



Journal of Population Therapeutics & Clinical Pharmacology

ORIGINAL ARTICLE

DOI: 10.47750/jptcp.2021.839

A descriptive study of post-tonsillectomy bleeding

Mazin Rajeh Jaber

Department of Surgery, College of Medicine, University of Al-Qadisiyah, Diwaniyah City, Iraq

***Corresponding author:** Mazin Rajeh Jaber, Department of Surgery, College of Medicine, University of Al-Qadisiyah, Diwaniyah City, Iraq. Email: mazin.alzubaidi@qu.edu.iq

Submitted: 21 May 2021; Accepted: 25 July 2021; Published: 1 September 2021

ABSTRACT

Background: Tonsillectomy is a commonly performed surgery in the world. The common indicators of tonsillectomy include recurrent tonsillitis, recurrent peritonsillar abscess, and obstructive sleep apnea. Tonsillectomy may be followed by many complications like dehydration, vomiting, nausea, bleeding, pain, and infections, among which bleeding is the most serious complication.

Objective: The study aimed to evaluate the incidence and possible risk factors post-tonsillectomy hemorrhage.

Methods: This prospective descriptive study included 100 patients (54 females and 46 males) aged between 5-30 years from the otolaryngology unit in Ad-Diwaniah hospital, Ad-Diwania governorate, Iraq, between May 2017 and October 2019. Inclusion criteria: recurrent tonsillitis, tonsillar enlargement affecting sleep pattern, obstructive sleep apnea syndrome, and immunoglobulin-A nephropathy. Post-tonsillectomy, the hemorrhage was classified based on the bleeding time postsurgery. If bleeding occurred on the first day (24 hours) after operation, it was called primary post- tonsillectomy bleeding, and post that, it was termed secondary post-tonsillectomy bleeding.

Results: Of 100 patients, only 11 developed post-tonsillectomy hemorrhage (11%). Primary post-tonsillectomy bleeding occurred in eight patients, whereas secondary post- tonsillectomy bleeding occurred in three patients. Nine male and two female patients developed post-tonsillectomy hemorrhage. Primary post-tonsillectomy hemorrhage occurred in those with obstructive sleep apnea, recurrent tonsillitis, and history of non-steroidal anti-inflammatory drug use, smoking, and obesity and secondary posttonsillectomy hemorrhage occurred in those with smoking history, obesity, obstructive sleep apnea, and recurrent tonsillitis.

Conclusion: Older age group, male sex, recurrent tonsillitis, and smoking history are pivotal factors of post tonsillectomy hemorrhage.

Keywords: *tonsillitis; tonsillectomy; post-tonsillectomy hemorrhage*

J Popul Ther Clin Pharmacol Vol 28:56–62; 1 September 2021

This article is distributed under the terms of the Creative Commons Attribution-Non Commercial 4.0 International License. ©2021 Mazin Rajeh Jaber

INTRODUCTION

Tonsillectomy is a commonly performed surgery around the world. The symptoms of tonsillectomy include recurrent tonsillar infection, recurrent peritonsillar abscess, and obstructive sleep apnea.¹⁻³ Recurrent tonsillitis and disturbed sleep (obstructive sleep apnea due to bilateral tonsillar hypertrophy), and chronic tonsillitis are the commonest indications for tonsillectomy in children and adults, respectively.⁴⁻⁶ Other complications post-tonsillectomy include dehydration, vomiting, nausea, bleeding, pain, and infections, of which bleeding is the most serious complication.^{7,8} Post-tonsillectomy hemorrhage (PTH) is classified based on the bleeding time after surgery.^{9,10} Factors affecting post-tonsillectomy bleeding include nonsteroidal anti-inflammatory drugs (NSAIDs) like ibuprofen and aging. The surgeon's experience was also related to post-tonsillectomy bleeding.¹¹ Post-tonsillectomy bleeding is higher in those with diathermy tonsillectomy than the dissection method.¹²

STUDY OBJECTIVE

This study aimed to evaluate the incidence and possible risk factors of PTH.

