Original Article

Post-Tonsillectomy Hemorrhage: An Analysis of Incidence and Risk Factors in Kuwait

Bashaer Abdullah, Imtiaz M Qazi, Jamal M Al Harbi, Milind Gosavi, Zakir Hussain, Abdullah Al Shukry
Department of Otorhinolaryngology and Head & Neck Surgery
Zain and Al-Sabah Hospitals, Ministry of Health, Kuwait

Kuwait Medical Journal 2015; 47 (3): 210 - 214

ABSTRACT

Introduction: Post-Tonsillectomy Hemorrhage (PTH) remains one of the commonest complications associated with tonsillectomies. Its incidence and risk factors vary widely in literature.
Objective: To examine our local experience and assess the incidence of PTH in comparison to that in the literature and to identify factors that contribute in increasing the risk of PTH in our setup.
Design: Retrospective study
Setting: Al-Sabah and Zain Hospital, MoH, Kuwait
Methods: A retrospective chart review was conducted on 2,038 patients who underwent tonsillectomy with or without adenoidectomy during a 12-month period (January to December 2010) in Zain and Al Sabah hospitals. Details regarding the patients' age, gender, surgical technique, and level of the operating surgeon were recorded in order to assess any correlation.
Intervention: Tonsillectomy
Main Outcome Measure: Incidence of PTH
Results: Out of the 2,038 patients included in this study, a total of 98 patients (4.8%) developed PTH. Thirty-one patients (31.6%) who developed PTH were above the age of 26 years. Out of the 98 patients (4.8%) who developed PTH, 63 patients (64.3%) were male. 'Hot' dissection technique was associated with higher incidence of PTH (71 patients; 72.4%) in comparison to the 'cold' dissection (27 patients; 27.5%).
Conclusion: The incidence of PTH in our institution is 4.8%, which is comparable with that reported in the literature, ranging between 1.5% and 6.68%. Male patients, increasing age and 'Hot' dissection technique were all identified as risk factors for PTH in our setup.

KEYWORDS: complications, hemorrhage, risk factors, tonsillectomy, techniques

INTRODUCTION

Tonsillectomy, with or without adenoidectomy, remains the most common procedure performed in the field of otorhinolaryngology. Although it is usually considered a fairly safe procedure, tonsillectomy still has the potential to cause lethal complications[1]. Post-tonsillectomy hemorrhage (PTH) is considered to be one of the most common and most anticipated complications associated with this procedure[2]. PTH is classified as primary (occurring intra-operatively), reactionary (within 24 hours post-operatively), or secondary, which might occur any time more than 24 hours post-operatively[3]. Primary PTH is generally considered to be directly related to the surgical technique used and intra-operative control of bleeding. However, secondary PTH is thought to be due to a combination of factors and its direct causation is not fully understood[4]. Many studies have been undertaken to determine and identify the risk factors associated with PTH and many theories regarding these factors have been suggested in order to help reduce the overall incidence of PTH. Some studies suggest that increasing age is associated with an increased risk of PTH, while others suggest that PTH is mainly related to the intra-operative technique of surgery and hemostasis. Despite all differences, there seems to be an agreement that PTH is likely to be due to a combination of factors. Furthermore, there remains to be an agreement to disagree regarding which technique should be considered as 'ideal' in performing tonsillectomies.

With this background in mind, the present study was conducted to determine the incidence of PTH in

Address correspondence to:
Dr Bashaer Abdullah, Specialist, Department of Otolaryngology, Zain Hospital, Al Sabah area, Kuwait. Tel:+965-99750612, E-mail: bashaerabdullah@gmail.com

our institution, as well as to identify the risk factors associated with it and to compare our data with the data published in international literature.

