International Journal of Otolaryngology and Head & Neck Surgery, 2025, 14(3), 152-165
https://www.scirp.org/journal/ijohns
ISSN Online: 2168-5460
ISSN Print: 2168-5452

Incidence and Risk Factors of Post Tonsillectomy Hemorrhage in Patients Operated during the 2016-March 2022 Period in "Mother Teresa" Hospital, Albania

Nikolina Nikolla[1], Eni Pulla[2]

[1]Department of Otorhinolaryngology, Luis Day Hospital, Tirana, Albania
[2]Department of Otorhinolaryngology, Catholic Hospital "Lady of Good Counsel", Tirana, Albania
Email: nikolinanikolla@hotmail.com, enipulla28@gmail.com

How to cite this paper: Nikolla, N. and Pulla, E. (2025) Incidence and Risk Factors of Post Tonsillectomy Hemorrhage in Patients Operated during the 2016-March 2022 Period in "Mother Teresa" Hospital, Albania. *International Journal of Otolaryngology and Head & Neck Surgery*, **14**, 152-165.
https://doi.org/10.4236/ijohns.2025.143018

Received: March 31, 2025
Accepted: May 19, 2025
Published: May 22, 2025

Abstract

Objective: Tonsillectomy is a common surgical procedure in the field of Otorhinolaryngology. Post-tonsillectomy hemorrhage remains a significant complication. The main goal of this study is to evaluate the incidence and risk factors of post-operative hemorrhage. **Methodology**: This is a retrospective study of 1369 patients who underwent tonsillectomy at "Mother Teresa" University Hospital Center, Albania from January 2016 to March 2022. The study data was obtained from the archives of the Statistics Service of the ENT-Department. 104 patients with post-tonsillectomy hemorrhage were identified. Their characteristics (age, gender), risk factors for hemorrhage, grade of hemorrhage, the day of the complication, average hospitalization and readmission to the operating room were analyzed. **Results**: At the University Hospital Center, 1369 tonsillectomies were performed from 2016 to the first quarter of 2022. The incidence of secondary hemorrhage is 7.6%, and only 1.53% of the cases required readmission to the operating room. No hemorrhage in our study resulted in death. In most cases, hemorrhage occurred on the 6th post-operative day. The risk of hemorrhage increases with age. There is no significant difference between genders. The most common indication for tonsillectomy is chronic tonsillitis. Neither the frequency nor the grade of hemorrhage is affected by the surgical indication. **Conclusion**: Tonsillectomy is considered a safe procedure for both children and adults based on the hemorrhage and mortality percentages. It is important to identify the risk factors that will determine the group of patients with the highest risk of post-tonsillectomy hemorrhage.

Keywords

Risk Factor, Post-Tonsillectomy Hemorrhage, Indication, Coagulation, Tonsillectomy, Retrospective Study

1. Introduction

Tonsillectomy is one of the most common procedures in the field of Otorhinolaryngology, yet hemorrhage post-tonsillectomy remains one of the most serious complications [1]. Significant post-tonsillectomy hemorrhage is defined as bleeding that occurs after the immediate post-operative period and requires medical attention, including observation, hospital admission, or surgical intervention. Known risk factors include gender, older age, surgical technique, indication for surgery and post-operative day. The main objective of this study is to evaluate post-tonsillectomy hemorrhage related to risk factors and to assess the incidence of this complication.

The key objectives include:

- Determining the number of tonsillectomies performed each year.
- Studying the incidence of hemorrhage in relation to the total number of tonsillectomies.
- Determining the percentage of patients readmitted to the operating room.
- Studying patient characteristics (age, gender).
- Studying the most affected age group and its relationship to indications for surgery and intraoperative blood loss.
- Evaluating the association between age and surgical indications.
- Determining the grade and frequency of hemorrhage and how risk factors influence these.
- Evaluating the distribution of hemorrhage in relation to the post-operative day.

1.1. Materials and Methods

This is a retrospective study of 1369 patients who underwent tonsillectomy at "Mother Teresa" Hospital from January 2016 to March 2022. All surgeries were performed by physicians in the ENT department or by residents under the supervision of senior physicians. To minimize variability, all surgeries were performed using cold steel dissection, with electrocautery for hemostasis (monopolar or bipolar). Surgeon experience (resident vs attending) was not considered. The interventions were performed under general anesthesia, with the Crowe-Davis mouth gag for better visualization of the tonsils. All patients were discharged without hemorrhage.

The study data was obtained from the archives of the Statistics Service for the ENT department. All patient records with a diagnosis of "post-tonsillectomy hemorrhage" were reviewed, resulting in 104 patients with this complication. Their

characteristics (age, gender), risk factors for hemorrhage, the grade and frequency of hemorrhage, the day the complication occurred, average hospital stay, readmission to the operating room, and need for transfusion were analyzed.

