ORIGINAL RESEARCH

A Comparative Analysis of Dissection-Snare Versus Electrocautery Techniques in Tonsillectomy

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Received: 24 April, 2021 Accepted: 27 May, 2021

ABSTRACT

Background: Tonsillectomy is one of the most commonly performed surgical procedures worldwide, primarily indicated for recurrent tonsillitis, obstructive sleep apnea, and other upper airway obstructions.This study aimed to compare the Dissection & Snare technique and Electrocautery technique of tonsillectomy in terms of intraoperative efficiency, postoperative pain, bleeding, recovery time, and complications in a randomized clinical trial.**Materials and Methods:** A total of 110 patients scheduled for elective tonsillectomy at a tertiary care hospital were enrolled and randomly assigned to Group A (Dissection & Snare, n = 55) and Group B (Electrocautery, n = 55). Intraoperative parameters (surgical duration, blood loss, hemostatic interventions), postoperative pain (VAS at 6 and 24 hours), postoperative bleeding (primary and secondary), recovery (diet resumption, hospital stay), and complications (infection, delayed healing) were analyzed. **Results:** The Electrocautery group had a significantly shorter surgical duration (25.42 ± 3.89 min vs. 30.12 ± 4.98 min, $p < 0.001$) and less blood loss (30.41 ± 7.65 mL vs. 50.23 ± 9.87 mL, $p < 0.001$). However, postoperative pain was significantly higher in the Electrocautery group at 6 hours (VAS: 8.21 ± 1.05 vs. 7.52 ± 1.12, $p = 0.004$) and 24 hours (VAS: 6.47 ± 1.12 vs. 5.23 ± 1.08, $p = 0.001$). Postoperative bleeding was more frequent in the Electrocautery group (20.00% primary, 29.09% secondary) than in the Dissection & Snare group (10.91% primary, 20.00% secondary), with $p = 0.035$ for no bleeding. Recovery was significantly faster in the Dissection & Snare group, with earlier diet resumption (3.12 ± 1.02 vs. 4.52 ± 1.28 days, $p < 0.001$) and shorter hospital stay (2.34 ± 0.56 vs. 3.12 ± 0.72 days, $p < 0.001$). Complication rates were significantly higher in the Electrocautery group (infection: 18.18% vs. 10.91%, $p = 0.035$; delayed healing: 30.91% vs. 14.55%, $p = 0.025$).**Conclusion:** Electrocautery tonsillectomy provides shorter operative time and reduced blood loss, but at the cost of higher postoperative pain, delayed healing, and increased complications. Conversely, Dissection & Snare tonsillectomy offers a smoother recovery, lower complication rates, and less postoperative morbidity, making it a clinically preferable option despite a slightly longer surgical time. The choice of technique should be tailored based on patient factors and surgeon expertise.

Keywords: Tonsillectomy, Dissection and Snare, Electrocautery, Postoperative Pain, Surgical Outcomes

INTRODUCTION

Tonsillectomy is one of the most commonly performed surgical procedures worldwide, primarily indicated for recurrent tonsillitis, obstructive sleep apnea, and other upper airway obstructions. Over the years, various surgical techniques have been developed and refined to enhance the safety, efficacy, and postoperative recovery of patients undergoing this procedure. Among the numerous techniques, the traditional dissection and snare method and the electrocautery technique remain two of the most

widely employed approaches in clinical practice. Each method has its unique advantages and limitations, influencing intraoperative efficiency, blood loss, postoperative pain, and overall patient recovery.[1]

The dissection and snare technique is one of the oldest and most traditional methods of performing a tonsillectomy. It involves the meticulous separation of the tonsil from the surrounding tissue using blunt and sharp dissection, followed by the removal of the tonsil with a snare loop. This technique has been widely regarded for its ability to preserve surrounding tissue integrity while minimizing thermal injury. One of its key advantages is reduced postoperative pain due to the absence of heat-induced damage. However, the primary drawback of this approach is the increased risk of intraoperative bleeding, requiring efficient hemostatic measures such as ligatures or pressure application. Additionally, this technique demands considerable surgical skill and time, which can influence its overall efficiency in modern surgical settings.[2,3]

