Mean Duration for Cessation of Pain following Tonsillectomy Operation among the Patients of Otolaryngology Department in a Tertiary Care Hospital: A Descriptive Cross-sectional Study

Nain Bahadur Mahato, Meera Bista, Bhuwan Bhandari, Anil Maharjan

Department of ENT-HNS, Kathmandu Medical College, Sinamangal, Kathmandu, Nepal, Department of Surgery, Nepal National Hospital, Kalanki, Kathmandu, Nepal, Department of Anesthesia and Critical Care, Kist Medical College, Imadol, Lalitpur, Nepal.

ABSTRACT

Introduction: Tonsillectomy is one of the most common surgical procedures performed by Otolaryngologists world-wide. There are various techniques for tonsillectomy, but none of the techniques has been accepted as the best one universally. Despite the efforts of all the surgeon and use of recent techniques, some post-tonsillectomy morbidity is unavoidable. The main objective of our study is to find out the mean duration for cessation of pain among the patients following tonsillectomy operation in a tertiary care hospital.

Methods: This is a descriptive cross-sectional study of 104 patients who underwent tonsillectomy in department of otolaryngology of Kathmandu Medical College from 1st August 2020 to 31st July 2021. Convenient sampling technique was used. Ethical Approval was taken from Ethical Clearance Committee of hospital (Reference number: 2207202005). Proforma containing visual analog score was given to every patient for scoring the severity of postoperative pain. The scoring of pain was done from 1st postoperative day till 14th postoperative day. Descriptive statistical analysis was done.

Results: One hundred four patients had undergone tonsillectomy in our hospital. The mean duration for cessation of pain was 10 (9.75±1.97) days with mean duration of analgesia taken of 11 (10.84±2.15) days. The mean duration after tonsillectomy operation for cessation of pain on drinking was 8 (7.51±1.19) days and on eating solids 12 (11.59±2.56) days. Patients reported the first normal night of sleep at seven (6.90±1.41) days and return to normal daily activities 11 (11.18±2.53) days.

Conclusions: From the study concluded that the mean duration for cessation of pain after tonsillectomy is slightly lower than other similar study.

Keywords: analgesia; pain; tonsillectomy.

INTRODUCTION

Tonsillectomy is the oldest surgical procedures performed by Otolaryngologists world-wide for the various indications. Tonsillectomy is performed by a variety of techniques. These techniques have evolved over the years aiming to make the procedure safe, decrease the surgical time, intra operative blood loss, postoperative morbidity, and complications. Despite the different techniques available for tonsillectomy, none of the techniques has been accepted as the best one universally.

Postoperative pain cessation varies during different day-today activities. Reactionary hemorrhage is the most feared complication post-tonsillectomy, despite the efforts of all surgeon to low reactionary hemorrhage rates seem to be unavoidable. Incidence of haemorrhage is not related to grade and seniority of

Correspondence: Dr. Nain Bahadur Mahato, Kathmandu Medical College, Department of ENT-HNS, Sinamangal, Kathmandu, Nepal. Email: nain_boldly@hotmail.com, Phone: +977-9851199191.
the surgeon. Cold steel dissection has higher incidence of reactionary haemorrhage and diathermy has greater incidence of secondary haemorrhage.

The main objective of our study is to find out the mean duration for cessation of pain among the patients following tonsillectomy operation in a tertiary care hospital.

METHODS

This is a descriptive cross-sectional study of 104 patients who underwent tonsillectomy in department of otolaryngology of Kathmandu Medical College over a period of 1 year duration from 1st August 2020 to 31st July 2021. Ethical Approval was taken from Ethical Clearance Committee of KMC (Reference number: 2207202005). Patients with history of recurrent tonsilitis, chronic tonsilitis, obstructive sleep apnoea syndrome (OSAS), second attack of quinsy were included in our study. The patients with bleeding disorders, hemoglobin level <10gm%, severe trismus, any chronic illness affecting recovery were excluded from the study. Convenient sampling technique was used.