Inclusion Criteria:

- Patients undergoing tonsillectomy (with or without adenoidectomy) between Jan 2016 and Mar 2022
- All age groups.
- Surgeries performed at Mother Teresa Hospital ENT Department
- Tonsillectomy indications: Chronic Tonsillitis, Hypertrophic Tonsils, Peritonsillar Abscess and Tonsillar Cancer

Exclusion Criteria:

- Patients presenting with minor hemorrhage not requiring hospitalization.
- Lack of informed consent
- Incomplete or missing medical records

1.2. Statistical Analysis

After creating the base dataset with data extracted from the University Hospital Center's Statistics, the data was transferred to the SPSS 26 statistical software. SPSS 26 software was used for all statistical analyses. Figures and graphs were created in Microsoft Excel. A base table with descriptive data was constructed to show patient characteristics. Results were presented in numbers and percentages, and for continuous parameters, the mean and standard deviation were calculated.

Most parameters in the dataset were categorical, and to test the relationship/association between them, the Chi-square test and cross-tabulations were used. A logistic regression model, T-test and Fisher's Exact Test were also performed.

2. Results

2.1. Distribution of Cases According to the Total Number of Tonsillectomies

Table 1. Distribution of cases according to the total number of tonsillectomies.

Year	Total number of Tonsillectomies		Total number of hemorrhages		Hemorrhage/ tonsillectomy
	Frequency	Percentage	Frequency	Percentage	
2016	327	23.9%	23	22.1%	7.0%
2017	319	23.3%	15	14.4%	4.7%
2018	295	21.5%	20	19.2%	6.8%
2019	262	19.1%	18	17.3%	6.9%
2020	57	4.2%	10	9.6%	17.5%
2021	78	5.7%	13	12.5%	16.7%
First trimester 2022	31	2.3%	5	4.8%	16.1%
Total	1369	100.0%	104	100%	7.6%

a. Number of tonsillectomies performed and hemorrhages during the study period expressed in frequency and percentage.

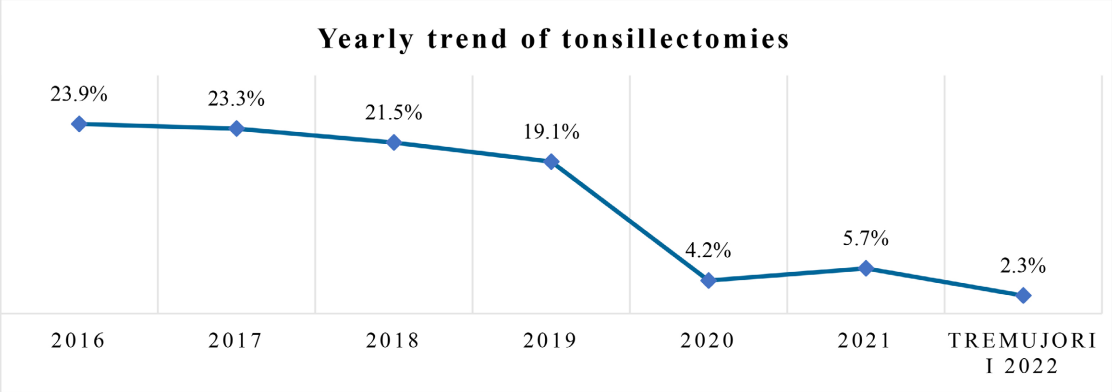

Figure 1. Trend of Tonsillectomies during 2016-March 2022.

As shown in **Figure 1**, the study period covers from 2016 to the first quarter of 2022. The collected data, in **Table 1**, showed that during this 6-year period, a total of 1369 tonsillectomies were performed. The highest number of procedures performed corresponds to the year 2016, with 23.9% of cases, while the lowest value was observed in 2022, with 2.3%, as only the first quarter of the year was included in the study. The trend of tonsillectomies gradually decreased from 2016 to 2019, followed by a significant decline in 2020, maintaining low levels in the following years.

2.2. Incidence of Secondary Hemorrhage

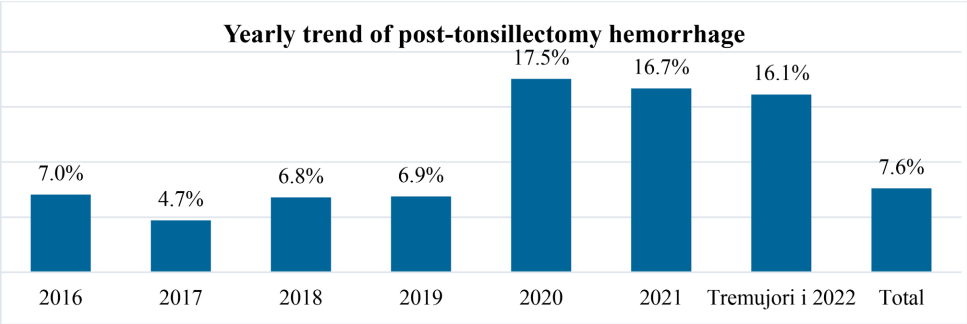

Figure 2. Tonsillectomies performed based on hemorrhagic cases.

