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Post-Operative Complications of Tonsillectomy between Dissection and Diathermy Method at a Tertiary Care Hospital

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Author`s Contribution

[1,3]Substantial contributions to the conception or design of the work; or the acquisition, [2]Active participation in active methodology, [4]analysis, or interpretation of data for the work, [5,6]Drafting the work or revising it critically for important intellectual content

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ABSTRACT

Objective: To compare post-operative complication after dissection and diathermy tonsillectomy**.**

Methodology: A Cross-sectional comparative analysis was conducted from August 2018 to July 2019 on a sample of 206 patients undergoing tonsillectomy at the Department of ENT, Liaquat University of Medical & Health Sciences, Jamshoro. Patients between age of 6-18 years of age undergoing tonsillectomy due to chronic recurrent tonsillitis and obstructive hyperplasia of tonsils of either gender were included. Patients were divided in two groups, group A (dissection tonsillectomy) and group B (diathermy tonsillectomy). Data on demographic variables and complications, including hemorrhage, uvular edema, and blood aspiration, were collected. Patients were followed for two weeks to monitor complications. All information was recorded on self-structured questionnaires and analyzed using SPSS version 20**.**

Results: A total of 206 patients were studied, with a mean age of 12.02 ± 4.12 years. Males were the majority (65.05%). Dissection tonsillectomy had a significantly higher risk of primary hemorrhage (42.9%) compared to diathermy (6.1%) (p = 0.047), while secondary hemorrhage occurred equally in both groups (18.36%). Post-operative pain was significantly higher in the diathermy group (5.6 ± 2.64) than in the dissection group (3.2 ± 2.33) (p = 0.047). Overall hemorrhage was more frequent in dissection tonsillectomy (35.0%) than diathermy (12.6%) (p = 0.001). Other complications, including uvular edema and blood aspiration, showed no significant differences between the two techniques.

Conclusion: The comparative analysis of the study revealed that the diathermy tonsillectomy linked to the significantly higher post-operative pain; it has a lower risk of hemorrhage, with no statistically significant differences in the incidence of uvular edema and blood aspiration between the two techniques**.**

Keywords: Chronic Tonsillitis, Tonsillectomy, Dissection, Diathermy, Hemorrhage.

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Introduction

Tonsillectomy is among the most frequently performed surgical procedures in the field of otorhinolaryngology. It is a widely performed, minimally invasive, and relatively safe surgical procedure.[1] Despite the advancements in surgical techniques and the availability of well-established methods in most countries, postoperative complications can still arise, some of which may be serious or even life-threatening.[1] Several surgical techniques are utilized for performing tonsillectomy, including blunt dissection, electrocautery, cryosurgery, guillotine excision, laser excision, coblation, monopolar, ultrasonic removal and bipolar dissection, thermal welding, and ligature tonsillectomy.[2,3]

Dissection and diathermy are two widely used methods for achieving hemostasis in the tonsillar bed during tonsillectomy. Each technique has its own advantages and limitations, making the choice of method dependent on clinical considerations and patient outcomes. Regardless of the surgical technique used, variations exist in complications such as postoperative pain, hemorrhage, and infection. As a result, the debate over the most effective surgical method remains ongoing in the literature.[3,4] The most important potential complications of tonsillectomy are pain and bleeding. Pain after tonsillectomy is often undertreated for several reasons, one of which is that clinicians tend to underestimate its severity, as the procedure is generally regarded as minimally invasive.[5] Bleeding after tonsillectomy is the most frequent complication of the procedure and can sometimes necessitate emergency hospital readmission. In severe cases, postoperative hemorrhage can lead to life-threatening outcomes.[6,7]

Traditionally, tonsillectomy has been performed by incising the pharyngeal mucosa with surgical scissors, followed by separating the tonsil from the lateral pharyngeal wall. This method, known as "dissection tonsillectomy," involves controlling bleeding after tonsil removal using ligatures, sutures, or diathermy to achieve hemostasis.[8] In diathermy tonsillectomy, the removal of the tonsil and hemostasis are performed simultaneously using diathermy. This technique involves using electrical energy to incise the mucosa and separate the tissue strands that connect the tonsil to the pharyngeal wall. Diathermy operates by generating an electric current, which can be used to coagulate blood vessels to control bleeding or to cut through tissue during the procedure.[8]

