

ORIGINAL RESEARCH

A Comparative Study of the Dissection Technique and the Snare and Electrocautery Technique for Tonsillectomy at a Tertiary Care Centre

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ABSTRACT

Background: Comparative analysis of the dissection technique and the snare and electro-cautery techniques for tonsillectomy.

Materials and Methods: All patients in the present research provided prior informed consent. To account for potential dropouts throughout the follow-up period, it was determined that a minimum of 50 patients would be enrolled in each group, resulting in a total sample size of 100.

The research included individuals clinically diagnosed with chronic tonsillitis who were beyond the age of six, regardless of their gender. All 100 patients included in the study were randomly assigned to either group A or group B in order to maintain a single-blind status. Tonsillectomy was performed on all cases by a single consultant surgeon using either the dissection and snare method or the electro-cautery method.

Results: The average amount of blood lost during surgery was 4.93 mL in group A and 2.65 mL in group B, with a statistically significant difference ($p < 0.001$). The average post-operative discomfort was 5.67 in group A and 6.46 in group B, with a p-value of less than 0.001. The average length of operation was 6.42 minutes for group A and 4.66 minutes for group B, with a statistically significant difference ($p < 0.001$). The average length of stay remained below two days in both groups. Group A had duration of 31.28 hours, whereas group B had duration of 45.76 hours, with a p-value of 0.01. In group A, there were 5 instances that required longer post-operative procedures such as ligation and cauterization for haemostasis, whereas in group B, there were 8 cases. Additionally, in group A, 7 patients required an extra dosage of analgesics, but in group B, there were 20 cases. Group-B subjects needed a greater mean extra dosage of analgesia. During the post-operative follow-up, slough was seen in the tonsillar fossa in 4 out of 14 patients in groups A and B. The p-value was 0.08.

Conclusion: Among the instances with chronic tonsillitis, the group-B tonsillectomy approach utilising electrocautery was shown to be more successful in significantly reducing both excessive intra-operative blood loss and the time of surgery under anaesthesia compared to the dissection and snare technique used in group-A.

Keywords: Dissection technique, Snare, Electrocautery technique, Tonsillectomy

Introduction

Tonsillectomy is a frequently performed surgical procedure carried out by ear, nose, and throat specialists. Celsus originally characterised it in the 1st century AD.^{1,2} Tonsillectomy is a surgical technique that involves the removal of both palatine tonsils from the tonsillar fossa. Tonsillectomy is often used to address recurring tonsillitis and tonsillar hypertrophy, with a primary focus on paediatric patients. Tonsillectomy can be performed using a number of well-established techniques, such as

coablation, laser surgery, diathermy (both monopolar and bipolar), cold dissection, and cryosurgery. The typical signs include repeated episodes of tonsillar infection or blockage of the airway (kissing tonsils). In the late 1960s, tonsillectomies were often done using the cold approach. This included dissecting the tonsil capsule from the bottom of the fossa using both blunt and sharp dissection techniques.^{3,4} During the 1970s, electro cautery was deemed a safe and straightforward procedure since it resulted in little bleeding during surgery.⁴ Despite advancements in technology, surgical procedures, and tonsillectomy instruments, significant obstacles still persist in terms of intra-operative blood loss, post-operative haemorrhage, and post-operative discomfort. Surgeons and anaesthesiologists consistently seek and advocate for measures to minimise perioperative and postoperative morbidity.^{5,6} Various electro cautery-based methods have been created to minimize post-operative bleeding, but they do not have a substantial impact on reducing post-operative discomfort.⁴ Cohen L was the first to regularly employ intra-operative closure of the bleeding site, and this practice has continued to be used without interruption.⁷ According to research conducted by Salam MA and Cable HR, the large number of tonsillectomy patients in their setting highlights the need to consider the duration of the operation and the amount of blood loss during the surgery.⁸ A study was conducted among a rural population in India to compare the methods of dissection, snare, and electro cautery for tonsillectomy. A study was conducted among a rural population in India to compare the methods of dissection and snare and electrocautery for tonsillectomy.

