Monopolar electrodissection versus cold dissection tonsillectomy among children

Manal A. Bukhari, MD, FKSU, *Ahmed Y. Al-Ammar,* MD, FKSU.

ABSTRACT

Objective: To compare cold dissection to monopolar tonsillectomy in terms of operative time, intraoperative bleeding, post operative bleeding, and pain.

Methods: The study included 100 children who underwent tonsillectomy between January 2002 and January 2004. This study was carried out at King Abdul-Aziz University Hospital, Riyadh, Kingdom of Saudi Arabia. Patients were randomly selected to have either the right or left tonsils removed by either technique (cold dissection or monopolar dissection technique). We compared both techniques in each side on the same patient.

Results: There was no significant difference in operative time between both sides by either technique, however, when the patients were grouped into ≤3 minutes and >3 minute groups, the result showed that a greater number of patients were operated up on ≤3 minutes by diathermy procedure compared to dissection method (44 versus 67) (p=0.0011). Blood loss was minimal with the diathermy technique; averaging 25.37 ml compared to 88.5 ml for cold dissection tonsillectomy. There was a significant increase in postoperative pain on the first postoperative day in the diathermy group compared to the cold dissection group (27% versus 12%) (p=0.0151). However, there was no significant difference in pain between both sides in the first 24 hours and from the 2nd to 10th postoperative days.

Conclusion: Monopolar dissection tonsillectomy is a safe technique. It significantly reduces the operative time and intraoperative blood loss. However, it causes more pain on the 1st post operative day, while on the rest of the days until the 10th post operative day, there was no significant difference in pain between two sides.

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From the Department of Otolaryngology, King Abdul-Aziz University Hospital, Riyadh, Kingdom of Saudi Arabia.

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Address correspondence and reprint request to: Dr. Manal A. Bukhari, Department of Otolaryngology, King Abdul-Aziz University Hospital, PO Box 245, Riyadh 11411, Kingdom of Saudi Arabia. Tel. +966 (1) 4775735. Fax. +966 (1) 4775748. E-mail: no72000@yahoo.com

Tonsillectomy is one of the most frequently performed ear, nose, and throat procedures in the United Kingdom and world wide.[1] There are several existing techniques to perform tonsillectomy, including cold dissection, guillotine excision, cryosurgery, ultrasonic removal, laser tonsillectomy, and monopolar and bipolar diathermy dissections. Ideally, the procedure to be employed should be fast, safe, painless, and bloodless, and associated with rapid recovery.[2] Post operative pain and hemorrhage are the issues that are usually discussed when comparing different surgical techniques for tonsillectomy in adults, however, operative time and intraoperative bleeding are important parameters in the pediatric population. To date, there is no conclusive evidence in the literature, as to which surgical technique is best for performing pediatric tonsillectomy.[3] Cold dissection tonsillectomy is currently the most common method of tonsillectomy in Kingdom of Saudi Arabia.[4] Electrodissection methods are increasingly being used for tonsillectomy dissection.[5] The use of monopolar diathermy in tonsillectomy was first introduced by Haase and Noguera[6] and Johnson.[7] There have been an increasing number of trials to assess the various aspects of these different methods. Some of these studies concluded that the diathermy technique is associated with less intraoperative blood loss with no measurable increase in postoperative morbidity compared to the dissection technique.[8] However, the main disadvantage of electrodissection tonsillectomy is the delayed increase in pain, though the pain is less during the immediate postoperative period.[9] This prospective study was designed to compare monopolar electrodissection tonsillectomy with cold dissection tonsillectomy. The study was structured so that the patient acted as their own controls; one tonsil was excised with the electrocautery technique and the other by the

cold dissection with snare technique. The 2 techniques were compared in terms of operative time, intraoperative bleeding, postoperative bleeding, and pain.