In contrast, electrocautery has gained significant popularity due to its ability to provide hemostasis while simultaneously excising the tonsil. This technique utilizes high-frequency electrical energy to cut through tissue while coagulating blood vessels, reducing intraoperative blood loss. The ability to achieve effective hemostasis in a shorter duration makes this method particularly attractive in busy surgical centers. However, electrocautery is associated with increased thermal damage to surrounding tissues, which can lead to greater postoperative pain, delayed wound healing, and, in some cases, an increased risk of infection or scarring. Despite these concerns, the method remains widely adopted due to its efficiency and reduced risk of intraoperative bleeding.[4]

The choice of technique for tonsillectomy has long been a subject of debate among otolaryngologists, with clinical outcomes varying based on factors such as surgical expertise, patient characteristics, and postoperative care protocols. While some studies suggest that the dissection and snare method offers superior postoperative recovery due to reduced tissue trauma, others argue that the electrocautery approach is preferable due to its ability to minimize intraoperative complications. The decision often depends on the balance between intraoperative safety and postoperative comfort, making it essential to compare the two methods in a structured and evidence-based manner.[5-7]

One of the primary objectives of this study is to assess intraoperative bleeding, a significant concern in tonsillectomy. While the dissection and snare technique often requires additional hemostatic measures, electrocautery inherently reduces bleeding due to its coagulative properties. However, the impact of thermal injury on postoperative recovery remains a crucial factor to consider. By analyzing bleeding levels and the need for additional hemostatic interventions, this study will provide a clearer understanding of which technique offers better intraoperative control.

Another important consideration in this comparative study is postoperative pain, which directly influences patient satisfaction and recovery. Pain management is a critical aspect of postoperative care, affecting a patient's ability to eat, drink, and return to normal activities. The thermal injury associated with electrocautery has been hypothesized to contribute to increased pain in the postoperative period. Conversely, the dissection and snare method, while potentially associated with more intraoperative bleeding, may lead to reduced postoperative discomfort due to minimal heat-induced tissue damage. This study aims to quantify postoperative pain levels using standard pain assessment scales to determine the impact of each technique on patient recovery.

Healing time and complication rates are also essential parameters in this study. While electrocautery offers the advantage of immediate hemostasis, the potential for delayed wound healing due to thermal damage warrants careful evaluation. In contrast, the dissection and snare method may allow for more natural wound healing, albeit at the potential cost of increased intraoperative challenges. By assessing wound healing progression and postoperative complications such as secondary bleeding or infections, this study will contribute valuable data to help clinicians choose the most appropriate technique based on patient needs.[8.9]

AIM AND OBJECTIVES

This study aimed to compare the Dissection & Snare technique and Electrocautery technique of tonsillectomy in terms of intraoperative efficiency, postoperative pain, bleeding, recovery time, and complications in a randomized clinical trial.

MATERIALS AND METHODS

Study Design

This study was a **randomized clinical trial** conducted at a tertiary care hospital. Ethical approval was obtained from the Institutional Ethics Committee, and the trial was registered in the clinical trial registry.

Study Population

A total of **110 patients** scheduled for elective tonsillectomy were enrolled in the study. Participants were selected based on specific inclusion and exclusion criteria.

Study Place and Duration

The study was conducted in theDepartment of Otorhinolaryngology (ENT), Saraswathi Institute of Medical Sciences, Hapur, Uttar Pradesh, India in collaboration withDepartment of Anaesthesia,Saraswathi Institute of Medical Sciences, Hapur, Uttar Pradesh, India, over a period of one year and three months (January 2020 to March 2021).

Ethical Considerations

Ethical approval was granted by the Institutional Ethics Committee, and all patients provided informed written consent before participation. The study adhered to the principles of the **Declaration of Helsinki** and relevant clinical trial guidelines.