SUBJECTS AND METHODS

A retrospective chart review of 2,038 patients who underwent tonsillectomy, with or without adenoidectomy, between January 1st and December 31st 2010 (12-month period) at the department of Otorhinolaryngology and Head and Neck surgery, Zain and Al-Sabah hospitals, Kuwait was undertaken. Zain and Al-Sabah hospital is an exclusively otorhinolaryngology and head and neck surgery tertiary care teaching hospital attached to the Ministry of Health, Kuwait. It is the main otorhinolaryngology center in the state of Kuwait which caters to approximately half of the population of the country (approximately 1.35 millions)[5]. All patients included in the present study underwent tonsillectomy, with or without adenoidectomy, for non-oncological indications. Patients who underwent tonsillectomy for suspicion of carcinoma were excluded from the study. Inpatient files and operative notes were thoroughly scanned and details regarding the patients' age, gender, days of hospital stay, surgical technique, level of the operating surgeon and the presence of peri and postoperative hemorrhage were recorded. A record was also made of patients who required surgical control of PTH as well as those who required only conservative management. It is also worth mentioning that none of the patients included in the present study had a known or suspicious history of a bleeding disorder based on history and clinical examination. Hence, coagulation screening was not performed routinely and only a complete blood count was done for all patients.

RESULTS

Patient Demographics

During the study period of 12 months (between 1st January – 31st December 2010), 2,038 patients were found to be eligible for inclusion in the study. The age of patients ranged from one to 43 years, with the majority of patients being between the ages of 1 - 5 years (n = 1073; 52.6%). Five-hundred and fifty-one patients (27.0%) were between six and 10 years of age, 149 patients (7.3%) were 11 to 15 years old, 66 patients (3.2%) were 16 to 20 years old, 60 patients (2.9%) were 21 to 25 years old. One hundred and thirty-nine patients (6.8%) were above 26 years of age (Fig. 1). 1,277 patients (62.7%) were male and 761 (37.3%) were female (Table 1). The majority of patients were discharged from the hospital on day one postoperatively (1,990 patients; 97.6%). Thirty-three patients (1.6%) were discharged from the hospital on day two postoperatively, six patients (0.3%) each were discharged on day three and day four respectively, whereas three patients (0.1%) were discharged on or after the 5th postoperative day (Table 2).

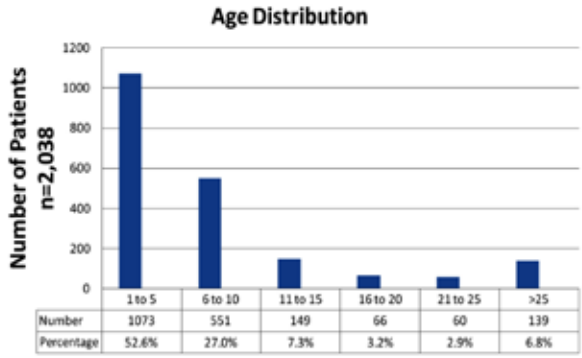

Fig. 1: Age distribution of all patients

Table 1: Distribution of patients according to gender

Gender	Number (n = 2,038)	Percentage
Male	1,277	62.7
Female	761	37.3

Table 2: Total days of hospital stay postoperatively

Hospital Stay	Number (n = 2,038)	Percentage
Day 1	1,990	97.6
Day 2	33	1.6
Day 3	6	0.3
Day 4	6	0.3
Day 5 and beyond	3	0.1

Operative Details

Details of the operation were reviewed, including the operative technique and the level of the operating surgeon (*i.e.*, resident, registrar, senior registrar or consultant). Operative techniques employed included 'cold' dissection (n = 680; 33.4%), 'hot' dissection (unipolar and bipolar) (n = 1,356; 66.5%) and coblation (n = 2; 0.1%). The majority of cases were operated by surgeons at registrar / senior registrar level (n = 1,748; 85.8%), followed by residents (n = 147; 7.2%) and consultants (n = 143; 7.0%).