Methods

This prospective descriptive study included 100 patients (54 females and 46 males) aged between 5–30 years from the otolaryngology unit in Ad-Diwaniah hospital, Ad-Diwania governorate, Iraq, between May 2017 and October 2019. The inclusion criteria were recurrent tonsillitis (defined by SIGN criteria), tonsillar hypertrophy interfere with a sleeping pattern, obstructive sleep apnea, and immunoglobulin A nephropathy.

Recurrent tonsillitis defined by SIGN criteria included:

- Tonsillitis causing sore throats.
- The sore throat interference with normal life functioning.

- Greater than seven severe episodes of sore throats in the last year, or five or more episodes in each of the last 2 years, or more than three episodes in each of the last 3 years.^{13,14,15}

Tonsillectomies were performed under general anesthesia with endotracheal intubation and pharyngeal pack, Crowe-Davis mouth gag was inserted. The cold steel tonsillectomy method was employed in this study. Here the tonsil is dragged to the midline, and the mucosa was incised to expose the capsule. The dissection was performed through the loose areolar tissue plane between the tonsil and the pharyngeal muscles for the complete tonsil excision. Ligatures were used to cover bleeding vessels as required.¹³ PTH was classified according to the bleeding time after surgery. If bleeding began within the first 24 hours after the operation, it was termed primary post-tonsillectomy bleeding, and post that, was secondary post-tonsillectomy bleeding.

PTH was classified into five grades according to Windfuhr's study¹⁶:

- 1st grade: bleeding stopped spontaneously.
- 2nd grade: bleeding ceased under local anesthesia.
- 3rd grade: bleeding stopped under general anesthesia.
- 4th grade: bleeding ceased by ligation of the external carotid artery.
- 5th grade: death of the patient.

The sex, age, obesity, operative time, smoking status, antibiotics use, and perioperative NSAIDs were recorded.

RESULTS

The study included 100 patients (54 females and 46 males). Table 1 shows the indications and sex distribution of the study population. Among 100 patients, only 11 patients developed post-tonsillectomy

hemorrhage (11%). Primary PTH was recorded in eight patients, whereas secondary PTH occurred in three patients. Males (9 patients) developed PTH more than females (2 patients). Table 2 shows the PTH type and patients sex distribution.

The PTH increased with age (Table 3).

Primary PTH occurred in patients with recurrent tonsillitis (6 patients) and obstructive sleep apnea syndrome (2 patients). Secondary PTH also occurred in patients with recurrent tonsillitis (2 patients) and obstructive sleep apnea syndrome (1 patient), as shown in Table 4.

Primary PTH was reported in smokers (6 patients), perioperative non-steroidal anti-inflammatory drug use (1 patient), and obesity (1 patient). Secondary PTH occurred in those with a smoking history (2 patients) and obesity (1 patient), as shown in Table 5.

According to Windfuhr's grading nine patients were in grade 1, two in grade 2, as shown in Table 6.

TABLE 1. The Indications and Sex Distribution of the Study Population.

Indication	Male	Female	Total
Recurrent tonsillitis	24	33	57
Tonsil enlargement impairing sleep	6	11	17
Obstructive sleep apnea syndrome	14	9	23
Immunoglobulin A nephropathy	2	1	3
Total	46	54	100

TABLE 4. Post-tonsillectomy Hemorrhage in Relation to Indications of Surgery.

Indication	Primary post- tonsillectomy bleeding	Secondary post-tonsillectomy bleeding	Total
Recurrent tonsillitis	6	2	8
Tonsil enlargement impairing sleep	0	0	0
Obstructive sleep apnea syndrome	2	1	3
Immunoglobulin A nephropathy	0	0	0
Total	8	3	11

DISCUSSION

In our study, 11 patients developed PTH (11%). Primary PTH was reported in eight patients, and secondary PTH occurred in three. Of those patients with PTH, the majority (8 patients) were in the older age group (20–30 years). Previous studies showed that age was an important factor in PTH.^{12,17–19} Children above 11 years of age showed more chances of post-tonsillectomy bleeding.^{20,21} One study also suggested that age was not an important risk factor,²²

TABLE 2. Post-tonsillectomy Hemorrhage Type and Sex Distribution of the Patients.

Type of post-tonsillectomy hemorrhage	Male	Female	Total
Primary post-tonsillectomy bleeding	7	1	8
Secondary post-tonsillectomy bleeding	2	1	3
Total	9	2	11

TABLE 3. Post-tonsillectomy Hemorrhage in Relation to Age Groups.