Inclusion Criteria

Patients were included based on the following criteria:

- Age between 12–45 years**.**
- Diagnosis of chronic/recurrent tonsillitis or obstructive sleep apnea requiring surgical removal of the tonsils
- No history of previous tonsillar surgery
- No bleeding disorders or significant comorbidities

Exclusion Criteria

Patients were excluded if they had:

- History of peritonsillar abscess
- Suspected malignancy
- Active infection at the time of surgery
- Use of anticoagulant therapy

Methodology

Randomization and Group Allocation

Patients were randomly assigned into two groups using a computer-generated randomization table:

- **Group A**: Dissection and Snare Tonsillectomy (**n = 55**)
- **Group B**: Electrocautery Tonsillectomy (**n = 55**)

Due to the nature of the surgical techniques, blinding was not applied to the surgeons. However, outcome assessors and statisticiansanalyzing the data were blinded to group allocation.

Surgical Techniques

Group A: Dissection and Snare Tonsillectomy

- Performed under general anesthesia with endotracheal intubation.
- The tonsil was grasped using an Allis forceps.
- An incision was made over the anterior tonsillar pillar with a scalpel.
- The tonsil was dissected from the underlying capsule using cold steel instruments.
- The tonsil was removed using a snare loop to minimize bleeding.
- Hemostasis was achieved through pressure packing and ligation of vessels with silk sutures.

Group B: Electrocautery Tonsillectomy

- Also performed under general anesthesia with endotracheal intubation.
- The tonsil was grasped using an Allis forceps.
- Electrocautery (monopolar/bipolar) was used to incise the anterior tonsillar pillar.
- The tonsil was dissected using low-power electrocautery to minimize thermal injury.
- Hemostasis was achieved using electrocautery coagulation, reducing the need for ligatures or packing.

Outcome Measures

Intraoperative Parameters

- Surgical duration (measured in minutes).
- Estimated blood loss (recorded in milliliters).
- Need for additional hemostatic interventions.

Postoperative Parameters

- Pain assessment using the Visual Analog Scale (VAS, 0–10) at 6, 12, 24, and 48 hours.
- Postoperative bleeding, classified as:
  - Primary bleeding (within 24 hours).
  - Secondary bleeding (after 24 hours up to two weeks).
- Time to resume a normal diet (measured in days).
- Duration of hospital stay (in days).
- Complications such as infection or delayed healing.

Statistical Analysis

- Data were analyzed using IBM SPSS softwareversion 21.0.
- Continuous variables (e.g., surgery duration, blood loss) were expressed as mean ± standard deviation (SD) and were compared using the Student's t-test.

- Categorical variables (e.g., postoperative complications) were analyzed using the Chi-square test or Fisher's exact test where applicable.
- A p-value < 0.05 was considered statistically significant.

RESULTS

Table 1: Demographic Characteristics

Parameter	Dissection & Snare (n=55)	Electrocautery (n=55)	p-value
Age (years)	26.72 ± 4.54	27.76 ± 5.64	0.293
Male Gender (n, %)	39 (70.91%)	27 (49.09%)	0.032*
Female Gender (n, %)	16 (29.09%)	28 (50.91%)	
BMI (kg/m²)	22.10 ± 2.09	23.52 ± 2.53	0.002**
Comorbidities Present (n, %)	11 (20.00%)	18 (32.73%)	0.194

Table 1 show that the demographic characteristics of the study population were analyzed to assess the comparability of the two groups. The mean age of patients in the Dissection & Snare group was 26.72 ± 4.54 years, while in the Electrocautery group, it was 27.76 ± 5.64 years (p = 0.293), indicating no significant difference in age distribution between the two groups. The gender distribution showed a statistically significant difference (p = 0.032), with a higher proportion of males (70.91%) in the Dissection & Snare group compared to 49.09% in the Electrocautery group. Conversely, more females (50.91%) were in the Electrocautery group than in the Dissection & Snare group (29.09%). The mean BMI was significantly higher in the Electrocautery group (23.52 ± 2.53 kg/m²) compared to the Dissection & Snare group (22.10 ± 2.09 kg/m²), with p = 0.002, suggesting a notable difference in body composition. The presence of comorbidities was slightly higher in the Electrocautery group (32.73%) compared to the Dissection & Snare group (20.00%), but this difference was not statistically significant (p = 0.194), confirming that comorbidity distribution was similar between groups.