Incidence of PTH

Out of a total number of 2,038 patients included in the study, 98 patients (4.8%) developed PTH. Most of these patients (31 patients; 31.6%) were above the age of 26 years, 21 patients (21.4%) were 1 - 5 years old, 17 patients (17.3%) were 6 - 10 years old, seven patients (7.1%) were 11 - 15 years old, 13 patients (13.3%) were 16 - 20 years old, and nine patients (9.2%) were of 21 - 25 years (Fig. 2). Out of the 98

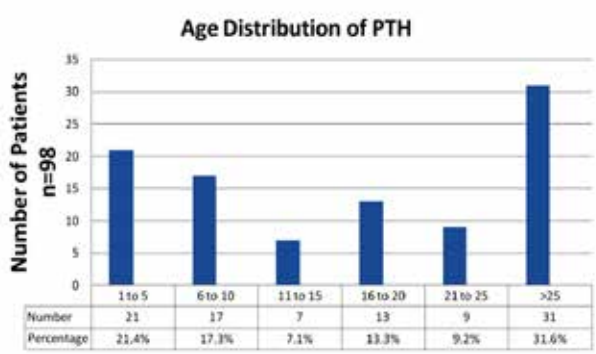

Fig. 2: Age distribution of patients who developed PTH

patients who developed PTH, 63 (64.3%) were male and 35 (35.7%) were female. Three patients (3.1%) had primary PTH (intra-operatively), 22 patients (22.4%) had reactionary PTH (within 24 hours of surgery), where as 73 patients (74.5%) had secondary PTH (> 24 hours postoperatively). Regarding the technique of surgery, 1,356 tonsillectomies were performed *via* 'hot' dissection; more specifically, 1,228 by unipolar electrodissection and 128 by bipolar electrodissection, and 680 tonsillectomies were performed *via* 'cold' dissection. PTH was noted in 71 patients (5.2%) out of those who underwent tonsillectomy *via* 'hot' dissection (69 patients (5.6%) by unipolar electrodissection and two patients (1.6%) by bipolar electrodissection). On the other hand, PTH was noted in 27 patients (4.0%) out of the total number of patients who underwent tonsillectomy *via* 'cold' dissection. Only two patients underwent tonsillectomy by coblation and no evidence of PTH was noted in them (Table 3).

Table 3: Incidence of PTH according to surgical technique

Technique	Number of PTH cases	Percentage
Cold	27	4.0
Unipolar	69	5.6
Bipolar	2	1.6
Coblation	0	0

DISCUSSION

The issue of PTH has been an area of extensive research over the last years. Despite all advances in technology and surgical techniques, PTH continues to be a prevalent and unforeseeable complication associated with this procedure[1,2,4,6,7]. Many guidelines have been published in an effort to identify risk factors and reduce the incidence of PTH[8-10].

Based on the results of our study, the rate of PTH was found to be 4.8%, occurring in 98 cases out of the total 2,038 patients, which is comparable to the rate in published literature. Although the reported incidence of PTH varies, the range has been reported to be between 1.5%[1] and 6.68%[2] in a recently published literature. Comparable results have been reported by other studies. In a study published in the Lancet by Lowe *et al*[11] which included 11,796 patients in England and Northern Ireland, the incidence of PTH and other complications arising up to the 28th day post-operatively were recorded. They reported that 389 patients (3.3%) of the total cohort size developed PTH. Out of the 389 patients, 59 patients (0.5%) had primary PTH, whereas the majority of patients (337 patients; 2.9%) developed secondary PTH. Similarly, in a retrospective study by Collison *et al*[12], the charts of 430 consecutive tonsillectomy patients were examined. All the tonsillectomies performed in this study were by one of two surgeons only, and both surgeons employed the same operative technique of tonsillectomy by 'cold' dissection. They reported that a total of 17 patients (4%) developed PTH, with the incidence of secondary PTH being reportedly higher than primary PTH. In a prospective study published in the American Academy of Otolaryngology and Head and Neck Surgery by Walker *et al*[13], data on children and adults was collected over a period of five years and included complications up to 28 days after surgery. The study included 1,133 patients who underwent tonsillectomy with or without adenoidectomy. They reported that PTH developed in 59 patients (5.2%) out of the total 1,133 patients, with the incidence being strongly correlated with increasing age.

