

The Preference of Coblation-Assisted Over Cold Dissection Tonsillectomy

Ammar Hadi Khammas*, Mohammed Radef Dawood*, Yaseen Adeeb Sakran**, Azad Mohammed Abdullah***

ABSTRACT:

BACKGROUND:

Tonsillectomy is one of the most commonly performed surgical procedures in otolaryngology. There are several operative methods currently in use, but the superiority of one over another has not been clearly demonstrated.

OBJECTIVE:

To compare intraoperative efficiency and postoperative recovery between dissection and coblation tonsillectomy.

PATIENTS AND METHODS:

This prospective clinical study was conducted at Rizgary teaching hospital/ Erbil, and Baghdad private hospitals from 29th November 2011 to 17th July 2012. The study included 100 patients who underwent tonsillectomy, half of them by coblation and the other half by cold dissection technique. Both techniques performed under general anesthesia. Each tonsillectomy technique was assessed intraoperatively for amount of blood loss, and duration of operation. Postoperatively they were assessed for pain, hemorrhage, and day of return to normal activity and normal diet.

RESULTS:

Duration of operations was significantly shorter for the coblation group versus the dissection group (17.5 min vs. 22.5 min, $P = 0.000$). Intraoperative blood loss was statistically lower for the coblation versus the dissection group (30.5 ml vs. 45.5 ml, $P = 0.003$). There was statistically significant difference in daily pain scores and return to normal diet and activity between the two groups (mean 0.5 day for coblation vs. 1.25 day for the dissection, $P = 0.001$). And only two patients (2%) in coblation group developed secondary bleeding.

CONCLUSION:

Coblation tonsillectomy offers better operative speed, intraoperative hemostasis, less postoperative pain scores and faster recoveries than dissection tonsillectomy especially in pediatric age group.

KEY WORDS: Tonsillectomy, coblation tonsillectomy, cold dissection tonsillectomy.

INTRODUCTION:

Tonsillectomy is one of the most frequently undertaken procedures in otolaryngology⁽¹⁾. Several techniques for this procedure have been described including blunt dissection, electrocautery, laser, coblation, and ultrasonic dissection⁽²⁾. There is still controversy over which is the optimal technique of tonsillectomy with the lowest morbidity rates. 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. The major postoperative morbidity includes pain and hemorrhage. Pain is

followed by inflammation and spasm of the pharyngeal muscles that leads to ischemia and a protracted cycle of pain. This does not completely subside until the muscle becomes covered with mucosa 14 to 21 days after surgery. The postoperative pain can cause significant limitations in activities and diet⁽³⁾.

Post-tonsillectomy hemorrhage remains the most serious complication of tonsillectomy. Hemorrhage has been divided into two broad categories; primary, occurring <24 hours after surgery and secondary, occurring >24 hours, commonly 5-10 days after the operation. Primary bleeding is

*College of medicine / Al- Mustansyriah University Baghdad Iraq.

**Al-Yarmouk Teaching Hospital / Baghdad Iraq.

***Rizgary Hospital / Erbil Iraq.

generally considered to be related to surgical technique whereas secondary or delayed

hemorrhages are a consequence of infection in the tonsillar fossae ⁽¹⁾. Contractions of pharyngeal muscles are responsible for physiological clearance of the tonsillar bed, and infections are due to debris and food accumulation in those areas. Restriction of muscular action by pain or voluntary immobility interferes with the mechanism of physiological tonsillar fossa clearance, increasing the possibility of infection and consequent bleeding ⁽²⁾. Some authors consider all bleeding events, while others include only those events that require subsequent treatment under general anesthesia⁽¹⁾.

PATIENTS AND METHODS:

This prospective study was carried out on 100 patients, they were selected for either coblation or dissection tonsillectomy techniques (the choice was optional after clarifying both techniques for them). Each group composed of 50 patients, the study period was 8 months from 29th November 2011- 17th July 2012 in ENT department of Rizgary Teaching Hospital - Erbil city and in Baghdad private hospitals, the procedure was performed by the same authors.