The sample size was calculated by using the formula,

\[ n = \frac{Z^2 \times \sigma^2}{e^2} \]

\[ = \frac{(1.96)^2 \times (0.5)^2}{(0.1)^2} \]

\[ = 96 \]

Where,

\[ n = \text{required sample size} \]

\[ Z = 1.96 \text{ at 95% Confidence Interval (CI)} \]

\[ \sigma = \text{standard deviation for mean duration of cessation of pain among the patients following tonsillectomy operation, 0.5} \]

\[ e = \text{margin of error, 10%} \]

Here, the calculated sample size is 96, taking non-response rate 8%, the sample size is 104. All the patients to be enrolled in our study were examined by consultant ENT surgeon. History regarding the indications of tonsillectomy and mouth opening were evaluated. Anterior rhinoscopy was done to find out deviated nasal septum (DNS) which would have obscured nasal intubation. All the patients undergoing tonsillectomy were positioned in Rose’s position and anesthetized by using nasal Ring-Adair-Elwin (RAE) endotracheal tube. The patients’ mouth was held open with Boyle- Davis gag for adequate exposure of the oropharynx. The patients were operated by two different techniques, Cold Dissection Technique (CDT) and Bipolar Electrocautery Technique (BET). The average time taken in both the procedures was 45 minutes.

In Cold Dissection Technique, tonsil was grasped with tonsil holding forceps and the anterior tonsillar pillar was cut with No. 12 knife. Surgical plane between the tonsillar capsule and superior constrictor muscle was identified and was dissected from the superior pole towards the lower pole by a serrated tonsil dissector. Inferior pole pedicle was crushed and cut completely by using Eve’s tonsillar snare. Following dissection, the tonsillar fossa was packed with a cotton swab for a few minutes and then, the other tonsil was similarly removed. Finally, the gauzes were removed and when necessary, bipolar electrocautery was used to secure hemostasis.

In Bipolar Electrocautery Technique, bipolar electrocautery forceps, set at a power of 35-40 W was used. In this method, incision on the anterior tonsillar pillar was made from superior pole towards inferior pole using the tip of a bipolar forceps. Superior pole of the tonsil was dissected off from the tonsillar fossa in the surgical plane. During dissection, encountered vessels were cauterized and then separated from the tonsil. The inferior pedicle was cauterized and the tonsil was completely removed. Any further hemostasis of the tonsillar fossa was secured by coagulation with the bipolar forceps. After securing complete hemostasis of both the tonsillar fossa, the gauzes and throat pack were removed. After extubation, post-tonsillectomy position (left lateral) was maintained in the postoperative ward for about 6 hours.

The patients were treated with intravenous 3rd generation cephalosporins and supportive medications for at least 5 days in the hospital. Proforma containing visual analog score was given to every patient for scoring the severity of postoperative pain. The scoring of pain was done from 1st postoperative day till 14th postoperative day. The data for mean duration for cessation of pain on drinking, on eating of solids, first normal night of sleep, return to normal daily activities were collected and analyzed for two different techniques. Descriptive statistical analysis was done.

RESULTS

One hundred four patients, age ranging from 15-50 years were enrolled in our study. The mean duration for cessation of pain was 10 (9.75 ± 1.97) days after tonsillectomy. The mean duration of analgesia taken of 11 (10.84 ± 2.15) days. The mean duration for cessation of pain on drinking was 8 (7.51 ± 1.19) days and on eating solids 12 (11.59 ± 2.56) days. Patients reported the first normal night of sleep at seven (6.90 ± 1.41) days and return to normal daily activities 11 (11.18 ± 2.53) days (Table 1).

Reactionary hemorrhage was seen in 3 (2.88%) patients, while secondary hemorrhage was seen in 2 (1.92%) patients. Postoperative fever was seen in 5 (4.80%) patients, 27 (25.96%) patients had referred
Otalgia and oedema of uvula was seen in 12 (11.53%) patients (Table 2).

Among the total patients, the tonsillectomy was done by cold dissection technique in 44 (42.30%) and 60 (57.69%) by bipolar electrocautery technique.