As in **Figure 2**, for the 6-year period, the incidence of post-tonsillectomy hemorrhage is 7.6%. A more detailed examination of the data over the years reveals that among the tonsillectomies performed each year, the cases with hemorrhage are as follows: 7% for 2016, 4.7% for 2017, 6.8% for 2018, 6.9% for 2019, 17.5% for 2020, 16.7% for 2021, and 16.1% for the first quarter of 2022.

2.3. Distribution of Cases with Post Tonsillectomy Hemorrhage Based on the Need for Readmission to the Operating Room Incidence of Secondary Hemorrhage

As shown in **Table 2**, of the patients included in the study, approximately 20.2%

were readmitted to the operating room.

Table 2. Data on readmission to the operating room, expressed in frequency and percentage.

Readmission to the operating room	Frequency	Percentage
Yes	21	20.2%
No	83	79.8%

2.4. Distribution of Cases Readmitted to the Operating Room in Relation to the Total Number of Tonsillectomies Performed

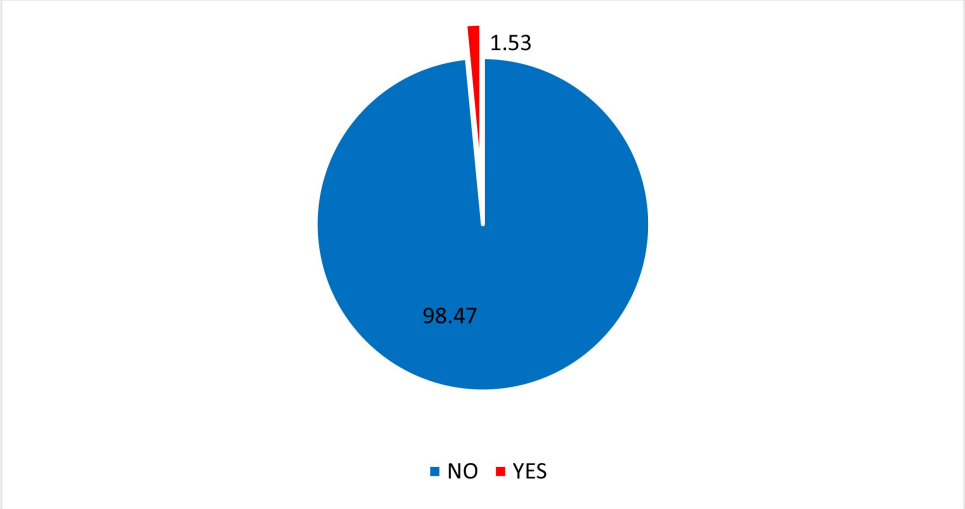

Figure 3. Distribution of cases readmitted to the operating room in relation to the total number of tonsillectomies performed.

From Figure 3, it can be observed that only 1.5% of cases were readmitted to the operating room in relation to the total number of tonsillectomies performed.

2.5. Demographic Data

Table 3. Demographic data expressed in frequency and percentage.

Demographic Data		Frequency	Percentage	p-value
Gender	Female	51	49.0%	0.844519
	Male	53	51.0%	
Age	<6 years old	15	14.4%	0.0001
	6 - 15 years old	21	20.2%	
	>15 years old	68	65.4%	

From Table 3, there is an almost equal distribution between females and males who underwent tonsillectomy, specifically, 51.1% of the cases are male and 49% are female.

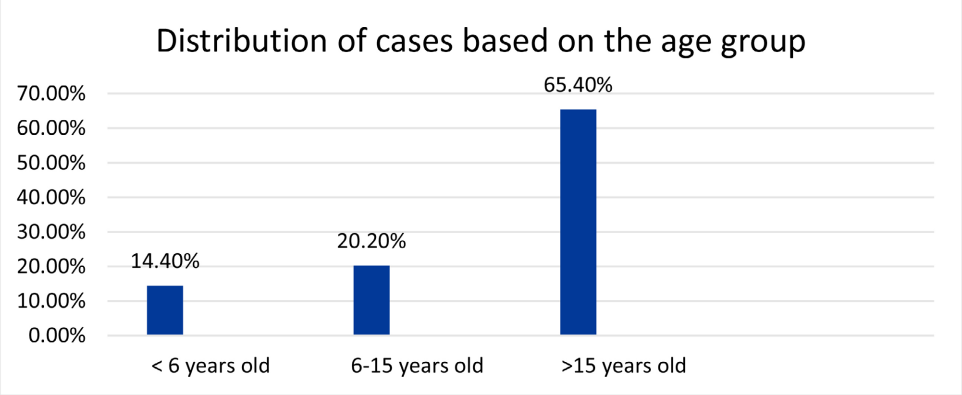

Figure 4. Distribution of cases based on the age group.