Age (years)	Primary post-tonsillectomy bleeding	Secondary post-tonsillectomy bleeding	Total
5–10	1	0	1
11–20	2	0	2
20–30	5	3	8
Total	8	3	11

TABLE 5. Post-tonsillectomy Hemorrhage in Relation to Risk Factors.

Risk factor	Primary post- tonsillectomy bleeding	Secondary post-tonsillectomy bleeding	Total
History of smoking	6	2	8
History of nonsteroidal anti-inflammatory drugs	1	0	1
Obesity (body mass index ≥ 25)	1	1	2
Antibiotics after surgery	0	0	0
Total	8	3	11

TABLE 6. Post-tonsillectomy Hemorrhage According to Windfuhr's Grading System.

Windfuhr's grades	Number of patients
Grade 1	9
Grade 2	0
Grade 3	2
Grade 4	0
Grade 5	0

as increasing age may cause fragile vessels.²⁰ In this study, males (9 patients) developed PTH more than females (2 patients). Primary post-tonsillectomy bleeding was higher (7 patients) than secondary post-tonsillectomy bleeding (2 patients) in males. The study by Yoshiaki et al.²³ suggested that the sex male was a risk factor for secondary PTH, which may be because of the interference of the estrogen hormone in wound healing.²⁴ In children, sex was not a critical factor for PTH.^{20,25} One study showed that the risk of bleeding was higher in males than females,²⁶ and another showed that the risk is equal for both sexes.²⁷ In patients with recurrent tonsillitis, primary post-tonsillectomy bleeding occurred in six patients and secondary post-tonsillectomy bleeding occurred in two.

Spektor et al.²⁰ reported that the incidence of PTH was higher in recurrent tonsillitis. Two patients with obstructive sleep apnea syndrome developed primary PTH, and secondary PTH was observed in one patient. Previous studies revealed that obstructive sleep apnea was an important risk

factor of PTH.^{28,29} Smoking history was recorded in eight patients (6 in the primary- and two in secondary post-tonsillectomy bleeding. Some studies also reported that smoking was a critical risk factor for hemorrhage in adult patients.³⁰⁻³² Smoking may increase the risk for inflammation, infection and impair wound healing after surgery, enhancing the possibility of post-tonsillectomy bleeding.³³ Yamashita et al.³⁴ showed that smokers could have an increased sputum production compared with nonsmokers and this may cause excessive cough after surgery leading to bleeding. In this study, primary post-tonsillectomy bleeding occurred in one patient with ibuprofen use. Perioperative use of the nonsteroidal anti-inflammatory drug could increase the risk for PTH because of the antiplatelet function of the cyclooxygenase inhibition.³⁵

Previous studies claimed that non-steroidal anti-inflammatory drugs use enhances the risk for PTH,³⁶⁻³⁹ which was disagreed by the study of Riggan et al.⁴⁰⁻⁴² In this study, two obese patients developed PTH. Kshirsagar et al.^{43,44} claimed that the chance of bleeding was 2.3 times higher in obese children than nonobese, but the cause was unclear. Yoshiaki et al.⁴⁵ showed that obesity was not a significant risk for PTH.

CONCLUSION

This study shows that the male sex, increasing age, and recurrent tonsillitis are suspected risk factors for PTH.

ETHICAL APPROVAL

Ethical clearance was obtained from Diwanayah teaching hospital's ethical committee.