Aims and objectives: The study aimed to evaluate post-operative pain, intra-operative blood loss, operating time, post-operative healing of the tonsillar fossa, and total duration of stay.

Materials and Methods

The present study was a prospective, randomised one. The research comprised 100 patients clinically diagnosed with chronic tonsillitis, regardless of their gender, admitted to the ENT emergency/OPD, Gouri Devi Institute of Medical Sciences and Hospital, Durgapur, West Bengal, Kolkata, India. All individuals in this research provided prior informed consent. The study was conducted from July 8, 2020, to August 30, 2021. Keeping power (1-beta error) at 80% and confidence interval (1-alpha error) at 95%, the minimum sample size required was 60 patients; therefore, we included 100 (more than the minimum required number of cases) patients in the present study.

Inclusion criteria

- Patients who gave written informed consent.
- Age > 6 years to 25 years.

Exclusion criteria

- Patients who were diagnosed with acute tonsillitis or had bleeding problems, active menstruation.
- A haemoglobin level less than 10 g/dL, or
- Antibiotic therapy within the last five days was not included.

All 100 patients included in the study were randomly assigned to either group A or group B in order to maintain a single-blind status. Tonsillectomy was performed on all cases by a single consultant surgeon using either the dissection and snare method or the electro cautery method. Groups A and B underwent tonsillectomy by dissection and snare and electrocautery, respectively, on all enrolled hundred cases. The cases received similar pre- and post-operative medications. In each instance, the consultant who was there administered general anaesthesia. Before each surgery, a comprehensive analysis of the patient's blood and urine was conducted, including tests such as the complete blood count (CBC), bleeding time (BT), clotting time (CT), blood grouping, as well as urine routine and microscopy.

The level of pain experienced after the surgery was measured using the Visual Analogue Scale (VAS), which allows patients to rate their discomfort on a scale from 1 to 10. In this research, the Visual Analogue Scale (VAS) was recorded after the administration of anaesthesia, namely 4-6 hours after the surgical procedure. The tonsillectomy procedure utilised the dissection and snare technique, employing a specific set of instruments from Kalelkar Surgical Pvt. Ltd. This set included the tonsillar snare made by Eve from Cold Steel, the tonsillar dissector cum anterior pillar retractor made by Mollison, the bipod by Draffin, the tonsil holding forceps by Denis Browne, and the mouth gag made by Boyle-Davis. The L&T brand's bi-polar and monopolar electrocautery devices were used. The duration of the procedure was recorded by measuring the time it took from creating the incision until full haemostasis was achieved in both dissected tonsillar fossae using a stopwatch. The amount of blood lost during the surgery was determined by weighing the gauze pieces before and after they absorbed blood. Any intra-operative problems that required a longer procedure were documented. The whole length of hospital stay, from the patient's admittance to their ultimate discharge after confirming their fitness, was evaluated based on the patient's condition, specifically looking for aberrant odynophagia, fever, and any active bleeding or extensive slough in the tonsillar fossa.

The need for further analgesic dosage was observed based on the level of pain assessed using the Visual Analogue Scale (VAS) during the first 4-6 hours and 24 hours following the procedure. Each patient was administered Dexmedetomidine intravenously at a dosage of 1 microgram per kilogram during surgery, followed by a continuous infusion of 0.5 micrograms per kilogram per hour in a normal saline drip until either 4 hours had passed or the patient had fully recovered from anaesthesia. Patients having a Visual Analogue Scale (VAS) score greater than 6 were given an extra analgesic dose of intravenous tramadol at a dosage of 0.8 mg per kilogram every 8 hours, or until their VAS score dropped below 5. The state of the tonsillar fossae was regularly assessed during the first 24 hours after a tonsillectomy. Subsequently, all patients were summoned once again for a further evaluation within 7–10 days after being released from the procedure.