In the study, 104 cases with post-tonsillectomy were included, of which:

- 14.4% of the cases belong to the age group < 6 years
- 20.2% of the cases belong to the age group 6 - 15 years
- 65.4% of the cases belong to the age group > 15 years

Table 4. Age statistics.

Age of the patient	
Mean	21.63
SD	12.724
Minimum	3
Maximum	66

- As seen in **Figure 4**, most of the cases correspond to the age group > 15 years, compared to the other age groups, with this difference being statistically significant with $p = 0.0001$ ($p < 0.05$).
- The age of the cases included in the study ranges from 3 years to 66 years, with an average value (±SD) of 21.63 (±12.724) years, as in **Table 4**.

2.6. Age-Gender Relation

An independent samples T-test was performed to evaluate the age difference between male and female patients. The results are presented below:

Table 5. Group statistics comparing age.

Gender	Nr.	Mean Age	SD
Female	51	23.22	7.397
Male	53	20.11	5.820

Table 5 explains that the mean age (±SD) of female patients was 23.22 (±7.397) years, while the mean age for male patients was 20.11 (±5.82) years.

Table 6. Independent samples T-test for age by gender.

Test	Value
T test for equality of means (t)	1.246
Degrees of freedom (df)	102
p-value (p)	0.215
Mean difference	3.102
Standard Error (SE)	2.489
95% Confidence Interval	−1.835 to 8.040

The results of the tests in Table 6 indicate that the difference in mean age between female and male patients is not statistically significant; $p = 0.215$ ($p > 0.05$).

2.7. Distribution of Cases According to Indications for Surgery and Secondary Hemorrhage

Table 7. Distribution of cases according to indication for surgery and secondary hemorrhage.

Surgery Indication	Frequency	Percentage
Peritonsillar Abscess	20	19.2%
Tonsillar Cancer	1	1.0%
Tonsillar Hypertrophy	19	18.3%
Chronic Tonsillitis	64	61.5%

As explained in Table 7, the most common indication for surgery that resulted in secondary hemorrhage is chronic tonsillitis, accounting for 61.5% of cases, followed by tonsillar hypertrophy in 18.3% of cases and peritonsillar abscess in 19.2% of cases. Tonsil cancer constitutes only 1% of the cases.

2.8. Association between Age and Indication for Surgery

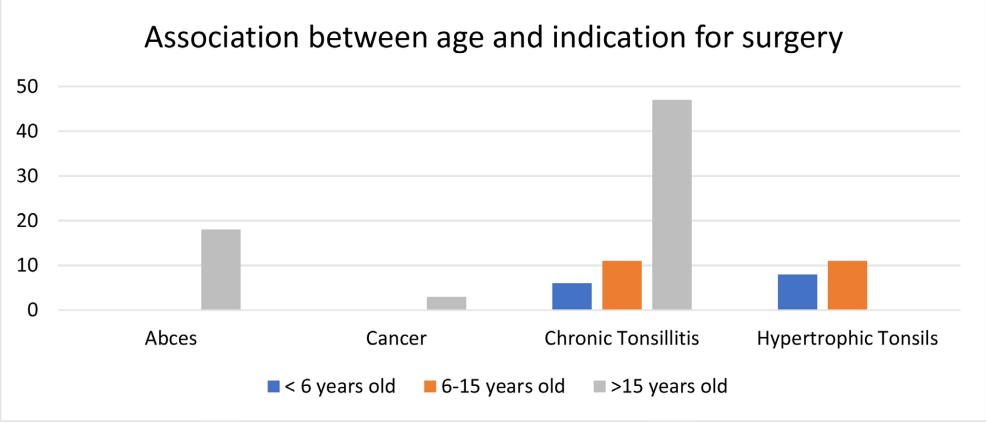

Figure 5. Association between age and indication for surgery.

From the application of the Chi-Square test, it is found that there is a significant relationship between age and the indication for surgery, $p = 0.0001$ ($p < 0.05$).

Thus, as shown in Figure 5 individuals over 15 years old have chronic tonsillitis and peritonsillar abscess as the main indications for surgery, while younger age groups primarily have hypertrophic tonsils as the indication.

