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A COMPARATIVE STUDY OF BIPOLAR ELECTROCAUTERY TONSILLECTOMY VERSUS DISSECTION SNARE AND LIGATION TONSILLECTOMY IN THE PEDIATRIC POPULATION

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ABSTRACT

Tonsillectomy is the most common surgical procedure done in the paediatric population. Over the years many proven methods for tonsillectomy such as guillotine, snare, bipolar electrocautery, unipolar electrocautery, laser, coblation and microdissection were devised. None of the methods however have been able to provide the patient with all aspects of the ideal tonsillectomy. In the present study we compared bipolar electrocautery tonsillectomy with dissection and snare tonsillectomy in children below the age of 16 years over the period of one year. Our study shows that dissection and snare is the gold standard method with less post operative pain and complications, where as bipolar electrocautery tonsillectomy is easy to perform, less blood loss but with more post operative pain and complications

INTRODUCTION

The first known tonsillectomy was performed by Aulus Cornelius (25BC-50BC, author of 'De Medicina') almost 2000 years ago¹. Modern tonsillectomy began in the early years of the last century, with the development of dissection tonsillectomy in Baltimore by Worthington (1907) and in London by Waugh(1900). Throughout the world, tonsillectomy is one of the most frequently performed otorhinolaryngological procedures². We decided to do a comparative study on traditional Dissection, Snare and Ligation tonsillectomy versus Bipolar electrocautery tonsillectomy. Our study is aimed at including more parameters and comparing the pros and cons of either technique in the same individual.

Aims and Objectives

The Aim of the study is to compare Bipolar Electrocautery tonsillectomy and Dissection snare and ligation tonsillectomy techniques with regard to the following: Intra-operative blood loss, Operative time, Post-operative pain, Tonsillar fossa Healing, Post-operative complications.

Duration of the Study

January 2016 to December 2016 for a period of one year.

MATERIALS AND METHODS

Inclusion Criteria

1. All children between 4 to 16 years of age with five or more episodes per year of sore throat due to tonsillitis.
2. Chronic Tonsillitis as a predisposing factor for chronic suppurative otitis media.
3. Any suspected Sleep Apnoea Syndrome.

Exclusion Criteria

1. Acute Tonsillitis within 6 week prior to surgery
2. Any second or revision tonsil operation (revision or remnant Tonsillectomy).
3. History of bleeding disorder and peritonsillitis.
4. Patients with craniofacial anomalies.
5. Children below 4 years of age.

All operations were conducted under general anesthesia using endotracheal intubation. The patients were placed in supine position with a sand bag between the shoulders (Rose Position). The mouth was held open by a Boyle's Davis Gag supported by Draffin Bipod Stand³. In the bipolar electrocautery tonsillectomy technique (using Johnson and Johnson Digital 400 diathermy machine set at 35W). After removal of the tonsil, further hemostasis was secured by point coagulation and the fossa was packed with cotton swabs. The tonsillar fossa was cooled with saline during the procedure. On

the other tonsil, Dissection, Snare and Ligation technique was performed. We define "Snare Dissection and Ligation" tonsillectomy as the standard technique. The fossa was packed with cotton swabs and silk ties were used to secure hemostasis. The operative time was measured from the start of palatoglossal incision to the attainment of hemostasis and was recorded separately for each side. The time taken to operate on each side was recorded in minutes¹. Intra-operative blood loss for each side, was measured by finding the difference in the weights of the pre-operative cotton swabs (a) and post-operative cotton swabs (b) and the resulting total obtained (1g=1ml, each 1g of additional weight was considered to equal 1ml of blood), was added to the difference between the volume of pre-operative saline in the irrigation bowl (c) and the volume of suction fluid in the graduated suction bottle (d)⁹. The following formula was used:

$$\text{Total intra-operative blood loss(ml)}=(b-a)+(d-c).$$

The weight measurement was performed by using Tanita Digital Scale, Professional-Mini 1479V, Japan. Subjective pain assessment in the post operative period was recorded by the intensity of pain and was evaluated by a graded index classified as mild, moderate or severe.

Mild- Pain with swallowing alone.

Moderate-Pain with tongue movements and swallowing.

Severe-Pain present at rest, movement of tongue and Swallowing.¹

Statistical analysis was undertaken by calculating the chi-square test and performing Fisher Two Tail Test (Statgraf, USA).