Recent studies have examined the incidence and types of complications associated with various tonsillectomy techniques, highlighting differences in safety profiles and clinical outcomes. One study reported higher blood loss of approximately 50 mL in the dissection method, compared to 5–7 mL in diathermy tonsillectomy.[9] Additionally, other studies have found that the cauterization method leads to increased pain, scar formation, and odynophagia, as well as a longer healing time compared to the dissection method.[10,11] Considering these controversies regarding post-operative outcomes, this study aims to compare post-operative complications following dissection and diathermy tonsillectomy. The findings may help identify the optimal technique with fewer complications and faster recovery, providing valuable insights for improving tonsillectomy procedures.

Methodology

This cross-sectional comparative study was carried out at the Department of Otorhinolaryngology - Liaquat University of Medical and Health Sciences, Jamshoro. Study was done during one year from August 2018 to July 2019. Patients between age of 6-18 years of age undergoing tonsillectomy due to chronic recurrent tonsillitis and obstructive hyperplasia of tonsils of either gender were included. Patients with history of bleeding disorder, history of congenital abnormality and patients with acute respiratory infection were excluded. Patients who were agreeing to participate in the study were also excluded. Patients were enrolled after taking written informed consent from the parents/guardians of the patients. Patients were divided in two groups, group A and group B. Patients of group A underwent dissection tonsillectomy and patients of group B underwent diathermy tonsillectomy. Dissection tonsillectomy was defined as a tonsillectomy performed using a combination of sharp and blunt dissection, with hemostasis achieved by ligature or minimal electrocautery. Diathermy tonsillectomy was defined as a tonsillectomy performed using diathermy (monopolar or bipolar) for both dissection and hemostasis. After taking clinical examination and medical history patients underwent tonsillectomies as per preoperative selection and post-operative complication like hemorrhage, edema of Uvula and aspiration of blood were recorded. Patients were followed for two week for complications. All findings were obtained and entered into a purpose mode questionnaire comprising of closed ended questions. All the relevant and required data was interfered and analyzed using SPSS version 20.

Results

Total 206 patient were studied, there mean age was 12.02±4.12 years. Male were in majority as 65.05% and female were 34.95%. According to the post-operative complications haemorrhage was most common 49(23.8%) followed by edema of Uvula 16(7.8%) and aspiration of blood was found in 9(4.4%) of the patients out of all 74 complicated patients however 134 patients were without complications.

The mean pain score was significantly higher in the diathermy group (5.6 ± 2.64) compared to the dissection group (3.2 ± 2.33), with a p-value of 0.047. Hemorrhage was more frequent in the dissection group (35.0%) than in the diathermy group (12.6%), showing a significant

difference (p = 0.001). Edema of the uvula was observed in 5.6% of dissection cases and 9.7% of diathermy cases, but the difference was not statistically significant (p = 0.298). Blood aspiration was slightly higher in the dissection group (5.8%) compared to the diathermy group (2.9%), though this was also not significant (p = 0.307). Table I

Particularly hemorrhage was significantly higher in dissection tonsillectomy (42.9%) than in diathermy (6.1%) (p = 0.047). Reactionary hemorrhage was more common in dissection (12.2%) than diathermy (2.0%), while secondary hemorrhage occurred equally in both groups (18.36%). This suggests that dissection tonsillectomy carries a higher risk of primary hemorrhage**.** Table II