Statistical analysis

The average post-operative discomfort, amount of blood lost during surgery, and overall length of hospital stay were compared using the Mann-Whitney U-test. The average length of operational time was compared using a Student's t-test. The data did not exhibit a normal distribution in some parameters, such as mean post-operative discomfort, intra-operative blood loss, and total period of hospitalization. Therefore, the parametric test, the student's t-test, was substituted with a nonparametric test called the Mann-Whitney test. The student's t-test was performed when the data followed a normal distribution, such as in the mean length of operational time. The Chi-square test was used to compare the dosage of analgesics and prolonged haemostatic measures.

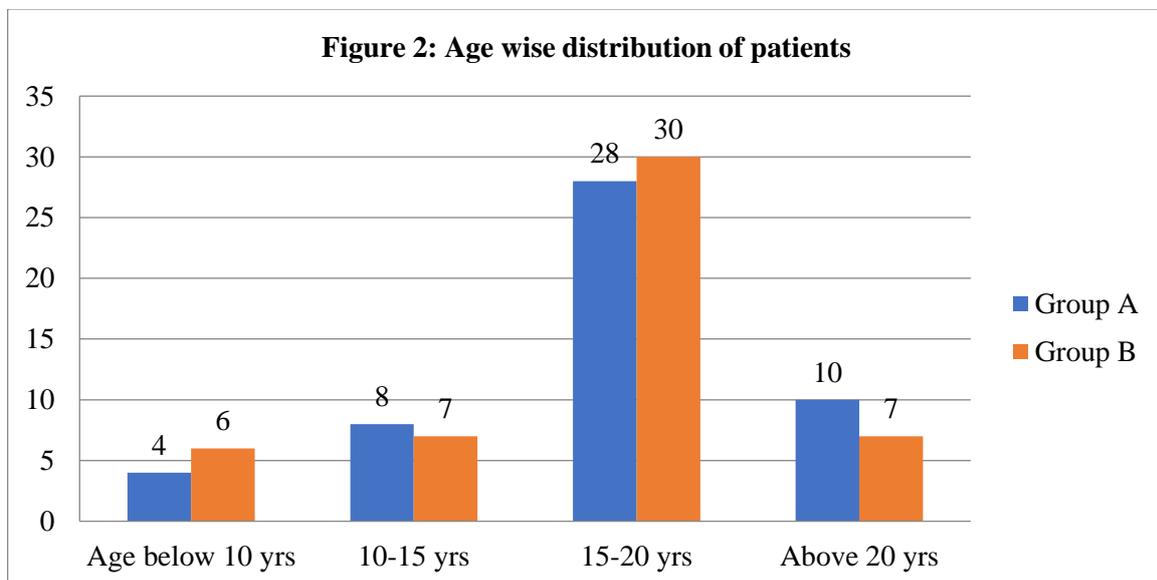
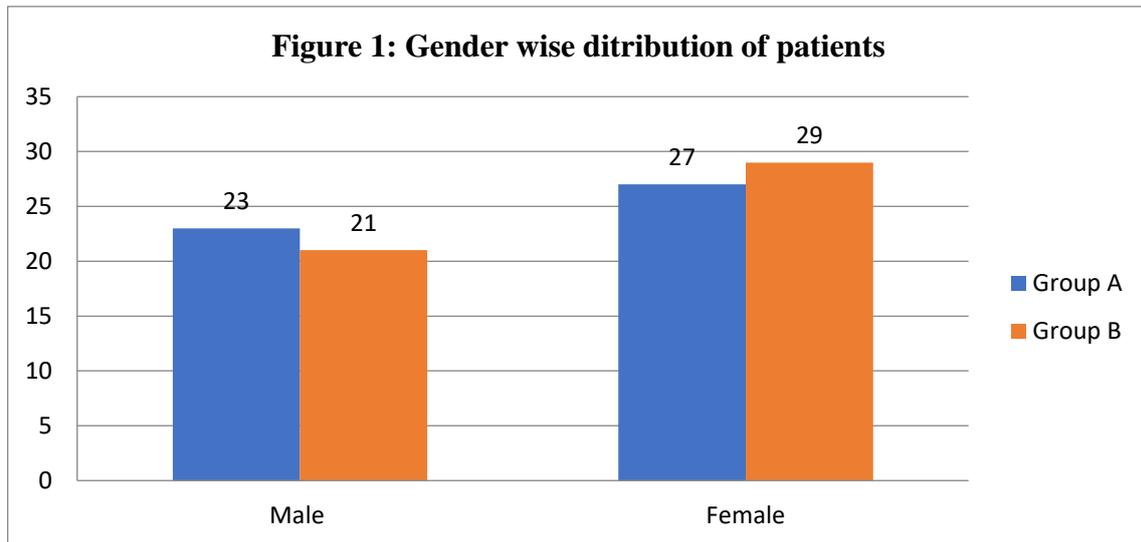
Results

