ORIGINAL RESEARCH

A Comparative Study of Tonsillectomy Techniques: Dissection and Snare versus Electrocautery

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ABSTRACT

Background: Tonsillitis refers to the infection or inflammation of the tonsils, which are two lymphoid structures situated at the rear of the throat. The present study was conducted to compare dissection and snare and electrocautery techniques of tonsillectomy.

Materials & Methods: 78 cases undergoing tonsillectomy of both genders were selected and equally divided into two groups- dissection and snare and electrocautery. In all cases, intra-operative blood loss, surgery duration, evaluation of postoperative pain, total hospital stay duration, any complications and their management, and tonsillar fossa condition were recorded after surgery and during the 10-day follow-up period.

Results: Group I had 20 males and 19 females and group II had 18 males and 21 females. In group I and group II, the mean blood loss was 4.8±2.1 ml and 2.4±1.5 ml, pain (VAS) was 5.7±3.6 and 6.4±1.4, operating time was 6.8±2.1 minutes and 4.2±2.1 minutes and hospital stay was 31.2±5.4 hours and 45.7±9.5 hours respectively. The difference was significant (P< 0.05).

Conclusion: The tonsillectomy method employing electrocautery proved to be more effective in significantly reducing both excessive intra-operative blood loss and the duration of surgery under anaesthesia, in comparison to dissection and snare group.

Keywords: Tonsillitis, Electrocautery, Dissection and snare, Visual Analog Scale

INTRODUCTION

Tonsillitis refers to the infection or inflammation of the tonsils, which are two lymphoid structures situated at the rear of the throat. The tonsils serve to filter bacteria and viruses that enter through the mouth or nose, but they can also become infected or inflamed. Viral infections are responsible for most instances of tonsillitis.[1] Common viruses responsible for tonsillitis include Adenovirus, the Influenza (flu) virus, Epstein-Barr virus (which leads to mononucleosis or "mono"), and Herpes simplex virus. Though bacterial infections occur less frequently, they can be more serious in nature. The most frequent cause of tonsillitis is Group A Streptococcus, the bacterium that leads to strep throat. If it is not treated, this can result in complications of a more serious nature.[2]

Across the globe, tonsillectomy is among the most frequently carried out surgical operations. The usual reasons for removal continue to be recurrent tonsillar infections (chronic tonsillitis) or airway obstruction (kissing tonsils).[3] Until

the late 1960s, tonsillectomies were carried out using a cold method, which involved dissecting the capsule of the tonsil from the floor of the fossa through both blunt and sharp dissection. In the 1970s, hot electrocautery was deemed safe and easy to perform because of the minimal intra-operative hemorrhage. Despite technological advancements, improved surgical techniques, and better instrumentation in tonsillectomy, intra-operative blood loss, post-operative hemorrhage, and post-operative pain continue to pose significant challenges.[4]

It has always been recommended by surgeons and anaesthesiologists, and they have sought methods, to reduce morbidity in the perioperative and postoperative periods.[5] Various techniques utilizing electrocautery have been devised that lead to reduced post-operative bleeding; however, these do not considerably lessen post-operative pain.[6] Cohen L was the first to use intra-operative ligation of the bleeding site as a standard practice, and it has continued to be used ever since.[7]

AIM AND OBJECTIVES

The present study was conducted to compare dissection and snare and electrocautery techniques of tonsillectomy.

MATERIALS AND METHODS

Materials and Methods

Study Design: This was a prospective, randomized, single-blind clinical trial comparing two surgical techniques for tonsillectomy—Dissection and Snare method versus Electrocautery technique. The study was designed to evaluate both intraoperative and postoperative outcomes in patients undergoing elective tonsillectomy.

Study Population: A total of 78 patients aged between 5 to 50 years, of either gender, who were clinically diagnosed with chronic tonsillitis or recurrent acute tonsillitis, were included in the study.

Study Setting: The study was conducted in the Department of Otorhinolaryngology (ENT), Nalanda Medical College & Hospital, Patna, Bihar, India.

Study Duration: The duration of the study was one year and eight months, from June 2019 to January 2021.

Ethical Considerations: Ethical approval was obtained from the Institutional Ethics Committee. Written informed consent was obtained from all participants (or guardians in case of minors). The study adhered to the principles of the Declaration of Helsinki, and confidentiality of patient information was strictly maintained.

Inclusion Criteria

- Patients aged 5 to 50 years.
- Diagnosed with chronic tonsillitis or recurrent acute tonsillitis.
- Patients with obstructive sleep apnea due to tonsillar hypertrophy.
- Willing to provide written informed consent.