2.9. Association between Age and Grade of Intraoperative Blood Loss

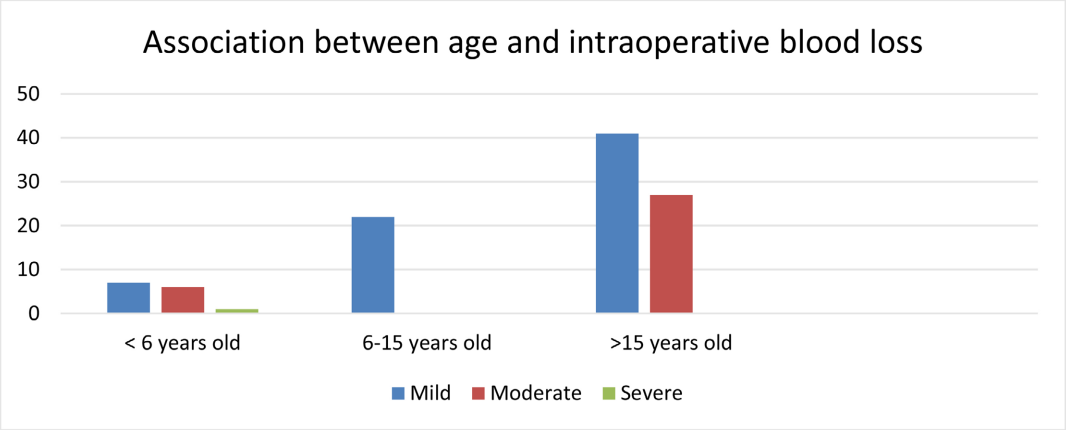

Figure 6. Distribution of cases by age and intraoperative blood loss.

From Figure 6, it can be concluded:

- The age group 0 - 6 years experiences less intraoperative bleeding but it can be mild, moderate, or abundant.
- The age group 6 - 15 years experiences more bleeding than younger children.
- The age group over 15 years is the group that experiences the most intraoperative bleeding overall, mostly mild but also moderate.

From the application of the Chi-Square test, it is found that there is a significant relationship between age group and intraoperative blood loss, $p = 0.001$ ($p < 0.05$).

2.10. Association between Grade of Bleeding and Indication for Surgery

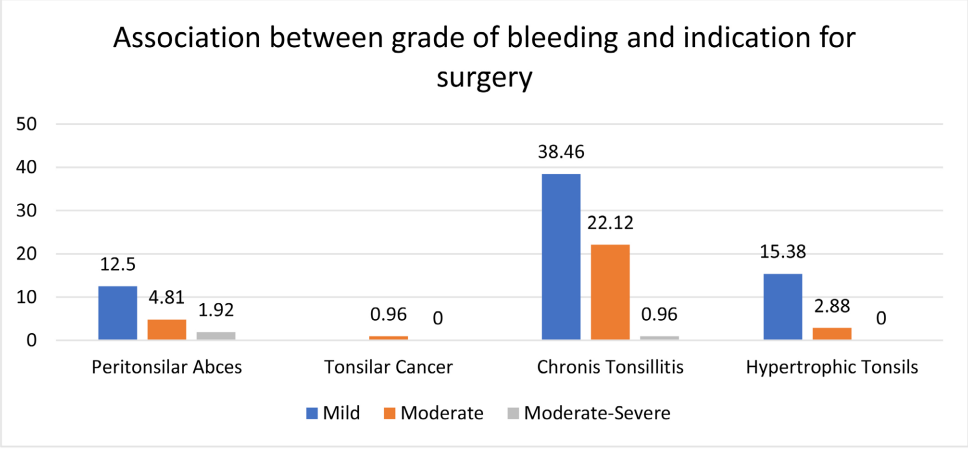

Figure 7. Grade of post-operative bleeding based on indications for surgery.

From Figure 7, it can be seen that bleeding is most commonly classified as moderate/severe for patients with the indication of peritonsillar abscess (1.92%) and chronic tonsillitis (0.96%). In the case of tonsillar carcinoma (CA), the grade of bleeding is seen to be only moderate (0.96%). Cases with tonsillar hypertrophy have mild and moderate levels of bleeding.

The application of Fisher's Exact Test revealed that there is no significant relationship between the indication for surgery and the grade of bleeding; $p = 0.109$ ($p > 0.05$).

2.11. Distribution of Cases by the Day on Which the Hemorrhage Occurred

As seen in Figure 8, the days of the onset of hemorrhage vary from the 2nd to the 23rd day after the operation. In the majority of cases, hemorrhage started on the 6th day post-operation in 15.4% of cases, followed by the 5th and 10th days, where hemorrhage was observed in 13.5% of cases. After the 10th day, a decrease in cases showing hemorrhage is observed.