### Table 1. Mean duration for cessation of pain during different activities.

| Variables                                | Minimum | Maximum | Mean ± SD |
|------------------------------------------|---------|---------|-----------|
| Mean duration for cessation of pain (3-21) days | 6       | 15      | 9.75 ± 1.979 |
| Mean duration for cessation of pain on drinking (1-18) days | 5       | 10      | 7.51 ± 1.199 |
| Mean duration for cessation of pain on eating solids (1-20) days | 7       | 18      | 11.59 ± 2.560 |
| Mean duration of analgesic taken (5-25) days | 7       | 17      | 10.84 ± 2.155 |
| First normal night of sleep (0-18) days | 4       | 10      | 6.90 ± 1.418 |
| Return to normal daily activities (2-24) days | 7       | 19      | 11.18 ± 2.530 |

The mean duration for cessation of pain was 9 (9.07 ± 2.00) days with mean duration of analgesia taken of 11 (10.57 ± 2.12) days in CDT (Table 3).

### Table 2. Number of patients with postoperative morbidity after tonsillectomy.

| Postoperative Morbidity   | Post-Tonsillectomy n (%) |
|---------------------------|--------------------------|
| Reactionary Hemorrhage    | 3 (2.88)                 |
| Secondary Hemorrhage      | 2 (1.92)                 |
| Postoperative Fever       | 5 (4.80)                 |
| Otalgia                   | 27 (25.96)               |
| Oedema of Uvula           | 12 (11.53)               |

The mean duration for cessation of pain was 10 (10.25 ± 1.81) days in BET group with mean duration of analgesia taken of 11 (11.03 ± 2.17) days in BET group (Table 4).

### Table 4. Mean duration for cessation of pain during electrocautery technique.

| Variables                                | Mean ± SD |
|------------------------------------------|-----------|
| Mean duration for cessation of pain (3-21) days | 10.25 ± 1.819 |
| Mean duration for cessation of pain on drinking (1-18) days | 8.03 ± 0.843 |
| Mean duration for cessation of pain on eating solids (1-20) days | 12.30 ± 2.367 |
| Mean duration of analgesic taken (5-25) days | 11.03 ± 2.170 |
| First normal night of sleep (0-18) days | 7.13 ± 1.384 |
| Return to normal daily activities (2-24) days | 11.27 ± 2.291 |

### DISCUSSION

History of tonsillectomy dates back to 3000 years ago with the first report referring to Hindu medicine about 1000 years B.C. In 40 AD, a Roman surgeon, Cornelius Celsus performed this operation for the first time using his fingernails. He also described scraping the tonsils and cutting them out by a hook-like instrument. At the beginning of the twentieth century that Worthington described the modern technique of tonsillectomy by dissection. In 1909, a surgeon named Cohen adopted ligature of bleeding vessels to control per-operative bleeding and thereafter, tonsillectomy became a common and safe procedure in hospitals around the world. In 1968, Remington-Hobbs, Haase and Noguera in 1969 described the use of diathermy for removal of tonsils. In 1982 Goycolea described electrodissection by using monopolar diathermy and Pang, 10 years later, reported the first tonsillectomy by bipolar electrocautery.

Nowadays, tonsillectomy is performed with a variety of techniques such as: conventional cold dissection, mono and bipolar electrocauteries, cryosurgery,
harmonic, coblation, radiofrequency and laser. All these techniques have advantages as well as drawbacks, as reported by the surgeons from time to time, hence none of them have been accepted as the single best technique universally. Over the last century many different techniques of tonsillectomy have been described, of which Cold Dissection-Snare method and Bipolar Electro dissection methods are commonly used. These methods have frequently been compared with each other by different investigators around the world, addressing especially the conventional cold dissection technique (CDT) versus the bipolar electrocautery technique (BET). In our study, we decided to assess the mean duration for cessation of postoperative pain after tonsillectomy during different day-to-day activities.