Exclusion Criteria

- Acute tonsillitis at the time of surgery.
- Patients with bleeding disorders.
- Patients on anticoagulant therapy.
- History of peritonsillar abscess or active infection.
- Patients with comorbidities contraindicating surgery.
- Previous history of tonsillar surgery.
- Active menstruation.
- Hemoglobin level <10 g/dL.
- Recent antibiotic therapy within 5 days prior to surgery.

Randomization and Blinding

All 78 patients were randomized into two equal groups of 39 each using a computer-generated randomization sequence. The study was conducted in a single-blind manner, where the patients were unaware of the technique used. All surgeries were performed by the same experienced consultant surgeon to minimize inter-operator variability.

Surgical Techniques

Group I: Dissection and Snare Method (n = 39)

- Surgery performed under general anaesthesia with orotracheal intubation.
- Incision made over the anterior tonsillar pillar followed by blunt dissection.
- Inferior pole removed using Eve's cold steel snare.
- Haemostasis achieved via ligation or pressure packing.
- Instrument set included Boyle-Davis mouth gag, Draffin's bipod, Mollison's dissector, and tonsil snare.

Group II: Electrocautery Method (n = 39)

- Tonsillectomy performed using monopolar or bipolar electrocautery (L&T make).
- Dissection and coagulation performed simultaneously using adjusted settings.
- Haemostasis achieved through thermal coagulation.

Preoperative Investigations

All patients underwent:

- Complete Blood Count (CBC)
- Bleeding Time (BT) and Clotting Time (CT)
- Blood grouping
- Urine routine and microscopy

Postoperative Management

- All patients received Dexmedetomidine 1 µg/kg IV intra-operatively, followed by 0.5 µg/kg/hr in saline for 4 hours postoperatively.
- Visual Analog Scale (VAS) was used to assess pain at 4–6 hours post-surgery and on postoperative days 1, 3, 7, and 10.
- Patients with VAS >6 received IV Tramadol 0.8 mg/kg every 8 hours until VAS <5.

Outcome Measures

1. **Intraoperative Blood Loss**: Assessed by measuring suction bottle volume and weighing gauze pieces before and after surgery.
2. **Duration of Surgery**: Recorded from first incision to complete haemostasis using a stopwatch.
3. **Postoperative Pain**: Measured using a 10-point VAS scale on postoperative days 1, 3, 7, and 10.
4. **Tonsillar Fossa Healing**: Evaluated for sloughing, bleeding, or signs of infection during early follow-up and at day 7–10.
5. **Hospital Stay Duration**: Measured from admission to discharge, based on clinical recovery and absence of complications.
6. **Postoperative Complications**: Included bleeding, infection, delayed healing, and additional analgesic or haemostatic interventions.

Statistical Analysis

- Data were analyzed using **SPSS Version 25.0**.
- Continuous variables were expressed as mean ± standard deviation.
- For parameters following normal distribution (e.g., operative time), **Student's t-test** was applied.
- For non-normally distributed data (e.g., blood loss, pain score, hospital stay), **Mann-Whitney U-test** was used.
- Categorical variables (e.g., need for additional analgesia or haemostasis) were analyzed using **Chi-square test**.
- A p-value of **<0.05** was considered statistically significant.

RESULTS

Table: Gender-wise distribution and age profile in both study groups

Parameter	Dissection & Snare (n = 39)	Electrocautery (n = 39)	p-value
Gender			
Male	20 (51.3%)	18 (46.15%)	0.80*
Female	19 (48.7%)	21 (53.85%)	
Mean Age ± SD (yrs)	23.8 ± 9.9	22.5 ± 10.5	0.52*

p-value for gender from Chi-square test; p-value for age from Independent Samples t-test.

The table 1 presents the gender-wise distribution and mean age of participants in the two tonsillectomy groups—Dissection & Snare and Electrocautery. Each group had 39 patients. There was no significant difference in gender distribution between the two groups (p = 0.80), as both had an equal number of males (n=20) and females (n=19). Similarly, the mean age was 23.8 ± 9.9 years in the Dissection & Snare group and 22.5 ± 10.5 years in the Electrocautery group, with no statistically significant difference (p = 0.523). This suggests that both groups were well-matched demographically, reducing potential bias due to age or sex in outcome assessment.