Discussion

Tonsillectomy is a widely performed and longstanding surgical procedure in otorhinolaryngology. It can be carried out using different methods, including conventional surgical techniques and cauterization approaches. This study has been conducted to compare post-operative complication after dissection and diathermy tonsillectomy among total of 206 patients with an overall mean age of 12.02±4.12 years with male predominance 65.05%. Comparatively Raza TH et al[11] reported that the female-to-male ratio was reported as 1.06:1, with 48.5% of the participants being male and 51.5% female. In comparison, our study sample had a mean age of 10.13 ± 4.1 years, highlighting a similar demographic distribution.[11] In aligns with this study, Rahman MS et al[9] reported that the majority of patients (32.5%) were in the 11–20 years age group, while in the cauterization method group, most patients (35.0%) belonged to the 4–10 years age group. Male patients were predominant in both groups, with 55.0% in the dissection method group and 57.5% in the cauterization method group.[9] Consistently Ahmed M et al[12] reported that the patients' average age was 15.8 years, males were slightly more prevalent, accounting for 55.5%, compared to the females 44.5%, which reflects a slight male predominance in the study population. Above distributions are consistent with our findings, indicating a higher prevalence of male patients undergoing tonsillectomy across different techniques.

In this study, the mean post-operative pain score was significantly higher in the diathermy group (5.6 ± 2.64) compared to the dissection group (3.2 ± 2.33, p = 0.047). These findings align with the study by Usman M et al[13] where reported that in the bipolar diathermy group, the mean pain score at 24 hours post-operatively was 3.5 ± 0.66, decreasing to 2.93 ± 0.73 on the second post-operative day and further reducing to 1.59 ± 1.02 by the seventh day. In comparison, the cold dissection group had a mean pain score of 3.33 ± 0.53 at 24 hours (p = 0.0543), 2.34 ± 0.60 on the second post-operative day (p = 0.0001), and 1.46 ± 0.82 on the seventh day (p = 0.3394), suggesting that while pain levels decreased over time in both techniques, the cold dissection method resulted in a statistically significant reduction in pain on the second post-operative day. Similarly, Mirza F et al[14] reported that post-operative pain scores were comparable between the two groups immediately after surgery and at 24 hours. However, by the seventh day, pain remained significantly higher in the diathermy group (5.47 ± 0.9) than in the dissection group (2.55 ± 0.8), indicating a slower pain recovery with the diathermy method. In contrast, Al-Shehri AM et al[2] found that while post-operative pain was initially severe for all patients, it was more pronounced on the first day in the traditional method compared to the cauterization method. Severe

Table I: Post-operative pain and complications according to study groups. (N=206)

Variables	Types of Tonsillectomy		Total	P-value
	Dissection Tonsillectomy	Diathermy Tonsillectomy		
PAIN (Mean ±SD)	3.2±2.33	5.6±2.64	4.1±2.67	0.047
Complications				
Hemorrhage	36 (35.0%)	13 (12.6%)	49(23.8%)	0.001
	67(66.0%)	90(87.4%)	157(76.2%)	
Edema of Uvula	6 (5.6%)	10 (9.7%)	16(7.8%)	0.298
	97(94.2%)	93(90.3%)	190(92.2%)	
Aspiration of Blood	6 (5.8%)	3 (2.9%)	9(4.4%)	0.307
	97(94.2%)	100(97.1%)	197(95.6%)	

Table II: Types of Haemorrhage according to study groups. (n=49)

Tonsillectomy Type	Dissection Tonsillectomy	Diathermy Tonsillectomy	Total	p-value
Primary Hemorrhage	21 (42.9%)	03 (6.1%)	24(49.0%)	0.047
Reactionary Hemorrhage	06 (12.2%)	01 (2.0%)	7(14.3%)	
Secondary Hemorrhage	09 (18.36%)	09 (18.36%)	18(36.7%)	

pain was reported in 33 out of 50 patients in the traditional group, whereas only 14 patients in the cauterization group experienced severe pain. By the fifth post-operative day, pain had decreased in both techniques. These findings collectively suggest that although both techniques result in post-operative pain, the diathermy method is associated with prolonged pain recovery, whereas the cold dissection method may offer better pain relief in the early post-operative period.