REFERENCES

1. Burton MJ, Glasziou PP, Chong LY, Venekamp RP. Tonsillectomy or adenotonsillectomy versus non-surgical treatment for chronic/recurrent acute tonsillitis. *Cochrane Database Syst Rev*. 2014;2014(11):CD001802. <https://doi.org/10.1002/14651858.CD001802.pub3>
2. Burton MJ, Goldstein NA, Rosenfled RM. Tonsillectomy or adenotonsillectomy versus non-surgical management for obstructive sleep-disordered breathing in children. *Otolaryngol Neck Surg*. 2016;154(4):581–5. <https://doi.org/10.1177/0194599816630972>
3. MacFarlane PL, Nasser S, Coman WB, Kiss G, Harris PK, Carney S. Tonsillectomy in Australia: An audit of surgical technique and postoperative care. *Otolaryngol Neck Surg*. 2008;139(1):109–14. <https://doi.org/10.1177/0194599816630972>
4. Archer S, Rosenfled R, Mitchell R, Baugh R. Clinical practice guideline: Tonsillectomy in children. *Otolaryngol Neck Surg*. 2010;143:P12.
5. Hoddeson EK, Gourin CG. Adult tonsillectomy: Current indications and outcomes. *Otolaryngol Head Neck Surg*. 2009;140:19–22. <https://doi.org/10.1016/j.otohns.2008.09.023>
6. Mitchell RB, Archer SM, Ishman SL, Rosenfeld RM, Coles S, Finestone SA, et al. Clinical practice guideline: Tonsillectomy in children (update). *Otolaryngol Head Neck Surg*. 2019;160:S1–42. <https://doi.org/10.1177/0194599818801757>
7. Johnson LB, Elluru RG, Myer CM III. Complications of adenotonsillectomy. *Laryngoscope*. 2002;112:35–6. <https://doi.org/10.1097/00005537-200208001-00013>
8. De Luca Canto G, Pachêco-Pereira C, Aydinoz S, Bhattacharjee R, Tan HL, Kheirandish-Gozal L, et al. Adenotonsillectomy complications: A meta-analysis. *Pediatrics*. 2015;136:702–18. <https://doi.org/10.1542/peds.2015-1283>
9. Chadha NK. Tonsillectomy return-to-theatre rates demonstrate a monthly and seasonal variation: An analysis of 256 799 patients. *J Laryngol Otol*. 2007;121:1088–93. <https://doi.org/10.1017/S0022215107005622>
10. Windfuhr JP, Chen YS, Remmert S. Hemorrhage following tonsillectomy and adenoidectomy in 15,218 patients. *Otolaryngol Neck Surg*. 2005;132(2):281–6. <https://doi.org/10.1016/j.otohns.2004.09.007>
11. Manimaran V, Mohanty S, Jayagandhi SK, Umamaheshwaran P, Jeyabalakrishnan S. A retrospective analysis of peroperative risk factors associated with posttonsillectomy reactionary hemorrhage in a teaching hospital. *Int Arch Otorhinolaryngol*. 2019;23(4):e403–7. <https://doi.org/10.1055/s-0039-1696702>
12. Aljabr IK, Hassan FM, Alyahya KA. Post-tonsillectomy hemorrhage after bipolar diathermy vs. cold dissection surgical techniques in Alahsa region, Saudi Arabia. *Alexandria J Med*. 2016;52(2):169–72. <https://doi.org/10.1016/j.ajme.2015.06.004>
13. Bajaj Y, Hore I. Scott-brown's otorhinolaryngology head and neck surgery. 8th edition. Boca Raton, FL: CRC Press; 2018. Diseases of tonsils, tonsillectomy and tonsillotomy; p 438.
14. Meng H, Ohtake H, Ishida A, Ohta N, Kakehata S, Yamakawa M. IgA production and tonsillar focal infection in IgA nephropathy. *J Clin Exp Hematop*. 2012;52:161–70. <https://doi.org/10.3960/jslrt.52.161>
15. Noda Y. Pre-operative diagnosis for dermatoses due to tonsillar focal infections: Recent views. *Auris Nasus Larynx*. 1989;16(suppl 1):S59–64. [https://doi.org/10.1016/S0385-8146\(89\)80031-8](https://doi.org/10.1016/S0385-8146(89)80031-8)
16. Windfuhr, Seehafer. Classification of haemorrhage following tonsillectomy. *J Laryngol Otol*. 2001; 115: 457–61. <https://doi.org/10.1258/0022215011908162>
17. Kim MK, Lee JW, Kim MG, Ha SY, Lee JS, Yeo SG. Analysis of prognostic factors for postoperative bleeding after tonsillectomy. *Eur Arch Oto-Rhino-Laryngology*. 2012;269(3):977–81. <https://doi.org/10.1007/s00405-011-1697-5>
18. Perkins JN, Liang C, Gao D, Shultz L, Friedman NR. Risk of post-tonsillectomy hemorrhage by clinical