We found the mean duration for cessation of pain was 10 days (range, 3-21 days) with mean duration of analgesia taken of 11 days (range, 5-25 days) which is slightly lower than the previous study. More than 52% of the patients needed 1 to 3 rescue analgesic doses daily during the first week after tonsillectomy. The mean duration for cessation of pain on drinking was 8 days (range, 1-18 days) and on eating solids 12 days (range, 1-20 days). Patients reported the first normal night of sleep at seven days (range, 0-18 days) and return to normal daily activities at 11 days (range, 2-24 days). Cardozo AA and colleagues have noted positive relationship between the total amount of bipolar diathermy used and postoperative pain. Similarly, Atallah, et al. found an increase in pain and a related prolongation of oral intake time in the postoperative period done by using bipolar cautery tonsillectomy. Increase in postoperative pain in intensity and duration in bipolar diathermy cases; was also observed by Fiona, et al.

In our study, 3 (2.88%) patients had reactionary hemorrhage, for which conservative treatment was sufficient to control the bleeding. Two (1.92%) patients, had secondary hemorrhage on 2nd week for which 1 patient required operation theatre for bleeding control and the other patient was managed conservatively in the ward. Pang YT has reported incidence of postoperative hemorrhage as 1.7% with bipolar diathermy tonsillectomy compared to 3.4% with cold dissection. Stephen O’Leary, et al. in his study reported that the difference in the risk of bleeding after dissection and diathermy tonsillectomy did not reach statistical significance. Whereas Gendy S and colleagues have reported a higher incidence of secondary haemorrhage with bipolar dissection (2.3%) compared to cold dissection (1%) which is similar to our study. One explanation for higher post-tonsillectomy bleeding rates after diathermy techniques may be related to greater thermal damage as the result of excessively high power settings or excessively frequent or prolonged application of diathermy.

Referred otalgia after tonsillectomy is one of the common postoperative morbidity. Twenty seven (25.96%) patients in our study complained of referred otalgia following tonsillectomy. Study done by Kurt Breson and Jeep Diepeveen, Niels Rasmussen (25.9%), Al-Yasiri (25%), Roos K, Lind L (32%) had similar results of referred otalgia as our study. Oedema of uvula was seen in 12 (11.53%) patients, this is normal and is due to the cauterization of the tonsil blood vessels that forces the uvula to swell up until the glands develop an alternative drainage pattern.

Postoperative fever is a common problem after tonsillectomy; 3 (2.88%) patients having a temperature higher than 37.5°C and 2 (1.92%) patients higher than 38°C in the first 24 hours post-tonsillectomy. Fever may occur due to trauma associated surgery that elicits the production of pyrogenic cytokines in the absence of infection. The production of host endogenous pyrogens, or pyrogenic cytokines is the final common pathway through which fever occurs from such diverse causes as infection and trauma in the absence of infection. Pyrogenic cytokines have various effects on stimulating or controlling the inflammatory response and fever. Cytokines act as an intracellular mediator and messenger controlling the host response to injury and infection.

**CONCLUSIONS**

The mean duration for cessation of pain after tonsillectomy is slightly lower than other similar study. Despite the different techniques and efforts of all the surgeons, some postoperative morbidity is unavoidable. Reactionary hemorrhage is the most feared complication post-tonsillectomy because of the risk of airway obstruction, shock and ultimately death if inappropriately managed. Excessive pain associated with referred otalgia, postoperative fever, oedema of the uvula, infection in tonsillar fossa promoting secondary hemorrhage etc are the other complications mainly seen in our practice.

**Conflict of Interest: None.**

**REFERENCES**

1. Scott A. Hot techniques for tonsillectomy. Issues Emerg Health Technol. 2006 Nov;(93):1-6. [PubMed]
2. Pang YT. Paediatric tonsillectomy: bipolar electrodissection and dissection/snare compared. J Laryngol Otol. 1995 Aug;109(8):733-6. [PubMed | Full Text | DOI]
3. Gendy S, O’Leary M, Colreavy M, Rowley H, O’Dwyer T, Blayney A. Tonsillectomy-cold dissection vs. hot dissection:
a prospective study. Ir Med J. 2005 Nov-Dec;98(10):243-4. [PubMed]

4. Ali M, Rafique A, Dastgir M, Rashid M, Maqbool S, Bashir S. Comparison of bipolar electrocautery and cold steel dissection methods for tonsillectomy. Pakistan Armed Forces Medical Journal. 2014;64(1):34-8. [Full Text]