All 100 patients in groups A and B were subjected to tonsillectomy using dissection and snare procedures, respectively, with the addition of electro cautery. The participants in both groups had an age range of 6 to 25 years. The gender distribution was practically equal, with a male-to-female ratio of 0.79 to 1. The mean age of group A was 17.08 ± 2.65 years, and the mean age of group B was 17.14 ± 2.78 years, as shown in Table 1, Figure 1.

Table 1: Gender and age wise distribution of the patients

Parameters	Group A (n=50)		Group B (n=50)		Total (n=100)	
	Number	Percentage	Number	Percentage	Number	Percentage
Gender						
Male	23	46%	21	42%	44	44%
Female	27	54%	29	58%	56	56%

Age						
Below 10	4	8%	6	12%	10	15%
10-15	8	16%	7	14%	15	15%
15-20	28	56%	30	60%	58	58%
Above 20	10	20%	7	14%	17	17%
Mean Age (in years)	17.08±2.65		17.14±2.78			



The average amount of blood lost during surgery was 4.93 mL in group A and 2.65 mL in group B, with a statistically significant difference ($p < 0.001$). The average post-operative discomfort was 5.67 in group A and 6.46 in group B, with a p-value of less than 0.001. The average length of operation was 6.42 minutes for group A and 4.66 minutes for group B, with a statistically significant difference ($p < 0.001$). The average length of stay remained below two days in both groups. Group A had a duration of 31.28 hours, whereas group B had a duration of 45.76 hours, with a p-value of 0.01 [Table 2].

Table 2: Quantitative parameters

Parameters	Group A (n=50)		Group B (n=50)		P value
	Mean	SD	Mean	SD	
Intra-operative blood loss (mL)	4.93	0.87	2.65	0.54	0.01
Pain after 4-6 hours post-surgery (VAS)	5.67	0.88	6.46	1.11	0.01
Duration of operating time(minutes)	6.42	1.09	4.66	0.89	0.01
Duration of stay(hours)	31.28	3.67	45.76	3.87	0.01

In group A, there were 5 instances that required longer post-operative procedures such as ligation and cauterization for hemostasis, whereas in group B, there were 8 cases. Additionally, in group A, 7 patients required an extra dosage of analgesics, but in group B, there were 20 cases. Group-B subjects needed a greater mean extra dosage of analgesia. During the post-operative follow-up, slough was seen in the tonsillar fossa in 4 out of 14 patients in group A and B. The p-value was 0.08, as shown in Table 3.

Table 3: Qualitative parameters

Cases requiring/having	Number of cases		Chi-square test value	p-value
	Group-A (n=50)	Group-B (n=50)		
Extended post-operative procedure	5	8	0.18	0.14
Additional analgesic dose in first 24 hours of surgery (mean extra analgesic dose in- μ g)	7	20	8.11	0.17
Presence of slough at post-operative fossa during follow-up	4	14	3.56	0.08

