

EVALUATION OF SAFETY OF BIPOLAR DIATHERMY TONSILLECTOMY

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Background: Tonsillectomy is a common operation in both children as well as adults, performed by a variety of techniques that have evolved over the years to ensure the safety of the procedure. Cold dissection and electrodissection are the two mostly used techniques. Bipolar diathermy tonsillectomy was evaluated for its safety and postoperative morbidity. **Methods:** This study was conducted over a period of two years, in the Department of Ear, Nose Throat and Head & Neck Surgery at Ayub Teaching Hospital, Abbottabad, Pakistan. Two hundred and forty-six were enrolled; however, 238 patients completed the full evaluation as the technique had to be modified in 8 patients. All the procedures were performed by the first author thereby ensuring the same expertise level. Operating time, intraoperative blood loss, postoperative algesia, feeding status and time taken getting back to school/work and episodes of secondary bleeding were recorded. **Results:** Time taken by the procedure ranged from 10 to 20 minutes. Intraoperative blood loss ranged between 2 to 5 ml. Postoperative pain averaged around 3–5 on a 1–10 point scale in 75% of patients. 80% of patients were back to normal diet by day 3 postoperative. Nine (3.6%) patients had a secondary haemorrhage that was managed conservatively and did not need surgical intervention. **Conclusion:** Bipolar diathermy tonsillectomy is an effective and safe technique, especially in children population. Adequate experience with the technique is mandatory to achieve the desired goals.

Keywords: Tonsillectomy; Electro dissection; Bipolar diathermy; Morbidity

INTRODUCTION

Tonsillectomy was first reported by the Roman encyclopedist Celsus in 30 AD.

Tonsillectomy is a common operation in both children as well as adults, performed by a variety of techniques.¹ None has been proved to be superior to another.² These techniques have evolved over the years aiming to make the procedure safe and decrease the postoperative morbidity and complications.³ This entails a shorter procedure time, minimal blood loss during surgery, minimal risk of postoperative complications, mainly secondary haemorrhage and decreased morbidity. Despite the developments in techniques and technology, tonsillectomy still carries a relatively high risk of morbidity.⁴

A number of different techniques have been mentioned in the literature but the two most commonly used techniques are cold dissection and electro dissection. As a matter of fact, these are the mostly discussed techniques in the literature.^{1,3,5–7}

Beginners learn the procedure utilizing cold dissection technique, while majority of expert surgeons are divided between cold dissection and electrodissection techniques, most of the times on account of personal liking and not under the influence of statistical data.

This prospective study was designed to evaluate the safety of bipolar electrodissection technique as quite frequently, in literature, this

technique has been blamed for increased morbidity and risk of secondary haemorrhage.

Techniques of Tonsillectomy

- Cold dissection
- Electrocautery
- Bipolar radiofrequency ablation (Coblation)
- Monopolar radiofrequency ablation
- Laser tonsil ablation (LTA)
- Harmonic scalpel
- Thermal welding
- Microdebrider assisted partial tonsillectomy
- Ligasure Vessel Sealing System (LVSS) tonsillectomy
- Argon Plasma Coagulation (APC)

MATERIAL AND METHOD

This study was conducted over a period of two years, in the Department of Ear, Nose Throat and Head & Neck Surgery at Ayub Teaching Hospital, a tertiary care centre in Abbottabad, Pakistan.

Two hundred and forty-six patients of both sexes had tonsillectomy with bipolar diathermy technique by the author. Age ranged from 2 to 46 years, 80% of these being children. Chronic tonsillitis and obstructive sleep apnea were the indications for surgery in these patients. Minimum age for tonsillectomy for chronic tonsillitis was 4 years whereas children between 2 to 4 years had tonsillectomy for obstructive symptoms. All the patients were admitted a day before surgery. Recent upper respiratory tract infection in the preceding two