Recurrent attacks of tonsillitis (seven attacks/year, or five attacks in two successive years or three attacks for three successive years) was the indication for surgery in these patients. Exclusion criteria included patients below 7 years, those with a history of bleeding disorders, history of snoring and mouth breathing, or big adenoid that need removal during the operation, and history of quinsy (excluding obstructive causes of tonsillectomy and quinsy cases was to face same difficulty during operation), while patients with history of acute tonsillitis within three weeks prior to surgery have been postponed after taking appropriate treatment then enrolled in the study. Investigations were: blood group and Rh, packed cell volume, bleeding and clotting time and virological tests. All procedures were carried out under general anaesthesia.

The surgical dissection technique was the same for both coblation and dissection tonsillectomy, and involved a subcapsular dissection for complete tonsil excision. In all patients of coblation group, tonsillectomy was performed using the ArthroCare ENT Coblator II surgery system with EVac 50 plasma wands (ArthroCare Corp., Sunnyvale, CA, USA). The wand composed of three active electrodes located at the distal end of the tip with the exposed portion of the shaft acting as the return

electrode just proximal to the active electrodes. Settings were standardized at seven for coblation

and three for coagulation, and the dissection started from lower pole upwards.

We have to mention that the EVac 50 plasma wand is expensive, so we recommended using it for three times by autoclaving to reduce the cost of operation.

Cold-dissection tonsillectomy was performed using curved Metzenbaum scissors to enter the peritonsillar space, blunt dissection to remove the tonsil from superior to inferior pole, and number 5 silk used for ligation of the inferior pole. Hemostasis was obtained by pressure and/ or ligation with no. 5 silk; no electrocautery was used for haemostasis.

Each tonsillectomy technique was intra-operatively assessed for: operative time (i.e. time from first incision to complete haemostasis of the tonsillar bed); and amount of blood loss by measuring blood collected in the suction bottle after subtracting the volume of saline used for coblation method and care not to use swabs as much as possible. Postoperatively, all patients were discharged next day of surgery after being given similar prescriptions of antibiotics (oral Amoxi-clav, (20-40mg/kg) for children, and (1200mg) for adults, three times daily for seven days). And pain medication (paracetamol syrup), with doses based on body weight (10mg/kg 4 times /day). Patients were given verbal as well as written instructions regarding medication at home along with guidance regarding food intake and general care. Furthermore they had been instructed to report early if patient is not feeding well or if there is an episode of bleeding or poor pain control. Postoperative sore throat, feeding status and time taken getting back to school/normal activity and episodes of primary and secondary bleeding were recorded.

All patients were followed up for 10 days after surgery. The questionnaire included a subjective assessment of post-operative pain, using a 10-point visual analogue scale (VAS) chart. The pain charts consisted of a 10 cm linear scale with 10 gradations ranging from: 0 equating to no pain, to 10 equating to severe pain. The parents were given a copy of visual analogue pain score. The degree of pain of the throat was to be marked on the scale first thing each morning, before taking any analgesic medication. Dietary intake was measured as fluids only, fluids and soft diet, fluids and limited diet, and fluids and normal diet. Parents were asked to

129

TONSILLECTOMY

record what they felt was their child's best dietary intake on that postoperative day. The initial

covered in slough and the questionnaire were completed.

questionnaire sheets (intra-operative to 48 h) were retained by the author prior to discharge. The remaining sheets were retained by daily contacting with the parents by telephone. Patients were all seen in the outpatient department on the 10th postoperative day and examination of their throat was carried out with a subjective measure about the area of the tonsillar fossa that was healed or

Data were analyzed using the statistical package for social science (SPSS version 18). Independent student t-test was used for comparison between sample means, while simple Pearson correlation coefficient was performed for testing the significance of correlation between the treatments. $P < 0.05$ was considered as significant and all data were expressed as Mean $\pm$ SE.

RESULTS:

Table 1: Male: female ratio in coblation and dissection techniques.

		Group				Total	
		Coblation		Dissection		No.	%
		No.	%	No.	%		
Sex	Male	30	60%	24	48%	54	54%
	Female	20	40%	26	52%	46	46%
Total		50	100%	50	100%	100	100%

Table 2: Main variables in coblation and dissection techniques.

Operation Techniques	Coblation		Dissection		P-values
	Mean	S.D.	Mean	S.D.	
Duration of operation (Minute)	17,7000	12,00213	22,3000	4,18086	.000
Intra operative blood loss (milliliter)	40,3000	40,73002	74,7000	30,29464	.003
Day of return to normal activity	0,7000	1,90093	7,3200	1,16829	.001

*P-value < 0.05 considered as significant difference.