OBSERVATION AND RESULTS

Table 1 Age and Gender Incidence

Age	Male	Female	Total (%)
4-8	8	7	15(30%)
9-12	11	13	24(%)
13-16	8	3	11(22%)

Female predominance were more between 9-12 year of age

Table 2 Intra Operative Blood Loss

Blood loss(ml)	Bipolar	Dissection
=10	18	0
11-50	25	17
51-100	5	21
101-150	2	11
151-200	0	1
>200	0	0

Intra operative blood loss was minimal with bipolar electrocautery tonsillectomy

Table 3 Operative Time

No of minutes	Bipolar	Dissection
≤5	3	1
6-10	19	2
11-15	15	16
16-20	5	17
21-25	5	11
26-30	3	1
>30	0	2

When compared to dissection and snare tonsillectomy the time duration was less in bipolar electrocautery tonsillectomy

Table 4 Post Operative Pain Assessment

Post operative duration	Bipolar				Dissection			
	Absent	Mild	Moderate	Severe	Absent	Mild	Moderate	Severe
Immediate	0	0	0	50	0	0	0	50
<24hrs	0	1	6	43	0	3	10	37
Day4	2	8	31	9	17	25	7	1
Day7	16	20	14	0	43	7	0	0
Day14	47	3	0	0	49	1	0	0
6 weeks	50	0	0	0	50	0	0	0

Post operative pain was less in patients who underwent dissection and snare tonsillectomy

Table 5 Post Operative Complication

	Bipolar	Dissection
Reactionary haemorrhage	0	0
Palatal trauma	2	0
Uvular trauma	9	1
Dental trauma	2	1
Secondary haemorrhage	3	0
Parapharyngeal abscess	0	0
Lung complication	0	0
Lip and tongue trauma	2	0
None	32	48

Post operative complications were less in patients who underwent dissection snare and ligation tonsillectomy

DISCUSSION

Our study has shown significant reduction in intra operative blood loss and operating time with bipolar electrocautery tonsillectomy which indirectly reduced the anaesthetic time. This was similar to a study by Raut V, *et al*² who compared bipolar scissors tonsillectomy with dissection and snare tonsillectomy; he has encountered a mean intra operative blood loss of 5 ml and 115ml respectively. Our results were similar to the study performed by Atallah N, *et al*⁵ on 70 patients; their mean operating time for bipolar electrocautery tonsillectomy was 4 minutes and 32 seconds and Dissection, snare and ligation tonsillectomy was 10 minutes and 32 seconds. Raut V, *et al* in their study of comparing bipolar scissors tonsillectomy with dissection, snare and ligation tonsillectomy reported mean operating times of 13 minutes and 20 minutes respectively for 200 patients.

One of the main drawbacks of the available studies was the difficulty in assessing and comparing pain between varying degrees of pain threshold. However, our study was designed in such a way that patients are actually comparing the pain between two sides, avoiding individual bias in pain assessment which was more or less similar to the studies by Choy ATK, *et al* and Akkielah A, *et al*.⁴ Atallah N, *et al*⁵ reported that ligation tonsillectomy was significantly more painful in the first post operative day (p<0.05) in their comparative study on post operative pain in tonsillectomy. Pain, particularly in children is probably the most significant obstacle to recovery following tonsillectomy, influencing the ability to return to normal activity⁶. Tonsillar fossa healing following tonsillectomy is by epidermal ingrowths from the incised edges of the anterior and posterior pillars². In bipolar electrocautery, the area of tissue coagulation is localized between the fine tips of the diathermy forceps causing less tissue damage in a more controlled and precise fashion resulting in less variable post-operative pain.

Ligation does not cause deep seated tissue damage but they may catch muscle fibres on the floor of the tonsillar fossa

resulting sometimes in more post-operative pain.⁷ In the post operative period complications following both the tonsillectomy procedures There was no statistically significant difference among the overall post operative complications in bipolar electrocautery tonsillectomy or dissection, snare and ligation tonsillectomy in our study. Our result also correlated to the studies of Raut V², Moonka PK⁷ and Wiemert TA⁸.



Figure 1 bipolar cautery



Figure 2 dissection snare and ligation



Figure 3 Blood loss measurement.

Summary

Intra operative blood loss- There was a total mean blood loss of 23.3 ml on the bipolar electrocautery side and 67.32ml on the dissection, snare and ligation side.

Operative time- The total mean operative time for the bipolar electrocautery side was 13.1 minutes while the time taken for dissection, snare and ligation was 18 minutes.

Post operative pain- The intensity of pain was more on the bipolar electrocautery side as compared to the dissection, snare and ligation side in a majority of patients. However, the overall difference in intensity of pain was not significant statistically.

CONCLUSION

In daily practice, tonsillectomy can be either “terribly simple or simply terrible”. Regarding the question of which technique results in the ideal tonsillectomy, bipolar electrocautery tonsillectomy is a more favourable technique in view of ease of procedure, decreased blood loss and quicker operative time, which is favoured by most surgeons. The only unfavourable point against bipolar electrocautery tonsillectomy is increased post operative pain morbidity and an increased risk of secondary haemorrhage. Although there is more intra operative blood loss and increased operative time with dissection, snare and ligation tonsillectomy, patients have less post operative pain and post operative complications compared to bipolar forceps tonsillectomy which was clinically significant in patients perspective. Tonsillectomy by dissection, snare and ligation technique is more acceptable from the patients’ perspective. We conclude by opining that, surgeons should select the technique that in their own hands offers minimum morbidity.

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