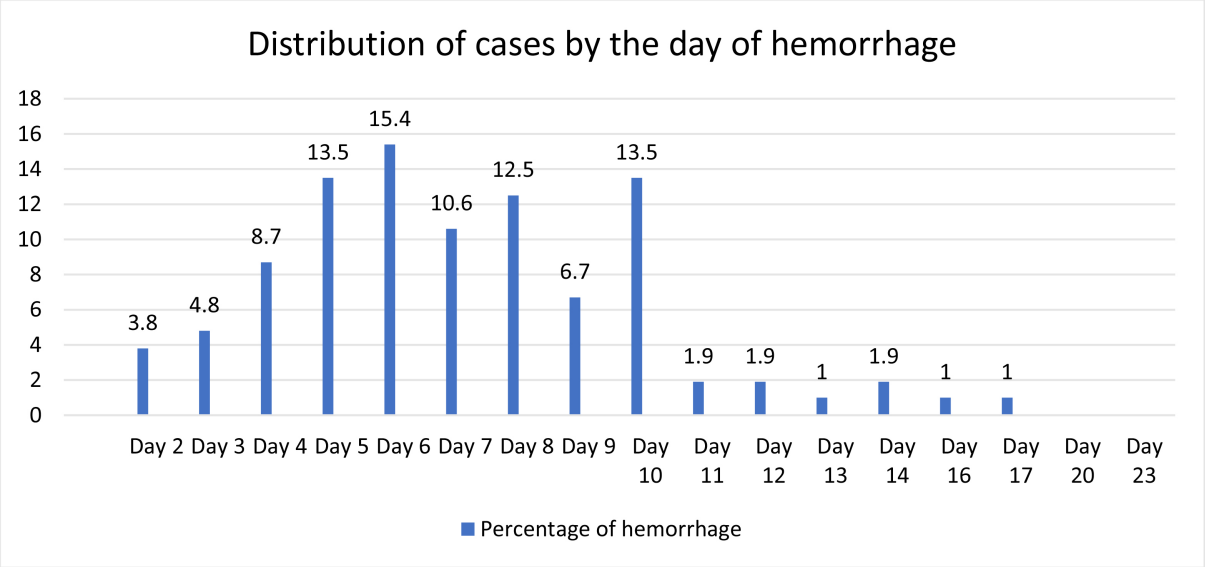

Figure 8. Distribution of cases based on the day when post-operative hemorrhage was detected.

2.12. Distribution of Cases by Hospital Stay Duration after Hemorrhage

Table 8. Distribution of cases by hospitalization.

Mean	2.08
SD	1.398
Minimum	0
Maximum	7

The hospital stays duration ranges from 0 (a few hours) to 7 days, with an average

(±SD) value of 2.08 (±1.398) days (Table 8). As seen in Figure 9, the majority of cases have a one-day hospital stay, specifically 46.2% of the cases. Cases that require a 7-day hospitalization account for 1.9% of the cases.

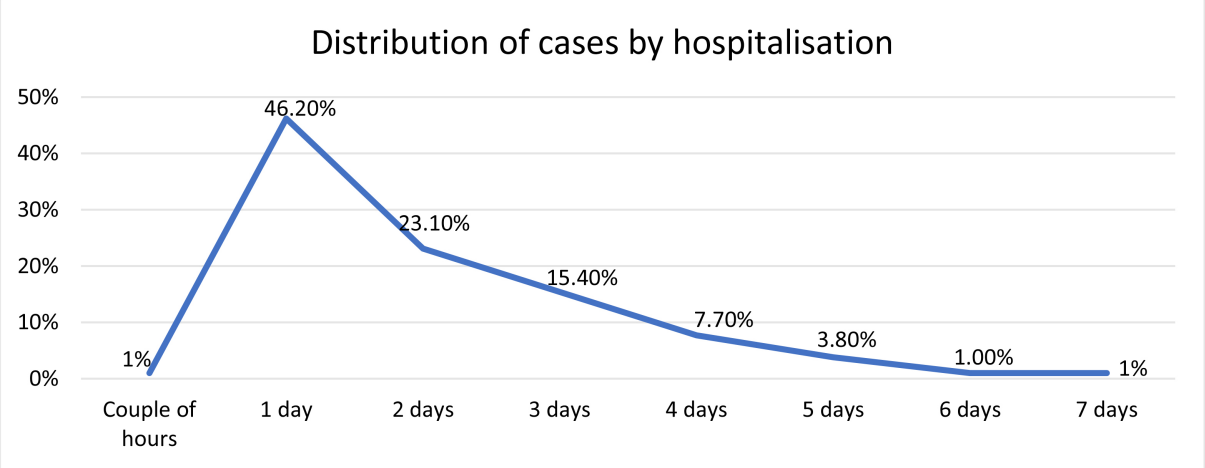

Figure 9. Distribution of cases by hospitalization.

2.13. Association between Age and Hospitalization after Hemorrhage Post Tonsillectomy

Table 9. Correlation of variables (Age-Hospital Stay).

		Days of hospitalization
Age of patient	r	0.259
	p	0.08
	N	104

From Table 9, the evaluation of the relationship between age and hospital stay duration was done through the application of Pearson correlation, which shows that this relationship is statistically significant ($p = 0.08$; $p < 0.05$), and weakly positive ($r = 0.259$).

It was observed that individuals over 15 years old tend to have a longer hospital stay, followed by the age group 6 - 15 years, and lastly the age group 0 - 6 years.