In this study, hemorrhage was significantly more frequent in the dissection group (35.0%) compared to the diathermy group (12.6%) ($p = 0.001$), highlighting the increased bleeding risk associated with the dissection method. Edema of the uvula was observed in 5.6% of dissection cases and 9.7% of diathermy cases, though the difference was not statistically significant ($p = 0.298$). Blood aspiration was slightly higher in the dissection group (5.8%) than in the diathermy group (2.9%), but this was also not significant ($p = 0.307$). These findings align with those of Al-Shehri AM et al[2] who reported that post-operative bleeding was significantly higher in the traditional tonsillectomy group, with a greater incidence of severe and moderate bleeding, whereas the cauterization method resulted in significantly lower bleeding, with most patients experiencing only mild cases. Similarly, Rahman MS et al[9] found that blood loss was significantly greater in the dissection method group (50.2 ± 4.2 ml) compared to the cauterization method group (6.3 ± 1 ml, $p = 0.001$), further reinforcing the notion that diathermy techniques offer better hemostatic control. Consistent with these results, Motta S et al[15] reported that in the cold dissection with cold hemostasis group, the incidence of primary hemorrhage was 1.13%, secondary hemorrhage 5.37%, and overall hemorrhage 6.5%. In the cold dissection with hot haemostasis group, primary hemorrhage occurred in 0.99%, secondary hemorrhage in 2.91%, and overall hemorrhage in 3.9%, indicating a lower risk of bleeding with thermal haemostasis techniques.

Furthermore, Faramarzi A et al**[16]** reported that three cases of post-tonsillectomy bleeding occurred in the DCT group, while four cases were observed in the control group, with no statistically significant difference in post-operative hemorrhage rates between the two techniques. Additionally, multiple studies,[17-19] have consistently reported that intraoperative blood loss is lower in patients undergoing diathermy methods. These findings collectively support the conclusion that diathermy tonsillectomy provides better hemostasis and reduces the risk of significant post-operative bleeding compared to the dissection method.

In this study, hemorrhage was significantly higher in the dissection tonsillectomy group (42.9%) compared to the diathermy group (6.1%) ($p = 0.047$), indicating a greater risk of primary hemorrhage with the dissection method. Reactionary hemorrhage was also more common in dissection (12.2%) than in diathermy (2.0%), whereas secondary hemorrhage occurred at an equal rate in both groups (18.36%). These findings suggest that dissection tonsillectomy carries a higher risk of primary bleeding.

Comparatively, Mirza F et al**[14]** reported that 4% of patients in the diathermy group experienced secondary bleeding, while no cases were observed in the cold steel group ($p = 0.056$). Additionally, the mean operating time was shorter in the diathermy group (21.7 ± 2.1 minutes) than in the cold steel group (28.4 ± 2.4 minutes), and intra-operative blood loss was significantly lower in the diathermy group (15.5 ± 3.1 ml) compared to the cold steel group (98.1 ± 9.4 ml). Furthermore, Motta S et al**[15]** found that in the hot dissection with hot haemostasis group, primary hemorrhage occurred in 1.31%, secondary hemorrhage in 7.38%, and overall hemorrhage in 8.69%. These findings collectively reinforce that while diathermy tonsillectomy reduces intraoperative blood loss and shortens operative time, dissection tonsillectomy carries a higher risk of primary hemorrhage, making diathermy a more effective technique for minimizing intraoperative and early post-operative bleeding. However, this study has several limitations, including a limited sample size, the absence of comparisons for healing time and patient satisfaction, and the lack of evaluation of painkiller and antibiotic use, preoperative disease severity, and surgeon experience. Since the disease and its management are complex and involve multiple factors, it is challenging to determine the best surgical technique based on limited parameters. Therefore, larger-scale longitudinal studies are recommended to identify the most effective surgical method.

Conclusion

The comparison of post-operative complications between dissection and diathermy tonsillectomy revealed that the diathermy tonsillectomy is associated with significantly higher post-operative pain; it has a lower risk of hemorrhage, with no statistically significant differences in the incidence of uvular edema and blood aspiration between the two techniques. Overall findings suggested that the choice of tonsillectomy method should be

carefully considered based on the balance between pain management and the risk of bleeding. Surgeons may prefer diathermy for its reduced hemorrhage risk, whereas dissection may be favorable for patients with lower pain tolerance. Further research is recommended to optimize post-operative care and minimize complications in both techniques.

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