Table 2: Assessment of Parameters

Parameters	Group I: Dissection and Snare (n=39)	Group II: Electrocautery (n=39)	P value
Blood loss (ml)	4.8±2.1	2.4±1.5	0.01
Pain (VAS)	5.7±3.6	6.4±1.4	0.03
operating time (mins)	6.8±2.1	4.2±2.1	0.05
Hospital stay (hours)	31.2±5.4	45.7±9.5	0.02

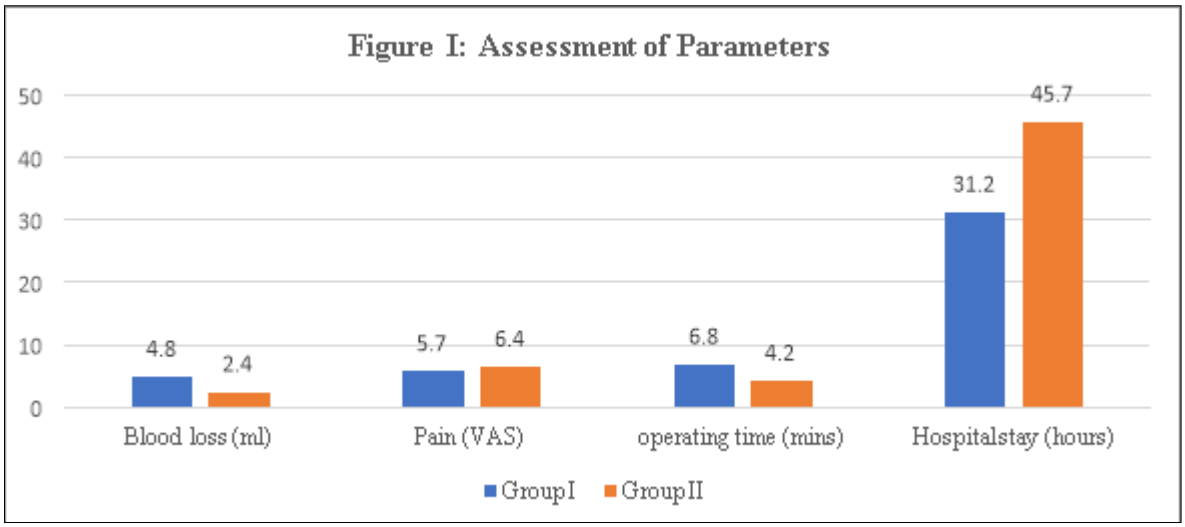

Table 2, figure I shows that in group I and group II, the mean blood loss was 4.8±2.1 ml and 2.4±1.5 ml, pain (VAS) was 5.7±3.6 and 6.4±1.4, operating time was 6.8±2.1 minutes and 4.2±2.1 minutes and hospital stay was 31.2±5.4 hours and 45.7±9.5 hours respectively. The difference was significant (P< 0.05).

Table 3: Comparison of Qualitative Parameters between Two Groups

Parameter	Group I: Dissection and Snare (n=39)	Group II: Electrocautery (n=39)	p-value
Extended Postoperative Procedure Required	3 (7.7%)	7 (17.9%)	0.182
Additional Analgesic Dose in First 24 hrs (Mean ± SD, µg)	112.5 ± 32.4	184.2 ± 40.8	0.0003**
Presence of Slough at Postoperative Fossa (Day 7-10)	5 (12.8%)	13 (33.3%)	0.038*

The table 3 presents extended postoperative procedure (e.g., prolonged haemostasis, repeat dressing, or suctioning) was needed more frequently in the electrocautery group (17.9%) compared to the dissection group (7.7%), although this difference was not statistically significant (p = 0.182). Additional analgesic requirement in the first 24 hours postoperatively was significantly higher in the electrocautery group (184.2 µg ± 40.8) than the dissection group (112.5 µg ± 32.4), with a p-value of 0.0003, indicating greater postoperative pain in the electrocautery group. Slough formation at the tonsillar fossa during follow-up on postoperative days 7–10 was more commonly observed in the electrocautery group (33.3%) than the dissection group (12.8%), with a statistically significant p-value of 0.038, suggesting slower or impaired wound healing in the electrocautery group.

DISCUSSION

Effective, safe, and atraumatic tonsil removal with little blood loss and post-operative morbidity is the goal of the perfect tonsillectomy technique.[8] Tonsillectomy is performed using a variety of tools and technology, such as intracapsular microdebriders, bipolar cautery, cryosurgery, coblation, and lasers.[9,10] The present study was conducted to compare dissection and snare and electrocautery techniques of tonsillectomy.