3. Discussion

In our study, the trend of tonsillectomies gradually decreased from 2016 to 2019, with a significant reduction—nearly sixfold—in 2020. This decline was primarily due to the COVID-19 pandemic and secondarily, due to a shift toward patients choosing surgical treatment in private clinics.

Although many studies have evaluated post-tonsillectomy hemorrhage, reported rates vary widely. Reference [2] conducted a review of 63 studies and concluded that the incidence of secondary hemorrhage should be on average 4.5% and not more than 13.9%. In the UK, a study involving 34,000 patients showed a

hemorrhage rate of 3.5%, with only 0.9% requiring reoperation [3]. By comparison, our study found a 7.6% hemorrhage rate and a 1.53% reoperation rate. This discrepancy may reflect broader inclusion criteria in our study, which also captured patients with documented bleeding that did not necessarily require surgical intervention. Additionally, limited patient education may have led some to interpret normal post-operative membrane sloughing as hemorrhage, prompting unnecessary visits to the emergency department.

Secondary hemorrhage in our cohort occurred between post-operative days 2 and 23, with a peak incidence on day 6, followed by days 5 and 10. This trend is consistent with prior findings as in [4], who attributed the peak incidence to the sloughing of fibrin from the tonsillar fossa.

Age emerged as a statistically significant risk factor, with the majority of cases corresponding to patients over 15 years, although the ages ranged from 3 to 66 years old. These conclusions align with prior international studies [5]-[8]. Adults tend to have a longer history of chronic tonsillitis, resulting in increased fibrosis and adhesions that complicate dissection and may increase the risk of intraoperative and delayed bleeding.

References [8] [9] both emphasize that increased fibrosis and adhesions in adult patients may contribute to a more challenging dissection and greater bleeding risk. While our overall hemorrhage rate (7.6%) is slightly above the average reported in literature (4.5% to 6.4%) [3] [4]. This discrepancy may reflect broader criteria for identifying hemorrhage in our study, including cases not requiring surgical intervention.

Clinically, the findings suggest that age is a significant independent risk factor and should guide both perioperative counseling and post-operative care. In particular, adults undergoing tonsillectomy for chronic tonsillitis or peritonsillar abscess may benefit from enhanced monitoring and early follow-up. Most hemorrhages occurred around post-operative day 6, supporting previous research linking bleeding to the sloughing of fibrin from the tonsillar fossa.

To reduce the incidence and severity of hemorrhage, we recommend the following: clear patient instructions on diet and physical activity during the first 10 post-operative days, early identification of at-risk individuals (e.g., adults, those with chronic tonsillitis), and consideration of meticulous intraoperative hemostasis techniques. Where possible, the use of standardized surgical methods and improved patient education could play a key role in reducing late post-operative complications. Additionally, creating structured follow-up protocols, particularly between days 5 and 10, may help in the early detection and management of bleeding episodes.

A significant association was also found between age and the indication for surgery. Children under 15 were more commonly operated on for hypertrophic tonsils, while patients over 15 were typically treated for chronic tonsillitis or peritonsillar abscess—again consistent with findings in [9] [10].

There was no significant gender difference in hemorrhage rates, although other

studies as in [11] and [8], have suggested that male patients may be more prone to post-operative bleeding due to hormonal factors and behavioral tendencies such as less cautious eating during recovery.

Chronic tonsillitis was the most frequent indication for surgery in hemorrhage cases (61.5%), followed by peritonsillar abscess (19.2%) and tonsillar hypertrophy (18.3%). Our results differ slightly from [9], which reported a lower rate of hemorrhage associated with peritonsillar abscess. This may be due to our older patient population. Notably, our analysis found no relationship between surgical indication and the grade of hemorrhage.

Importantly, no deaths occurred in our cohort. This is consistent with data from the USA and Europe, where mortality rates following tonsillectomy are extremely low ranging from 0.01% to 0.03% as in [12]. Further supporting the conclusion that tonsillectomy remains a safe procedure.

Hospital stays ranged from a few hours to seven days, with an average of 2.08 days. Most patients (46.2%) were hospitalized for one day. A statistically significant association was observed between age and hospital stay length, with older patients tending to require longer admission. This likely reflects their increased risk of bleeding and slower recovery. Reference [13] reported similar trends in Austria, with an average hospital stay of 2.9 days.

4. Limitations

This study has several limitations inherent to its retrospective design.

- It relies on the accuracy and completeness of medical records, which may have led to underreporting of minor hemorrhagic events that did not require hospitalization.
- Although all surgeons reportedly used similar techniques, potential variability in surgical skill, intraoperative hemostasis methods, and post-operative care could not be fully controlled.
- We did not account for comorbid conditions, medications (e.g., anticoagulants), or patient adherence to post-operative instructions, all of which may influence bleeding risk.
- The calculation of the exact post-operative day on which hemorrhage occurred may be subject to error, depending on patient-reported history.
- Some patients may have mistaken normal membrane sloughing for hemorrhage and presented it to the emergency room prematurely, which may have led to an overestimation of hemorrhage cases.
- The lack of long-term follow-up data limits our ability to assess late complications or delayed hemorrhagic episodes occurring after the documented hospital encounter.