Discussion

Tonsillectomy is a prevalent surgical procedure performed globally by otolaryngologists. Tonsillectomy can be performed using a number of well-established techniques, such as co-ablation, laser surgery, diathermy (both monopolar and bipolar), cold dissection, and cryosurgery. Tonsillectomy is mostly performed using two basic techniques: cold dissection and electrocautery dissection. These methods are widely used in practice. Tonsillectomy is accomplished by blunt dissection, laser, or diathermy. The earliest technique used for electro-dissection tonsillectomy was the use of monopolar diathermy. In the past, there were concerns about using diathermy during tonsillectomy due to the simultaneous use of flammable anaesthetic gases. Subsequently, following the introduction of non-flammable anesthetic drugs, the use of monopolar and then bipolar diathermy for achieving hemostasis began. Several writers have used this technique, resulting in little morbidity, including shorter surgical duration and dramatically reduced blood loss. Electrocautery dissection is very accurate, enabling the identification and diathermy of blood vessels while minimizing blood loss.^{9,10}

In present comparative research, the average amount of blood lost during surgery was 4.93 ± 0.87 mL in group A (tonsillectomy using dissection and snare) and 2.65 ± 0.54 mL in group B (tonsillectomy using electrocautery). The difference in blood loss between the two groups was statistically significant ($p < 0.001$). Several previous studies have revealed that the electrocautery

group had much lower intra-operative average blood loss compared to the dissection-snare group.⁹
¹¹ Similarly, the average duration of operation in this trial was lower in the electrocautery group. Several studies have shown that the duration of surgery was considerably shorter in the electrocautery group compared to the dissection group.^{10,12-14} In this research, the average level of pain experienced by patients 4-6 hours after surgery was 5.67 ± 0.88 and 6.46 ± 1.11 on the VAS scale in groups A and B, respectively. The difference in pain levels between the two groups was statistically significant ($p < 0.001$). In a study conducted by Álvarez Palacios I et al.¹⁵, post-operative pain was compared among three different techniques: cold dissection (CD), monopolar-bipolar dissection (MBD), and coblation dissection (CBD). The study, which included 103 cases, found no significant differences in post-operative pain between the groups, except for the first day when MBD tonsillectomy resulted in a higher pain score. Similarly, the research conducted by Mofatteh MR and Salehi F, as well as Senzen OS and Kaytanc H, discovered that the electrocautery group had greater pain ratings than the dissection and snare group on the first day after surgery.^{11,13}

The supplementary analgesic dosage required in the instances of this research was greater in the electrocautery group compared to the dissection and snare groups. Research conducted by Nunez DA and Provan J with 54 patients found that the use of electrocautery during surgery resulted in a higher need for extra analgesic medication during the first 24 hours compared to the dissection and snare groups. During this investigation, problems such as primary or reactionary haemorrhage were seen in 5 and 8 patients in groups A and B, respectively. These complications necessitated further treatments, such as ligation and cautery.¹⁶ Mackenzie IJ documented a study including 172 patients who had ligation on one side and diathermy on the other side. The study found that just one instance of main bleeding occurred on the side that was ligated. None of the cases in this study experienced secondary hemorrhage, which may be attributed to the use of proper aseptic care and careful tissue handling during surgery.¹⁷ This finding is consistent with a study by Lassaletta-L, which also found no difference in the occurrence of post-operative haemorrhage between the two techniques. There was no statistically significant difference in the average length of stay, the length of time for post-operative procedures, the amount of extra pain medication necessary, or the healing of the tonsillar fossa throughout the 7–10 day period in both groups of this research.¹⁴

Limitations of study: The limitations of the research include the short period and limited sample size.

Conclusion

Among the instances with chronic tonsillitis, the group-B tonsillectomy approach utilizing electrocautery was shown to be more successful in significantly reducing both excessive intra-operative blood loss and the time of surgery under anaesthesia compared to the dissection and snare technique used in group-A. Therefore, when considering a tonsillectomy for chronic tonsillitis with a higher risk of complications due to a borderline hemoglobin level or other factors that increase the risks of anesthesia, particularly in busy hospitals with a high number of patients, it is advisable to choose the more efficient technique of electro-cautery.

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