Table 3: Distribution of operations according to age groups.

Age groups	Group				Total	
	Coblation		Dissection		No.	%
	No.	%	No.	%		
Below 18	37	74%	44	88%	81	81%
18 and above	13	26%	6	12%	19	19%
Total	50	100,0%	50	100,0%	100	100,0%

Table ٤: Comparison between coblation and dissection methods in different age groups.

Age	Age < ١٨			Age ≥ ١٨		
	Coblation	Dissection	P-values	Coblation	Dissection	P-values
Day of return to normal activity	٤,٧٥٦٧٥٧	٧,١٨١٨١٨	٠,٠٠٠*	٨,٣٨٤٦١٥	٨,٣٣٣٣٣٣	٠,٩٤٤
Intra operative blood loss (ml)	٢٠,٥٤٠٥٤	٧٣,٠٦٨١٨	٠,٠٠٠*	١١٥,٧٦٩٢	٨٦,٦٦٦٦٧	٠,١٨٤
Duration of operation (minutes)	١٠,٨٦٤٨٦	٢١,٤٧٧٢٧	٠,٠٠٠*	٣٧,١٥٣٨٥	٢٨,٣٣٣٣٣	٠,٠١*

Table ٥: Main variables in regard to sex in coblation and dissection techniques.

Operation Techniques	Coblation					Dissection				
	Male		Female		P-values	Male		Female		P-values
Variable	Mean	S.D.	Mean	S.D.		Mean	S.D.	Mean	S.D.	
Duration of operation (Minute)	٢١,٥ ^a	١٣,٣٢	١٥,١٦ ^b	١٠,٥١	٠,٠٠٨	٢١,٣٥ ^a	٣,٨٠	٢٣,٣٣ ^a	٤,٤٠	٠,٩٧٠
Intra operative blood loss	٥٩,٧٥ ^a	٥٤,٩٠	٣٥,٦٧ ^b	٣٦,٣١	٠,٠٠٧	٧٢,٨٨ ^a	٢٦,١٢	٧٦,٦٧ ^a	٣٤,٧٢	٠,٦٤٠
Day of return to normal activity	٦,١٥ ^a	١,٩٨	٥,٤ ^a	١,٩٠	٠,٧٣٠	٧,٣٤٦ ^b	١,٢٩	٧,٢٩ ^b	١,٠٤	٠,١٥١

*P-value<٠,٠٥ considered as significant difference

**P-value>٠,٠٥ considered as Non-significant difference

*** Same letters means no significant, while different letters means significant

DISCUSSION:

In the current study, patients who underwent coblation tonsillectomy reported less intraoperative blood loss and duration of operation, freedom from pain, ceased liquid-only diet, and returned to school/normal activity significantly more quickly than patients who submitted to dissection tonsillectomy, especially for ages below ١٨ years. Several past studies have shown the potential for significantly improved recovery with the coblation tonsillectomy over electrocautery, but research comparisons of the coblation tonsillectomy and cold dissection are more limited in number^(١). In a study done by Matin M.A. in ٢٠٠٥, shows that coblation tonsillectomy has greater advantages of operative speed (mean: ١٢ minutes vs. ٢٠ minutes for dissection), intraoperative hemostasis (negligible blood loss vs. ٥٠-١٠٠ ml in dissection) and lowers postoperative pain scores or recoveries (day ٣ vs. day ٨ for dissection)^(٢), this result is close to our result. In another study done by

Shapiro and Bhattacharyya in ٢٠٠٧ compared the intraoperative efficiency and postoperative recovery between dissection and Coblation tonsillectomy (age ٢-١٦ years). It was shown that Coblation tonsillectomy offers better operative speed (coblation: ٥ min vs. dissection ٧,٨ min) and intraoperative hemostasis as compared with dissection tonsillectomy. However, coblation tonsillectomy does not result in lower postoperative pain scores or recoveries despite these intraoperative advantages^(٣). Businco and Tirelli in ٢٠١١ did a study, despite longer duration of the coblation technique (٣٠-٣٥ min vs. ٢٠-٢٥ min for dissection), shows superiority of coblation on dissection tonsillectomy with Intra-operative bleeding during the coblation procedure tended to be half (~١٠ ml per case) of what had experienced using cold dissection (~٢٠-٢٥ ml per case), and the day of pain free was ٤,٨ vs. ٩,٤ for cold dissection, also coblation group stopped liquid

TONSILLECTOMY

diet sooner (day 5 vs. day 4) and lost fewer school days than dissection patients⁽¹⁾.