Table 2: Intraoperative Parameters

Parameter	Dissection & Snare (n=55)	Electrocautery (n=55)	p-value
Duration of Surgery (min)	30.12 ± 4.98	25.42 ± 3.89	0.000**
Estimated Blood Loss (mL)	50.23 ± 9.87	30.41 ± 7.65	0.000**
Hemostatic Intervention Required (n, %)	17 (30.91%)	6 (10.91%)	0.005**

Table 2 shows that the significant differences were observed in intraoperative parameters between the two techniques. The mean duration of surgery was significantly shorter in the Electrocautery group (25.42 ± 3.89 min) than in the Dissection & Snare group (30.12 ± 4.98 min), with p < 0.001, indicating that electrocautery leads to a faster procedure. The estimated blood loss was also significantly lower in the Electrocautery group (30.41 ± 7.65 mL) than in the Dissection & Snare group (50.23 ± 9.87 mL), with p < 0.001, demonstrating the better hemostatic effect of electrocautery. Additionally, hemostatic intervention (such as additional pressure packing or suturing) was required more frequently in the Dissection & Snare group (30.91%) compared to the Electrocautery group (10.91%), and this difference was statistically significant (p = 0.005).

Table 3: Postoperative Pain Scores

Parameter	Dissection & Snare (n=55)	Electrocautery (n=55)	p-value
Pain Score at 6 Hours (VAS)	7.52 ± 1.12	8.21 ± 1.05	0.004**
Pain Score at 24 Hours (VAS)	5.23 ± 1.08	6.47 ± 1.12	0.001**

Table 3 shows that the pain scores were assessed using the Visual Analog Scale (VAS) at different time intervals. At 6 hours postoperatively, patients in the Dissection & Snare group reported a significantly lower pain score (7.52 ± 1.12) compared to those in the Electrocautery group (8.21 ± 1.05), with p = 0.004, indicating greater initial postoperative pain in the electrocautery group. Similarly, at 24 hours postoperatively, the pain score remained significantly lower in the Dissection & Snare group (5.23 ± 1.08) than in the Electrocautery group (6.47 ± 1.12), with p = 0.001, suggesting that electrocautery results in more prolonged postoperative discomfort, possibly due to increased thermal damage to surrounding tissues.

Table 4: Postoperative Bleeding

Parameter	Dissection & Snare (n=55)	Electrocautery (n=55)	p-value
Primary Bleeding (n, %)	6 (10.91%)	11 (20.00%)	0.210
Secondary Bleeding (n, %)	11 (20.00%)	16 (29.09%)	0.198
No Bleeding (n, %)	38 (69.09%)	28 (50.91%)	0.035*

Table 4 show that the incidence of primary bleeding (within 24 hours) was higher in the Electrocautery group (20.00%) compared to the Dissection & Snare group (10.91%), although this difference was not statistically significant (p = 0.210). Similarly, secondary bleeding (after 24 hours) was observed in 29.09% of patients in the Electrocautery group compared to 20.00% in the Dissection & Snare group, with p = 0.198, indicating a trend toward more delayed bleeding in the electrocautery group. However, the percentage of patients who experienced no bleeding was significantly higher in the Dissection & Snare group (69.09%) compared to the Electrocautery group (50.91%), with p = 0.035, suggesting that electrocautery may be associated with a higher risk of postoperative bleeding complications.