5. Conclusion

In summary our findings show that the incidence of secondary hemorrhage increases with age, but there was no significant difference between genders. No hem-

orrhage in our study resulted in death. In most cases, it occurred on the 6th postoperative day. The most common indication for tonsillectomy is chronic tonsillitis. The grade of hemorrhage is not affected by the surgical indication. It is important to highlight these risk factors so that the mortality and morbidity of hemorrhages will be reduced.

Acknowledgments

We would like to extend our gratitude to all our patients who participated in this study and to the staff of Otorhinolaryngology Department in "Mother Teresa" University Hospital.

Conflicts of Interest

The authors declare that there is no conflict of interest regarding this study, and it has never been published in whole or in any specific parts.

References

[1] Huyett, P.D.J. (2018) Tonsillectomy. In: Myers EN, S.C., Ed., *Operative Otolaryngology Head and Neck Surgery*, Elsevier, 1566.

[2] Blakley, B.W. (2009) Post-Tonsillectomy Bleeding: How Much Is Too Much? *Otolaryngology—Head and Neck Surgery*, **140**, 288-290. https://doi.org/10.1016/j.otohns.2008.12.005

[3] Lowe, D., van der Meulen, J., Cromwell, D., Lewsey, J., Copley, L., Browne, J., *et al.* (2007) Key Messages from the National Prospective Tonsillectomy Audit. *The Laryngoscope*, **117**, 717-724. https://doi.org/10.1097/mlg.0b013e318031f0b0

[4] Wei, J.L., Beatty, C.W. and Gustafson, R.O. (2000) Evaluation of Posttonsillectomy Hemorrhage and Risk Factors. *Otolaryngology—Head and Neck Surgery*, **123**, 229-235. https://doi.org/10.1067/mhn.2000.107454

[5] Maksimovic, Z.V.T.T. (2007) Incidence of Post-Tonsillectomy and Post-Tonsillectomy Hemorrhage in 5125 Patients Operated during the 1994-2005 Period at Department of ENT Head and Neck Surgery, Osijek University Hospital. *Acta Clinica Croatica*, **46**, 247-250.

[6] Negm, H., Atef, A., Lasheen, H., Kamel, A.A., Azooz, K. and Elhoussainy, O. (2017) Factors Affecting Secondary Post-Tonsillectomy Hemorrhage: A Case-Control Study. *The Egyptian Journal of Otolaryngology*, **33**, 50-55. https://doi.org/10.4103/1012-5574.199414

[7] Tomkinson, A., Harrison, W., Owens, D., Fishpool, S. and Temple, M. (2012) Post-Operative Hemorrhage Following Adenoidectomy. *The Laryngoscope*, **122**, 1246-1253. https://doi.org/10.1002/lary.23279

[8] Windfuhr, J.P., Chen, Y.S. and Remmert, S. (2005) Hemorrhage Following Tonsillectomy and Adenoidectomy in 15,218 Patients. *Otolaryngology—Head and Neck Surgery*, **132**, 281-286. https://doi.org/10.1016/j.otohns.2004.09.007

[9] Kwok, M.M., Subramaniyan, M., Rimmer, J. and Karahalios, A. (2018) Post-Tonsillectomy Haemorrhage in Australia—A Multivariable Analysis of Risk Factors. *Australian Journal of Otolaryngology*, **1**, 1-8. https://doi.org/10.21037/ajo.2018.01.06

[10] Perkins, J.N., Liang, C., Gao, D., Shultz, L. and Friedman, N.R. (2012) Risk of Post-Tonsillectomy Hemorrhage by Clinical Diagnosis. *The Laryngoscope*, **122**, 2311-

2315. https://doi.org/10.1002/lary.23421

[11] Coordes, A., Soudry, J., Hofmann, V.M. and Lenarz, M. (2016) Gender-Specific Risk Factors in Post-Tonsillectomy Hemorrhage. *European Archives* of *Oto-Rhino-Laryngology*, **273**, 4535-4541. https://doi.org/10.1007/s00405-016-4146-7

[12] Chen, M.M., Roman, S.A., Sosa, J.A. and Judson, B.L. (2014) Safety of Adult Tonsillectomy. *JAMA Otolaryngology–Head & Neck Surgery*, **140**, 197-202. https://doi.org/10.1001/jamaoto.2013.6215

[13] Sarny, D.M. (2010) Study on All Patients Undergoing Tonsillectomy, Tonsillotomy or Adenoidectomy in Austria in 2009-2010.