Methods. One hundred children were recruited for this study between January 2002 and January 2004 at King Abdul-Aziz University Hospital, Riyadh, Kingdom of Saudi Arabia. Children between the age of 4 and 18 years listed for tonsillectomy were included. Children were recommended not to have aspirin within the 2 weeks before surgery. Children with acute tonsillitis 6 weeks before surgery, and those with bleeding disorders were excluded from this study. Preoperatively, cases had routine blood studies including a complete full blood count and a prothrombin/partial thromboplastin time. Informed consent was sought before the patients were informed that each one of the tonsils would be removed by either method, however, they were unaware of which technique was to be used for which side. All tonsillectomies were performed under general anesthesia. The children were randomly selected to have either the right or the left tonsils removed using the electrodissection monopolar technique or cold dissection technique. The cold dissection method used blunt dissection and snares, with bipolar diathermy for hemostasis. The electrodissection utilized the monopolar technique, power of 3 Watts, throughout the whole procedure. Initially by using the cutting mode to cut the mucosa at the medial margin of the anterior tonsillar pillar, then the coagulation mode to continue the dissection around the tonsillar capsule. The time taken for the operation was recorded separately for each side; this was calculated from the beginning of the actual operation (namely, holding the tonsils with tonsil holding forceps) until the attainment of satisfactory hemostasis on the operated side. Intraoperative blood loss was estimated in millimeters by the surgeon and the operating room staff for each side, and by actual measurement of blood in the suction bottle. The children were prescribed standard regular postoperative doses of analgesics; paracetamol and non-steroidal anti-inflammatory drug were used together as well as antibiotic (amoxicillin) for 7 days to reduce the postoperative morbidity. Patients were discharged on the next day after surgery in all cases. Parents were given a diary card to record from day one to 10, diet, severity of pain, as well as the side of maximum pain. The nurse recorded the pain in the first 24 hours, then the first postoperative day by the doctor. On the 10th postoperative day the patients were interviewed regarding pain, underwent examination, and the diary cards were collected.

The data analysis was carried out using the Statistical Package for Social Sciences version 10.05 software package (SPSS, Inc., Chicago, IL). A *p*-value of <0.05 was considered statistically significant. Categorical variables were compared using chi square test.

Results. One-hundred children participated in this study, their age ranged between 4-12 years, with a mean age of 7.37 years. Sixty-three (63%) were males and 37 (37%) were females. The monopolar technique was used on the right side in 81 patients and on the left side in 19 patients. The cold technique was used on the right side in 19 patients and on the left side in 81 patients. Intraoperative blood loss was minimal with the electrocautery dissection technique, averaging 25.37 ml (range 0-60ml). Cold dissection tonsillectomy resulted in an average of 88.45 ml blood loss per side (range 20-240ml). The mean operative time for monopolar dissection was 3.51 minutes (ranging between 1-12

Table 1 - The distribution of the patients according to operative time & tonsillectomy technique.

Operative time in minutes per tonsil	Number of patients	
	Dissection/snare	Diathermy
≤ 3	44	67
>3	56	33
Total	**100**	**100**

Table 2 - Showing the distribution of the patient according to the side of maximum throat pain during the postoperative period.

Time after procedure	Throat pain				
	Equal on both side (n)	Worse on dissection side n (%)	Worse on diathermy side n (%)	No pain (n)	*P* value
First 24 hours	72	11(11)	17(17)	0	NS
Day one	61	12(12)	27(27)	0	0.0151
Day 2	65	16(16)	19(19)	0	NS
Day 3	53	22(22)	25(25)	0	NS
Day 4	55	23(23)	22(22)	0	NS
Day 5	42	26(26)	29(29)	3	NS
Day 6	37	31(31)	26(26)	6	NS
Day 7	20	26(26)	29(29)	25	NS
Day 8	19	17(17)	18(18)	46	NS
Day 9	17	4 (4)	6 (6)	73	NS
Day 10	16	3 (3)	4 (4)	77	NS

