diathermy tonsillectomies ranged from 5 ml to 20 ml, with the average being 10 ml. Besides these, operative time also differed between the two procedures. The incidence of postoperative pain is significant after electrocautery but is not as severe after dissection method [22]. In this study it was 10 ml for diathermy and 65 ml for dissection method. There is no consensus on the best technique for a tonsillectomy till now. Although post-operative bleeding, pain, fever and infections are complications of both techniques and have similar incidences, the intra-operative blood loss and time are two important factors which can affect the outcome of both techniques. In our study the dissection procedure was found as safer and comparatively hassle free than diathermy method.

Conclusion

Post-operative bleeding, pain, fever and secondary infections are the major complications of both techniques. In spite these, intra-operative blood losing and time requirement are two important factors which can affect the outcome of both techniques. Though blood losing and time requirements are required more than diathermy method, but dissection method are considering comparatively better in terms of secondary infection evaluation from this study. So we could draw the conclusion that the dissection technique is a more effective than diathermy technique in tonsillectomy.

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