weeks, any systemic infections and bleeding diathesis were ruled out through history and clinical assessment. Relevant investigations were carried out when indicated. All the procedures were carried out under general anaesthesia. Senior anaesthetist supervised procedures in younger children. Bipolar diathermy was used selectively, coagulating and dividing the attachment of the tonsil to the bed thereby avoiding unwanted thermal damage to the tonsil bed ensuring minimal charring. Bleeding points, usually very few, following excision of the tonsil were selectively secured with bipolar diathermy. Postoperatively, all the patients received antibiotics intravenously for 24 to 48 hours, according to weight and age along with adequate intramuscular/per oral analgesia. They were encouraged feeding as soon as possible. Most of the patients (93%) were discharged next day. Those who were slow to start feeding, mostly adults, with longstanding history of chronic tonsillitis and those who had to travel long distance going back home, were kept in for 48 hours. Patients were given verbal as well as written instructions regarding medication at home along with guidance regarding food intake and general care. All the patients were followed up at two weeks following surgery. 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.

Time duration of the procedure, intraoperative blood loss, postoperative algesia, feeding status and time taken getting back to school/work and episodes of secondary bleeding were recorded.

Table-1: Age group distribution (n=246)

Age group	No of patients	%
2 – 4 years	5	2.03
4-10 years	122	49.59
10-18 years	63	25.6
18-30 years	32	13
30-40 years	21	8.53
40-46 years	3	1.21

RESULTS

Two hundred and thirty-eight patients had successful completion of the procedure. Surgeon had to revert to cold dissection to complete the procedure in 8 patients, all adults, on account of excessive bleeding during the procedure, apparently due to extensive fibrosis in the tonsillar bed, when it was found difficult to continue with electro dissection. These cases were not included for further evaluation. All these patients had longstanding history of recurrent tonsillitis where as 2 patients had episodes of peritonsillar abscess treated with incision & drainage in the past.

Time taken by the procedure ranged from 10 to 20 minutes, being shorter in children and longer in adults. This time was calculated from the time of first application of the bipolar diathermy to the security of haemostasis.

Table-2: Duration of surgery (n=238)

Number	Time
60	10 minutes
130	15 minutes
48	20 minutes

Blood loss during the procedure ranged between 2 to 5 ml, averaging less than 5 ml in 90% of the subjects. Estimation of blood loss was purely subjective assessment by the surgeon.

Postoperative pain averaged around 3–5 on a 1–10 point scale in adults and older children, who could understand and respond to such assessment, i.e., 75% of patients. Such assessment was not possible in younger children. However, crying and reluctance to take food were taken as signs of significant pain (5%), whereas staying quite and keen on taking food were considered as pain free children (20%). In symptomatic patients, postoperative pain needed attention between day 3 and 5, more in adults.

Most of the patients (80%) were back to adequate normal diet by day 3 postoperative, however, some patients were slow on that being afraid of causing damage to the wound.

Nine (3.6%) patients had a secondary haemorrhage that was managed conservatively and did not need surgical intervention.

DISCUSSION

Tonsillectomy may be performed by different techniques.¹ These techniques have evolved over the time with the objective of reducing the morbidity and complications associated with the procedure. All these techniques have advantages as well as drawbacks, as reported by the surgeons from time to time, but none of them has been accepted as the single best technique universally.²

Operating time, intra-operative blood loss, postoperative pain, return to normal diet and activity and secondary haemorrhage are the points of concern that have divided the surgeons between different techniques and are the objectives of clinical research going around globally.

Cold dissection and electrodissection are the two mostly used techniques. As a matter of fact, beginners learn the procedure utilizing the cold dissection method in most of the units. Thereon, depending upon the facilities available and individual preferences, surgeons opt for different techniques. Ongoing research on the subject indicates that most

of the newer techniques are still under assessment to be proven superior or otherwise.

Most opponents of electrodissection technique stand their ground on account of two reservations, i.e., more postoperative algesia and increased risk of secondary bleeding.

This study evaluated the efficacy of electrodissection technique using bipolar diathermy, addressing the above mentioned parameters. All the procedures were done by the same surgeon with adequate amount of experience with the modality, thereby offering the same expertise level.