NS - not significant

minutes), and for cold dissection the mean was 4.02 minutes (ranging between 1-15 minutes). The difference in time by either techniques was not statistically significant (p=0.0816). However, when the patients were grouped into ≤3 minutes and >3 minute operative times, the results indicated that a greater number of patients were operated in ≤ 3 minutes by the diathermy procedure compared with the dissection method (67 versus 44 cases) (**Table 1**). This difference was statistically significant, p=0.0011. On the first postoperative day, the pain was significantly increased in the diathermy side compared to cold dissection side 27% versus 12% (p=0.0151). While in the first 24 hours and from the 2nd day until the 10th postoperative day, there was no significant difference in pain between both sides (**Table 2**). There was a relationship between the number of doses of postoperative analgesia used per day and the side of throat pain. Those who used only 1-2 doses/day did not show any difference in pain between the 2 sides. However, in 16 cases, who used 3-4 doses/day, throat pain was worse on the diathermy side compared to the dissection side (7 versus 1). This difference, however, was not statistically significant, p= 0.079. The overall incidence of reactionary hemorrhage (occurring within first 24 hours after surgery) was 2% (2 cases), one had bleeding from both sides, and the second case had bleeding from the dissection side. All settled with conservative local management. There was more slough tissue present on the diathermy side compared to the cold dissection side (18% versus 3%) at the 10th postoperative day, this difference was statistically significant (p=0.0008).

Discussion. Ideally, tonsillectomy should be quick, painless, and associated with no blood loss. In reality, however, the morbidity of tonsillectomy may be significant.[2] Surgeons should select the technique that, in their own hands, offers the minimum morbidity. Pain is the most common problem after tonsillectomy.[9] Nunez et al[10] also reported that pain was the most common reason for seeking out patient medical attention in the first 2 weeks after tonsillectomy. Most investigators found no significant difference in pain during the first 24 hours after surgery between the hot and cold methods.[2,5,9,11] Tay,[9] on the other hand, reported significantly less pharyngeal pain on the electrodissection side in the first postoperative day in adult patients. Our study supports the finding of Waxler et al,[12] that there is less pharyngeal pain on the cold dissection side in the first postoperative day in pediatric patients. Our study showed no significant difference in pain between both sides in the first 24 hours, and from the 2nd day until the 10th postoperative day. However, other studies reported significantly more pain during postoperative days 4-10 with electrodissection tonsillectomy.[13] Intraoperative blood loss was less with the hot technique in our study, agreeing with previous studies.[12] The postoperative bleeding showed insignificant difference between the 2 techniques. Across all previous studies, very few patients had postoperative bleeding, and there were no meaningful differences between the cold and hot techniques.[13] Weimert et al,[5] noted a decrease in operative time by using the cautery technique, average 2.5 minutes for the cautery side and 6 minutes for dissection/snare side. Mann et al,[11] noted an average of 10.1 minutes for the cautery side and 12.4 minutes for the dissection side. However, Leach et al reported a decreased operative time with the cold technique, (13.5 versus 9.9 minutes).[2] In contrast, our average time for electrodissection was not significantly less in comparison with the cold dissection side (4.02 versus 3.51 minutes); perhaps some of the resident trainees involved in the present study had more experience with the cold dissection technique. However, when we split the patients into ≤ 3 minutes and >3 minute groups, there were significantly higher numbers of patients operated up on in ≤3 minutes by diathermy compared to the dissection technique (p<0.05).

From our findings clearly monopolar diathermy is a faster technique for tonsillectomy, offering a better hemostasis intra-operatively, and is not associated with increased postoperative hemorrhage. Our study supported the fact that there is no significant increase in postoperative pain with this technique, except during the first postoperative day.

In conclusion, the monopolar diathermy technique significantly reduces the operating time and intraoperative blood loss, however, causes more pain on the first postoperative day when compared with the cold technique. We think that brief pain should not preclude the use of the monopolar technique that offers many benefits. Ultimately, it remains the prerogative of the surgeon to choose the technique that he believes will best serve his patients.

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