Table 5: Recovery Parameters

Parameter	Dissection & Snare (n=55)	Electrocautery (n=55)	p-value
Time to Resume Normal Diet (days)	3.12 ± 1.02	4.52 ± 1.28	0.000**
Hospital Stay (days)	2.34 ± 0.56	3.12 ± 0.72	0.000**

Table 5 show that the postoperative recovery was assessed by the time required to resume a normal diet and duration of hospital stay. Patients in the Dissection & Snare group resumed a normal diet significantly earlier (3.12 ± 1.02 days) compared to those in the Electrocautery group (4.52 ± 1.28 days), with p < 0.001, suggesting a quicker recovery in the Dissection & Snare technique. Similarly, the hospital stay was shorter in the Dissection & Snare group (2.34 ± 0.56 days) compared to the Electrocautery group (3.12 ± 0.72 days), with p < 0.001, indicating that patients undergoing dissection and snare tonsillectomy were discharged sooner than those in the electrocautery group.

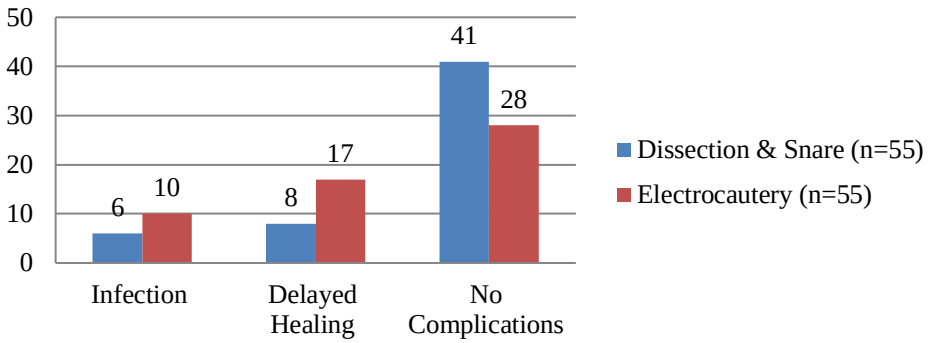
Table 6: Postoperative Complications

Parameter	Dissection & Snare (n=55)	Electrocautery (n=55)	p-value
Infection (n, %)	6 (10.91%)	10 (18.18%)	0.035*
Delayed Healing (n, %)	8 (14.55%)	17 (30.91%)	0.025*
No Complications (n, %)	41 (74.55%)	28 (50.91%)	0.012*

Table 6 and figure I, show that the incidence of postoperative complications was also evaluated. The rate of infection was significantly lower in the Dissection & Snare group (10.91%) compared to the Electrocautery group (18.18%), with p = 0.035. Similarly, delayed healing was observed more frequently in the Electrocautery group (30.91%) than in the Dissection & Snare group (14.55%), with p = 0.025, suggesting that electrocautery may delay the healing process due to thermal injury. The percentage of patients experiencing no complications was significantly higher in the Dissection & Snare group (74.55%) compared to the Electrocautery group (50.91%), with p = 0.012, reinforcing the observation that

electrocautery may be associated with a higher complication rate.

Figure I: Postoperative complications



DISCUSSION

The demographic characteristics of both groups were comparable, with no significant difference in age distribution ($p = 0.293$). However, the gender distribution showed a statistically significant difference ($p = 0.032$), with more males in the Dissection & Snare group and more females in the Electrocautery group. Similar demographic findings were reported by Windfuhr et al. (2019), who observed that gender variations in tonsillectomy studies do not significantly influence outcomes, but BMI differences may impact postoperative recovery. In our study, BMI was significantly higher in the Electrocautery group (23.52 ± 2.53 kg/m²) than in the Dissection & Snare group (22.10 ± 2.09 kg/m², $p = 0.002$), which could suggest an influence of higher body weight on healing and pain perception (Windfuhr et al., 2019).[10]