In our study, the age of the patient also proved to be related to the increased risk of PTH. Out of the 98 patients (4.8%) who developed PTH, 31 (63%) were above the age of 26 years, implying that increasing age is directly proportional to the risk of PTH. In the National Prospective Tonsillectomy Audit (NPTA) [8], researchers of the Royal College of Surgeons of England acknowledged this relationship between increasing age and increased risk of PTH, with the incidence increasing from 1.9% in patients aged below five years to 4.9% in those above 15 years. Furthermore, in a retrospective study of 15,218 patients published in Germany, Windfuhr *et al*[1] reported a clear relation between increasing age and PTH. In their study, the risk of PTH for patients younger than four years was noted to be 1.27%. This increased gradually with increasing age to reach a maximum of 9.0% in patients older than 70 years. Similar findings have also been reported by other studies[14,15].

In addition to increasing age, the results of our study show a strong correlation between the patients' gender and the incidence of PTH. A total of 63 male patients (64.3%) developed PTH, in comparison to only 35 female patients (35.7%).

This finding is in conformity to that published in the literature, where the male gender was found to be a risk factor for PTH[1-4,6,7].

Despite the considerable number of tonsillectomies performed worldwide, differences still prevail regarding what surgical technique should be regarded as the 'ideal', and many surgeons often have a personal preference in the approach to this procedure[16]. Many surgical techniques have been adjusted and modified over the years, and many advances have been made to the surgical equipment available for performing the procedure. Common techniques include electrocautery dissection, also known as the 'hot' technique and the 'cold' dissection (using elevator and snare). Newer methods are also available but remain under investigation and these include the harmonic scalpel, ultrasonic dissector, and radiofrequency thermal ablation[17,18]. In our study, the 'hot' and 'cold' techniques were mainly employed. Out of the total 2,038 patients, 1,356 underwent tonsillectomy by 'hot' dissection and 680 underwent tonsillectomy by 'cold' dissection. Of the 1,356 patients who underwent 'hot' dissection, 71 patients (5.2%) developed PTH. On the other hand, of the 680 patients who underwent 'cold' dissection, 27 patients (4.0%) developed PTH, suggesting that the 'hot' technique is associated with a slightly higher risk of PTH in comparison with the 'cold' approach. These results are consistent with results from most studies. However, several other studies did not observe any association with the type of technique used. In a retrospective review of 495 patients, Ali *et al* observed that the incidence of PTH with hot techniques is at least double the rate of that associated with the traditional cold technique[2]. Similarly, the NPTA study[8] also found a 2.5 - 3.2 times greater risk for PTH with the use of diathermy compared with cold steel. They also advised surgeons who performed tonsillectomies using electrocautery to get adapted to an alternative technique in order to reduce the risk of peri and postoperative bleeding. On the contrary, in a recent retrospective study by Akin *et al*[19], no association was found between PTH and the type of surgical technique. Similar results were reported by Leinbach *et al*[20] who concluded, in their systematic review, that there were no meaningful differences when comparing the two techniques in terms of PTH. However, they observed that hot dissection was associated with more postoperative pain.

Furthermore, no association was found between the level of the operating surgeon and the incidence of PTH. The incidence of PTH was noted to be highest in tonsillectomies performed by middle grade surgeons (registrars / senior registrars, 45 cases; 46.0%). However, this group of surgeons also performed the highest number of procedures (1,748 out of the total of 2,038 procedures; 85.8%). Therefore, due to the unequal distribution of procedures, this result is deemed insignificant and no direct association should be implied.

CONCLUSION

Although advances in technology, in association with the production of newer and safer surgical instruments, have helped in reducing the overall incidence of complications related to tonsillectomy, PTH remains a major drawback that has the potential to be life threatening. Despite the frequency of this procedure, no level of experience can predict the occurrence of such complication and no substitute can be found for careful preoperative assessment, including a clear history and examination, and a cautious intraoperative attitude to ensure adequate hemostasis. Most importantly, patients should be clearly informed about the possible risks and complications associated with the procedure in order to allow them to make an informed decision regarding consent to surgery.