Operating time was recorded from the time of first application of diathermy until security of haemostasis. Time taken to anaesthetize the patient, positioning, application of mouth gag apparatus, recovery and extubation were not included being same for any technique under general anaesthesia. It ranged between 10 to 20 minutes, being longer in adults, apparently on account of more fibrosis in the tonsil bed. Silveira H and colleagues have reported significant less operating time with bipolar electrodissection compared to cold dissection in children.⁶ Similar findings have been reported in the literature.^{1,8}

Intra-operative blood loss estimation in our study was purely a subjective assessment by the surgeon and certainly is subject to argument/disagreement by the reader. Loss of 2 to 5 ml of blood was noted during the procedure, again being more in adults, apparently for the same reason of more fibrosis and therefore poor vascular response. Other studies have also noted less intraoperative blood loss with this technique.^{1,6,8}

Postoperative pain was recorded on a 1–10 point scale in the evening on the day of surgery and before discharge from the hospital after 24 hours. This assessment was possible in only 75% of patients, mostly adults and older children. Majority of these patients were falling in the ≤ 5 area. This could be attributed to regular and adequate analgesia starting parenterally during the procedure and continuing through the hospital stay. Such information was not possible in children, especially in the younger age group. Irritability, restlessness, crying and reluctance to take food were taken as an indication of pain in these children. Pain assessment and recording at home was not satisfactory for multiple factors including lack of application on part of patients/parents as well as illiteracy and other social reasons. However, adequate intake of food and was taken as factor against pain. Overall, pain did not occupy a major slot in our worries during the two weeks postoperative period. To the contrary, high pain scores have been reported with electrodissection, especially, after the first few days following

surgery.^{3,7} Increased pain reported with electrodissection could possibly be on account of various factors like experience with the technique, length of disease, amount of energy used during the procedure etc rather than the modality alone. Cardozo AA and colleagues have noted statistically significant positive relationship between the total amount of bipolar diathermy used and postoperative pain.⁹

The technique of selective coagulation and dissection of the tonsillar attachment and minimal use of diathermy in the tonsillar bed and therefore less charring in the bed may be a reasonable cause of less pain as noticed in our patients. However, further evaluation of this aspect is needed to be convinced.

Regarding food intake, patients were encouraged feeding as soon as fully recovered from anaesthesia. Light and fluid diet was recommended initially and the surgeon preferred the patients to be back to semisolid/solid diet as soon as possible. Adequate counseling and assurance both to the patient as well as the attendants was helpful. Chewing gum for some time before meals helped considerably in this regard. Children were quick as compared to adults, majority of them back to normal diet by day 3 to 5 postoperative. Adults were found to be more curious being afraid that solid diet may damage the wound.

Pang YT has also reported significantly early return to feeding with bipolar diathermy tonsillectomy compared to cold dissection technique in children.¹

Nine (3.6%) patients were reported with secondary haemorrhage. Out of those, 4 (1.6%) patients presented with active bleeding, 3 (1.2%) had a clot in the tonsillar fossa and 2 (0.8%) had a history of bleeding but did not have evidence of bleeding on arrival. All these patients were managed conservatively and did not need surgical intervention. Literature review revealed that bipolar diathermy tonsillectomy did not carry risk of secondary haemorrhage different from other standard techniques.¹⁰ Pang YT has reported incidence of postoperative haemorrhage as 1.7% with bipolar diathermy tonsillectomy compared to 3.4% with cold dissection, carrying no statistical significance.¹ Whereas Gendy S and colleagues have reported a higher incidence of secondary haemorrhage with bipolar dissection (2.3%) compared to cold dissection (1%) in a study including 545 children.³ Similarly Lowe D *et al* after conducting a prospective national audit concluded that hot tonsillectomy techniques are associated with substantially high risk of secondary haemorrhage.¹¹

All the patients were back to normal life activities by two weeks following surgery, including those who had a secondary bleed. As a matter of fact,

80% of adult population returned to routine daily activities including job, business etc, by day 8 to 10 following surgery.

CONCLUSION

Bipolar diathermy tonsillectomy is an effective and safe technique, especially in children population and patients with bleeding disorders. It offers several advantages in terms of shorter operating time and minimal intraoperative blood loss. Selective and appropriate use of diathermy, avoiding excessive thermal damage to the tonsillar bed may help in ensuring less postoperative pain.

Adequate experience with the technique is mandatory to achieve the desired goals.

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