5. Vithayatil AA, Maruvala S. Comparison between cold dissection snare method and bipolar electrodissection method in tonsillectomy. Res Otolaryngol. 2017;6(2):17-22. [Full Text]

6. Guragain R, Bhusal C, Adhikari P, Pokharel R. Intraoperative blood loss & operating time in tonsillectomy: is electrodissection better? Nepalese J ENT Head Neck Surg. 2010;1(1):6-7. [Full Text] [DOI]

7. Kendrick D, Gibbin K. An audit of the complications of paediatric tonsillectomy, adenoidectomy and adenotonsillectomy. Clin Otolaryngol Allied Sci. 1993 Apr;18(2):115-7. [PubMed] [Full Text] [DOI]

8. O’Leary S, Vorrath J. Postoperative bleeding after diathermy and dissection tonsillectomy. Laryngoscope. 2005 Apr;115(4):591-4. [PubMed] [Full Text] [DOI]

9. Curtin JM. The history of tonsil and adenoid surgery. Otolaryngol Clin North Am. 1987 May;20(2):415-9. [PubMed] [Full Text]

10. Feldman H. 2000-year history of tonsillectomy Images from the history of otolaryngology, highlighted by instruments from the collection of the German Medical History Museum in Ingolstadt. Laryngorhinootologie. 1997 Dec;76(12):751-60. [PubMed] [Full Text] [DOI]

11. Worthington TC. A simple method of excision of the faucial tonsil. JAMA. 1907 May 25;48:1761-2. [Full Text]

12. Haase FR, Noguera JT. Hemostasis in tonsillectomy by electrocautery. Arch Otolaryngol. 1962 Feb;75:125-6. [PubMed] [Full Text] [DOI]

13. Remington-Hobbs C. Diathermy in dissection tonsillectomy and retrograde dissection adenoidectomy. J Laryngol Otol. 1968 Nov;82(11):953-62. [PubMed] [Full Text] [DOI]

14. Goycoolea MV, Cubillos PM, Martinez GC. Tonsillectomy with a suction coagulator. Laryngoscope. 1982 Jul;92(7 Pt 1):818-9. [PubMed] [Full Text] [DOI]

15. Salonen A, Kokki H, Nuutinen J. Recovery after tonsillectomy in adults: a three-week follow-up study. Laryngoscope. 2002 Jan;112(1):94-8. [PubMed] [Full Text] [DOI]

16. Cardozo AA, Hallikeri C, Lawrence H, Sankar V, Hargreaves S. Teenage and adult tonsillectomy: dose-response relationship between diathermy energy used and morbidity. Clin Otolaryngol. 2007 Oct;32(5):366-71. [PubMed] [Full Text] [DOI]

17. Atallah N, Kumar M, Hilali A, Hickey S. Post-operative pain in tonsillectomy: bipolar electrodissection technique vs dissection ligation technique. A double-blind randomized prospective trial. J Laryngol Otol. 2000 Sep;114(9):667-70. [PubMed] [Full Text] [DOI]

18. MacGregor FB, Albert DM, Bhattacharyya AK. Post-operative morbidity following paediatric tonsillectomy; a comparison of bipolar diathermy dissection and blunt dissection. Int J Pediatr Otorhinolaryngol. 1995 Jan;31(1):1-6. [PubMed] [Full Text] [DOI]

19. Blomgren K, Qvarnberg YH, Valtomen HJ. A prospective study on pros and cons of electrodissection tonsillectomy. Laryngoscope. 2001 Mar;111(3):478-82. [PubMed] [Full Text] [DOI]

20. Breson K, Diepeveen J. Dissection tonsillectomy–complications and follow-up. J Laryngol Otol. 1969 Jun;83(6):601-8. [PubMed] [Full Text] [DOI]

21. Rasmussen N. Complications of tonsillectomy and adenoidectomy. Otolaryngol Clin North Am. 1987 May;20(2):383-90. [PubMed] [Full Text] [DOI]

22. Lin E, Calvano SE, Lowry SF. Inflammatory cytokines and cell response in surgery. Surgery. 2000 Feb;127(2):117-26. [PubMed] [Full Text] [DOI]