The **gender distribution** was identical between the groups, with a nearly equal representation of males and females (51.3% vs 48.7%). This balanced distribution ensures that gender-related physiological differences did not skew the outcomes. Previous studies have noted subtle sex-based variations in pain perception and wound healing (Fillingim et al., 2009), making equal gender representation particularly important in studies evaluating post-operative pain and recovery.[11]

Similarly, the **mean age** of participants was statistically similar in both groups, which is significant because age can influence intraoperative bleeding, healing capacity, pain tolerance, and recovery (Windfuhr & Chen, 2001).[12] For example, older individuals often report **lower pain intensity** post-tonsillectomy,

possibly due to differences in neural sensitivity or psychological coping mechanisms.

These findings are consistent with previous trials that demonstrated **no demographic imbalance** between surgical groups when randomization is properly employed (Friedman et al., 2003).[13] Such methodological robustness enhances the internal validity of the trial and strengthens confidence in the outcome measures comparing the two surgical techniques.

Havle et al.[14] compared and find the advantages and disadvantages between dissection and snare, and electrocautery techniques of tonsillectomy Mean intra-operative blood loss was significantly less after using electrocautery. The mean postoperative pain was significantly less after dissection and snare method. The mean duration of surgery was significantly less after using electrocautery. The mean duration of hospitalisation, the extended postoperative procedure required was more after electrocautery method however, it was not statistically significant. There was no significant difference in postoperative tonsillar fossa healing in either group during follow-up period of 7-10 days.

We found that in group I and group II, the mean blood loss was 4.8±2.1 ml and 2.4±1.5 ml, pain (VAS) was 5.7±3.6 and 6.4±1.4, operating time was 6.8±2.1 minutes and 4.2±2.1 minutes and hospital stay was 31.2±5.4 hours and 45.7±9.5 hours respectively. Ali Ns et al.[15] compared harmonic scalpel (HS) tonsillectomy with electrocautery (EC) tonsillectomy in terms of operating time, intra-operative blood loss, post-operative pain and secondary haemorrhage. Sixty adult patients subjected to tonsillectomy only, were evaluated. The patients were stratified into 2 groups (30 each) based on the dissecting instrument used (HS vs. EC). The mean operative time was less in electrocautery group (EC 3.57 +/- 0.85 minutes Vs HS 4.20 +/- 1.37 minutes; $p<0.05$). The mean intra operative blood loss was less in HS group (EC 3.43 +/- 3.42 ml Vs HS 2.40 +/- 2.74 ml; $p =0.10$). Post operative pain was significantly lower in harmonic scalpel group as compared to electrocautery group on 1st, 2nd and 3rd postoperative day ($p < 0.05$). From 3rd postoperative day onwards, although harmonic scalpel group was slightly better in terms of pain on visual analog scale but it was not statistically significant. Secondary haemorrhage after tonsillectomy was less in HS (EC 10% Vs HS 3%; $p=0.61$).

The study by Salam MA et al.[16] reported that as the number of cases of tonsillectomy is high in their set up the time of operation as well as the intra-operative blood loss are the important factors to be considered in tonsillectomy.

Our findings indicate that **postoperative pain**, reflected by increased **analgesic requirement in the first 24 hours**, was significantly higher in the electrocautery group. This aligns with previous studies by *Windfuhr et al.* and *Lampson et al.*, who reported increased thermal tissue damage in electrocautery procedures leading to heightened pain sensation in the early postoperative period.[17,18]

Furthermore, **slough formation at the tonsillar fossa**, which can delay healing and increase the risk of secondary infection or haemorrhage, was significantly higher in patients undergoing electrocautery. The mechanism may be attributed to coagulative necrosis induced by thermal energy, which slows mucosal regeneration. A similar observation was made by *Chang et al.* and *O'Leary et al.*, emphasizing delayed healing in electrocautery techniques.[19,20]

While **extended postoperative procedures** were more frequent in the electrocautery group, the difference was not statistically significant. However, the trend suggests a potentially higher incidence of minor complications requiring intervention, which warrants further investigation with a larger sample size.

LIMITATIONS OF THE STUDY

- **Single-centre study**: May limit the generalizability of the findings to broader populations or different settings.
- **Small sample size**: With only 78 participants, the study might be underpowered to detect smaller differences in some outcomes.
- **Short follow-up period**: Long-term complications and recurrence rates could not be evaluated.
- **Single surgeon and anesthesiologist**: While this reduces variability, it may introduce performance bias.
- **VAS subjectivity**: Pain perception is subjective and may vary across individuals despite standard assessment.

CONCLUSION

Authors found that the tonsillectomy method employing electrocautery proved to be more effective in significantly reducing both excessive intra-operative blood loss and the duration of

surgery under anaesthesia, in comparison to dissection and snare group.

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