Roje et al in 2004, did a comparison study between the two technique, revealed the mean intra

operative blood loss was 10.83 ml in coblation vs. 22 ml in the dissection group, Children operated on by coblation technique faster resumed normal physical activities in 2 vs. 4 days and these results was statistically significant⁽¹⁾.

This result was again supported by another study done by Paramasivan et al in 2011 (age group of 5-12 years), who concluded that coblation tonsillectomy was fast and easy to perform with little intraoperative bleeding. It offers significant advantages in the postoperative period, with rapid return to normal diet and reduction in postoperative pain⁽¹⁾.

All these are due to the technique of coblation which uses radiofrequency technology to cut and coagulate tissue simultaneously, this leads to decrease in operative time and also significant decrease in intra operative blood loss when compared with blunt dissection tonsillectomy with minimal lateral thermal damage occurs because it cuts at a lower temperature, so the degree of thermal injury to tonsillar bed was minimized, with decrease in tissue trauma leading to decrease in post operative pain, faster return to normal diet and activity when compared to dissection tonsillectomy.

In another study that done by Parker et al in 2004, with respect to postoperative pain and return to normal diet, pediatric coblation tonsillectomy did not offer significant advantage over cold steel dissection with bipolar haemostasis⁽¹⁾, also Philpott et al in 2003 evaluated postoperative pain, otalgia, swallowing and analgesia use at selected time points over 14 days and showed no significant benefits for coblation tonsillectomy over cold dissection in adults⁽¹⁾, this may be due to more fibrosis at the tonsillar bed and larger bleeders that require more use of coagulation with subsequent more lateral thermal damage, all these contribute to more postoperative pain and delay in return to normal diet and activity, and this was near to our result regarding adults in coblation group.

Fortunately there were no any episodes of primary bleeding, but two cases (4%) presented with secondary bleeding, first one at 7th, and second at 8th postoperative day, which was statistically not significant.

Several reports have described differences in proportions of secondary hemorrhage between

adults and children, with adults showing greater susceptibility to delayed hemorrhage⁽²⁾, some authors have suggested that the risk of

postoperative haemorrhage is increased in patients undergoing coblation tonsillectomy. However, other investigators have not found this⁽¹⁾ like Belloso et al, in their study in 2003 (included children and adult), they even found an overall lower incidence of secondary haemorrhage after coblation tonsillectomy, compared with blunt dissection using bipolar diathermy haemostasis (2.2% vs 6.9%)⁽²⁾, also this is clear in the study of Businco and Tirelli (age 5-16 years), where no patient experienced a post-operative bleeding episode requiring a clinic visit or readmission⁽³⁾.

In the study of Shapiro and Bhattacharyya, There was one postoperative hemorrhage in the coblation group on 7th postoperative day. This patient was treated with operative control of the bleeding, without blood transfusion⁽⁴⁾.

Regarding postoperative healing of the tonsillar fossa, we didn't find any difference between the two group, and this is supported by Magdy et al who compare coblation to dissection-suture ligation (group A), monopolar electrocautery (group B), and CO₂ laser (group C) in adult patients in 2004, there was no significant difference in healing between coblation and dissection-ligation tonsillectomies (group A)⁽⁵⁾, while Matin M When examined the throat at 4 days post op, there was a large difference in the healing of the tonsillar fossa, with nearly all the coblation fossae fully healed and considerable slough/granulation tissue present in the dissection group⁽⁶⁾, and in the study of Paramasivan et al some amount of poor healing was observed with dissection technique⁽¹⁾.

The weakness of our study included relatively small sample size, small number of adult patients and nonblinded subjects.

CONCLUSION:

Coblation tonsillectomy offers less operative time, less intra operative blood loss, less post operative pain and faster return to normal diet and activity when compared with the dissection method for ages below 14 years old.