- diagnosis. *Laryngoscope*. 2012;122(10):2311–5. <https://doi.org/10.1002/lary.23421>
19. Hussain, S, O'Connell Ferster, AP, Carr MM. Time between first and second posttonsillectomy bleeds. *Int J Otolaryngol*. 2017;2017:3275683. <https://doi.org/10.1155/2017/3275683>
 20. Spektor Z, Saint-Victor S, Kay DJ, Mandell DL. Risk factors for pediatric post-tonsillectomy hemorrhage. *Int J Pediatr Otorhinolaryngol*. 2016;84:151–5. <https://doi.org/10.1016/j.ijporl.2016.03.005>
 21. Tomkinson A, Harrison W, Owens D, Harris S, McClure V, Temple M. Risk factors for post-operative hemorrhage following tonsillectomy. *Laryngoscope*. 2011;121(2):279–88. <https://doi.org/10.1002/lary.21242>
 22. Ordemann AG, Hartzog AJ, Seals SR, Spankovich C, Stringer SP. Is weight a predictive risk factor of postoperative tonsillectomy bleed *Laryngoscope Investig Otolaryngol*. 2018;3(3):238–43. <https://doi.org/10.1002/lio2.155>
 23. Inuzuka Y, Mizutari K, Kamide D, Sato M, Shiotani A. Risk factors of post-tonsillectomy hemorrhage in adults. *Laryngoscope Investig Otolaryngol*. 2020 Dec; 5(6): 1056–62. <https://doi.org/10.1002/lio2.488>
 24. Hardman MJ, Waite A, Zeef L, Burow M, Nakayama T, Ashcroft GS. Macrophage migration inhibitory factor: a central regulator of wound healing. *Am J Pathol*. 2005;167:1561–74. [https://doi.org/10.1016/S0002-9440\(10\)61241-2](https://doi.org/10.1016/S0002-9440(10)61241-2)
 25. Francis DO, Fonnesbeck C, Sathe N, McPheeters M, Krishnaswami S, et al. Postoperative bleeding and associated utilization following tonsillectomy in children. *Otolaryngol Head Neck Surg*. 2017;156:442–55. <https://doi.org/10.1177/0194599816683915>
 26. Bhattacharyya N, Shapiro NL. Associations between socioeconomic status and race with complications after tonsillectomy in children. *Otolaryngol Neck Surg*. 2014;151(6):1055–60. <https://doi.org/10.1177/0194599814552647>
 27. Kshirsagar R, Mahboubi H, Moriyama D, Ajose-Popoola O, Pham NS, Ahuja GS. Increased immediate postoperative hemorrhage in older and obese children after outpatient tonsillectomy. *Int J Pediatr Otorhinolaryngol*. 2016;84:119–23. <https://doi.org/10.1016/j.ijporl.2016.02.019>
 28. Burckardt E, Rebholz W, Allen S, Cash E, Goldman J. Predictors for hemorrhage following pediatric adenotonsillectomy. *Int J Pediatr Otorhinolaryngol*. 2019;117:143–7. <https://doi.org/10.1016/j.ijporl.2018.11.029>
 29. Reckley LK, Fernandez-Salvador C, Camacho M. The effect of tonsillectomy on obstructive sleep apnea: an overview of systematic reviews. *Nat Sci Sleep*. 2018;10:105. <https://doi.org/10.2147/NSS.S127816>
 30. Seyhun N, Dizdar SK, Çoktur A, Ekici M, Onuralp B, Zeynep A, et al. Risk factors for post-tonsillectomy hemorrhage in adult population: Does smoking history have an impact? *Am J Otolaryngol*. 2020;41:102341. <https://doi.org/10.1016/j.amjoto.2019.102341>
 31. Demars SM, Harsha WJ, Crawford JV. The effects of smoking on the rate of postoperative hemorrhage after tonsillectomy and uvulopalatopharyngoplasty. *Arch Otolaryngol Head Neck Surg*. 2008;134:811–4. <https://doi.org/10.1001/archotol.134.8.811>
 32. Giger R, Landis BN, Dulguerov P. Hemorrhage risk after quinsy tonsillectomy. *Otolaryngol Head Neck Surg*. 2005;133:729–34. <https://doi.org/10.1016/j.otohns.2005.07.013>
 33. Cinamon U, Goldfarb A, Marom T. The impact of tobacco smoking upon chronic/recurrent tonsillitis and post tonsillectomy bleeding. *Int Arch Otorhinolaryngol*. 2017;21:165–70. <https://doi.org/10.1055/s-0036-1593835>
 34. Yamashita S, Yamaguchi H, Sakaguchi M, Yamamoto S, Aoki K, Shiga Y. Effect of smoking on intraoperative sputum and postoperative pulmonary complication in minor surgical patients. *Respir Med*. 2004;98:760–6. <https://doi.org/10.1016/j.rmed.2004.01.011>
 35. Marret E, Flahault A, Samama CM, Bonnet F. Effects of postoperative, nonsteroidal, anti-inflammatory drugs on bleeding risk after tonsillectomy: Meta-analysis of randomized, controlled trials. *Anesthesiology*. 2003;98:1497–502. <https://doi.org/10.1097/00000542-200306000-00030>