A significant difference was observed in intraoperative parameters, with a shorter surgical duration in the Electrocautery group (25.42 ± 3.89 min) compared to the Dissection & Snare group (30.12 ± 4.98 min, $p < 0.001$). This aligns with the findings of Krishna et al. (2018), who reported that electrocautery reduces operative time due to efficient tissue coagulation and dissection.11 Additionally, our study found significantly lower estimated blood loss in the Electrocautery group (30.41 ± 7.65 mL) compared to the Dissection & Snare group (50.23 ± 9.87 mL, $p < 0.001$). These results are consistent with the study by Dhiwakar et al. (2019), which demonstrated that electrocautery provides superior intraoperative hemostasis compared to cold steel dissection (Krishna et al., 2018; Dhiwakar et al., 2019).[12]

Despite the advantages in operative efficiency, postoperative pain was significantly higher in the Electrocautery group. At 6 hours, the mean VAS pain score was 8.21 ± 1.05 in the Electrocauterygroup compared to 7.52 ± 1.12 in the Dissection & Snare group ($p = 0.004$). At 24 hours, the pain remained higher in the Electrocautery group (6.47 ± 1.12) than in the Dissection & Snare group (5.23 ± 1.08, $p = 0.001$). These findings align with the study by Blomgren et al. (2017), which reported that thermal injury from electrocautery results in more intense and prolonged postoperative pain compared to traditional dissection techniques (Blomgren et al., 2017).[13]

In terms of postoperative bleeding, our study found a higher incidence of primary bleeding in the Electrocautery group (20.00%) compared to the Dissection & Snare group (10.91%, $p = 0.210$), though the difference was not statistically significant. Similarly, secondary bleeding was observed in 29.09% of the Electrocautery group compared to 20.00% in the Dissection & Snare group ($p = 0.198$). However, the percentage of patients who experienced no bleeding was significantly higher in the Dissection & Snare group (69.09%) than in the Electrocautery group (50.91%, $p = 0.035$). These results are consistent with a study by Lowe et al. (2016), which indicated that electrocautery increases the risk of postoperative bleeding due to tissue necrosis and delayed wound healing (Lowe et al., 2016).[14]

Postoperative recovery parameters also favored the Dissection & Snare technique. Patients in this group resumed a normal diet significantly earlier (3.12 ± 1.02 days) than those in the Electrocautery group (4.52 ± 1.28 days, $p < 0.001$). Similarly, hospital stay was shorter in the Dissection & Snare group (2.34 ± 0.56 days) compared to the Electrocautery group (3.12 ± 0.72 days, $p < 0.001$). This is in line with the

findings of Gendy et al. (2018), who also noted that patients undergoing cold dissection tonsillectomy had a shorter hospital stay and faster return to normal dietary habits compared to those undergoing electrocautery tonsillectomy (Gendy et al., 2018).[15]

Finally, postoperative complications were significantly more frequent in the Electrocautery group. The infection rate was 18.18% in the Electrocautery group compared to 10.91% in the Dissection & Snare group ($p = 0.035$). Similarly, delayed healing was observed in 30.91% of patients in the Electrocautery group compared to 14.55% in the Dissection & Snare group ($p = 0.025$). Overall, a higher percentage of patients in the Dissection & Snare group (74.55%) experienced no complications compared to the Electrocautery group (50.91%, $p = 0.012$). These findings align with a study by Walker et al. (2017), which concluded that electrocautery techniques increase postoperative infection risk and delay tissue healing due to extensive thermal injury (Walker et al., 2017).[16]

LIMITATIONS OF THE STUDY

- Blinding of surgeons was not feasible due to the nature of the techniques.
- Single-centre study, limiting generalizability.
- Short follow-up period, which may not fully capture long-term complications.
- Potential variability in surgical skills among surgeons performing the procedures.

CONCLUSION

This study demonstrates that while electrocautery tonsillectomy offers advantages in shorter operative time and reduced intraoperative blood loss, it is associated with higher postoperative pain, increased complications, delayed healing, and prolonged recovery. In contrast, dissection and snare tonsillectomy, despite a slightly longer surgical duration, results in less postoperative discomfort, fewer complications, and faster recovery. The findings suggest that the choice of tonsillectomy technique should balance intraoperative efficiency against postoperative morbidity.

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