REFERENCES

1. Windfhur JP, Chen YS, Remmert S. Hemorrhage following tonsillectomy and adenoidectomy in 15,218 patients. Otolaryngol Head Neck Surg 2005; 132:281-286.
2. Ali RB, Smyth D, Kane R, Donnelly M. Post-tonsillectomy bleeding: a regional hospital experience. Ir J Med Sci 2008; 177:297-301.
3. Oswal V, Remacle M, Jovanovic S, Krespi J. Principles and practice of lasers in otorhinolaryngology and head and neck surgery. Kugler Publications 2002; 397.
4. Peterson J, Losek JD. Post-tonsillectomy haemorrhage and pediatric emergency care. Clin Pediatr (Phila) 2004; 43:445.
5. Bertelsmann Stiftung. BTI 2012 – Kuwait country report. Gutersloh: Bertelsmann Stiftung, 2012.
6. Kristensen S, Tveterås K. Post-tonsillectomy haemorrhage. A retrospective study of 1150 operations. Clin Otolaryngol Allied Sci 1984; 9:347-350.
7. Colclasure JB, Graham SS. Complications of outpatient tonsillectomy and adenoidectomy: a review of 3,340 cases. Ear Nose Throat J 1990; 69:155-160.
8. Ramsden. National Prospective Tonsillectomy Audit. Final report of an audit carried out in England and Northern Ireland between July 2003 and September 2004. Royal College of Surgeons of England. May 2005.
9. Reginald FB, Sanford MA, Ron BM, *et al*. Clinical practice guideline: Tonsillectomy in children. Otolaryngol Head Neck Surg 2011; 144:S1-30.
10. Lowe D, Meulen J, Cromwell D, Lewsey J, *et al*. Key messages from the National Prospective Tonsillectomy Audit. Laryngoscope 2007; 117:717-724.

11. Lowe D, Van Der Meulen J. Tonsillectomy technique as a risk factor for postoperative haemorrhage. Lancet 2004; 364:697-702.
12. Collison PJ, Mettler B. Factors associated with post-tonsillectomy haemorrhage. Ear Nose Throat J 2000; 79:640-642.
13. Walker P, Gillies D. Post-tonsillectomy hemorrhage rates: are they technique-dependent? Otolaryngol Head Neck Surg 2007; 136:s27.
14. Carmody D, Vamadevan T, Cooper SM. Post tonsillectomy haemorrhage. J Laryngol Otol 1982; 96:635-638.
15. Reiner SA, Sawyer WP, Clark KF, *et al*. Safety of outpatient tonsillectomy and adenoidectomy. Otolaryngol Head Neck Surg 1990; 102:161-168.
16. Gallagher TQ, Wilcox L, McGuire E, Derkay CS. Analyzing factors associated with major complications after adenotonsillectomy in 4,776 patients: Comparing three tonsillectomy techniques. Otolaryngol Head Neck Surg 2010;142:886-892.
17. Walker R, Syed Z. Harmonic scalpel tonsillectomy versus electrocautery tonsillectomy: a comparative pilot study. Otolaryngol Head Neck Surg 2001; 125:449-455.
18. Back L, Paloheimo M, Ylikoski J. Traditional tonsillectomy compared with bipolar radiofrequency thermal ablation tonsillectomy in adults. Arch Otolaryngol Head Neck Surg 2001; 127: 1106-1112.
19. Akin RC1, Holst R, Schousboe LP. Risk factors for post-tonsillectomy haemorrhage. Acta Otolaryngol 2012; 132:773-777.
20. Leinbach RF1, Markwell SJ, Colliver JA, Lin SY. Hot versus cold tonsillectomy: a systematic review of the literature. Otolaryngol Head Neck Surg 2003; 129:360-364.