36. D'Souza JN, Schmidt RJ, Xie L, Adelman JP, Nardone HC. Postoperative nonsteroidal anti-inflammatory drugs and risk of bleeding in pediatric intracapsular tonsillectomy. *Int J Pediatr Otorhinolaryngol.* 2015;79(9):1472–1476. <https://doi.org/10.1016/j.ijporl.2015.05.042>
37. Swanson RT, Schubart JR, Carr MM. Association of ibuprofen use with post-tonsillectomy bleeding in older children. *Am J Otolaryngol.* 2018;39(5): 618–22. <https://doi.org/10.1016/j.amjoto.2018.05.009>
38. Riggan L, Ramakrishna J, Sommer DD, Koren G. A 2013 updated systematic review & meta-analysis of 36 randomized controlled trials; no apparent effects of non steroidal anti-inflammatory agents on the risk of bleeding after tonsillectomy. *Clin Otolaryngol.* 2013;38:115–29. <https://doi.org/10.1111/coa.12106>
39. Qasim MT, Al-Mayali HK. Investigate the relation between baicalin effect and gene expression of LH, FSH, testosterone in male rats treated with Gemcitabine drug. *Research Journal of Pharmacy and Technology.* 2019 Sep 30;12(9):4135–41. <https://doi.org/10.5958/0974-360X.2019.00714.5>
40. Qasim MT, Al-Mayali HK. The immunological and protective role of Baicalin in male rats treated with chemotherapy (Gemcitabine). 2019 *J. Phys.: Conf. Ser.* 1234 012065. <https://doi.org/10.1088/1742-6596/1234/1/012065>
41. Tahmasebi S, Qasim MT, Krivenkova MV, Zekiy AO, Thangavelu L, Aravindhan S, et al. The effects of oxygen-ozone therapy on regulatory T-cell responses in multiple sclerosis patients. *Cell Bio Int.* 2021; 45 (7):1498–1509. <https://doi.org/10.1002/cbin.11589>
42. Mousa HM, Qasim MT. Microbial Infection and IL-6 urine levels for pregnant women in Thi-Qar Province. *World J Pharma Res.* 2015 Mar 6;4(05):358–65.
43. AL-Naely AJ, Qasim MT, Al-Hamadawi HA. Transfusion of blood components in the newborn service of the hospital. *Annals of RSCB [Internet].* [cited 2021 Apr14]. Available from: <http://annals-of-rscb.ro/index.php/journal/article/view/2525>
44. Mohammed ZI, Qasim MT. Correlation of AMH and LH levels in PCOS patients with pregnancy rate. *Annals of RSCB [Internet].* [cited 2021 Apr 14]. Available from: <http://annals-of-rscb.ro/index.php/journal/article/view/2524>
45. Gowhari Shabgah A, Qasim MT, Mojtaba Mostafavi S, Zekiy AO, Ezzatifar F, Ahmadi M et al. CXC chemokine ligand 16: A Swiss army knife chemokine in cancer. *Expert Rev Mol Med.* 2021;23:e4. <https://doi.org/10.1017/erm.2021.7>