REFERENCES:

1. Mckerrow W S. Diseases of the tonsil. In: Michael G, Nicolas S J, Ray C, Linda L, Jhon W., editors. Scott-Brown's otorhinolaryngology, head and neck surgery. 7th ed. London. Hodder Arnold. 2008; 1:1216-22.

٢. Oko M O, Ganly I, Loughran S, Clement WA, Young D, and Geddes N K. A Prospective Randomized Single-Blind Trial Comparing Ultrasonic Scalpel Tonsillectomy with Tonsillectomy by Blunt Dissection in a Pediatric Age Group. Glasgow, United Kingdom: Otolaryngology–Head and Neck Surgery. ٢٠٠٥; ١٢٣: ٥٧٩-٨٤.
٣. Saengpanich S., Kerekhanjanarong V., Aramwatanapong P., Supiyaphun P. Comparison of Pain after Radiofrequency Tonsillectomy Compared with Conventional Tonsillectomy: A Pilot Study. J Med Assoc Thai. ٢٠٠٥; ٨٨: ١٨٨٠-٨٣.
٤. Faramarzi A, Heydari S T. Prevalence of Posttonsillectomy Bleeding as Day case Surgery with Combination Method; Cold Dissection Tonsillectomy and Bipolar Diathermy Hemostasis. Iran J Pediatr. ٢٠١٠; ٢٠: ١٨٧-٩٢.
٥. Belloso A, Chidambaram A, Morar P, Timms M S. Coblation Tonsillectomy Versus Dissection Tonsillectomy: Postoperative Hemorrhage. Laryngoscope. ٢٠٠٣; ١١٣: ٢٠١٠-١٣.
٦. Niamatullah. Post tonsillectomy haemorrhage, result of ٣ months follow-up. JPMI. ٢٠٠٣; ١٧: ٢٦٧-٧٢.
٧. Businco L D R, Guido Coen Tirelli G C. Pediatric Tonsillectomy: Radiofrequency-Based Plasma Dissection Compared to Cold Dissection with Sutures. [www. businco. it]. [cited at Jan. ١٩th -٢٠١١]. Available from [http://www.businco.it/studio].
٨. Martin MA. Coblation tonsillectomy versus blunt dissection tonsillectomy. The ORION Medical Journal. ٢٠٠٦; ٢٣: ٣٣٠-٣١.
٩. Shapiro N L, Bhattacharyya N. Cold Dissection versus Coblation-Assisted Adenotonsillectomy in Children. Laryngoscope. ٢٠٠٧; ١١٧: ٤٠٦-١٠.
١٠. Roje Z, Racic G, Dogas Z, Pisac V P, Timms M. Postoperative Morbidity and Histopathologic Characteristics of Tonsillar Tissue Following Coblation Tonsillectomy in Children: A Prospective Randomized Single-Blind Study , Coll. Antropol. ٢٠٠٩; ٣٣: ٢٩٣-٩٨.
١١. Paramasivan V K, Arumugam S V, Kameswaran M. Randomised comparative study of adenotonsillectomy by conventional and coblation method for children with obstructive sleep apnoea. [<http://hinari-gw.who.int>]. [Cited at March ١٧th ٢٠١٢]. Available from [http://dx.doi.org/١٠.١٠١٦/j.ijporl.٢٠١٢.٠٢.٠٤^٩].
١٢. Parker D., Howe L., Unsworth, V. , Hilliam R. A randomised controlled trial to compare postoperative pain in children undergoing tonsillectomy using cold steel dissection with bipolar haemostasis versus coblation technique. Clin. Otolaryngol. ٢٠٠٩; ٣٤: ٢٢٥-٣١.
١٣. Philpott, C.M., Wild, D.C., Mehta, D., et al. A double-blinded randomized controlled trial of coblation versus conventional dissection tonsillectomy on postoperative symptoms. Clin. Otolaryngol. ٢٠٠٥; ٣٠: ١٤٣-٤٨.
١٤. Magdy E A, Elwany S, El-Daly A S, Abdel-Hadi M, Morshedy M A. Coblation tonsillectomy: a prospective, double-blind, randomised, clinical and histopathological comparison with dissection–ligation, monopolar electrocautery and laser tonsillectomies. The Journal of Laryngology & Otology. ٢٠٠٨; ١٢٢: ٢٨٢-٩٠.