Avicenna Anatolian Journal of Medicine

Original Article

Tonsillar Actinomycosis as a Cause of Asymmetric Tonsil Hypertrophy

Authors & Affiliations

Başak Yalçıner

Department of Otolaryngology-Head and Neck Surgery, Bilkent City Hospital, Ankara, Türkiye

Corresponding Author: Başak Yalçıner, M.D., Department of Otolaryngology-Head and Neck Surgery, Bilkent City Hospital, Ankara, Türkiye.
E-mail: basakalanyali91@gmail.com

Submitted at: 01.11.2025 - Accepted at: 17.11.2025 - Published at: 19.11.2025

Avicenna Anatol J Med. Year; 2025, Volume: 2, Issue: 2
doi 10.5281/zenodo.17639612

Abstract

Background: Actinomyces are organisms in the oropharynx that can colonize tonsillar tissue. This study aimed to determine the prevalence of tonsillar actinomycosis in patients with asymmetric tonsil enlargement and identify associated clinical factors.

Methods: This retrospective cohort study included 132 adult patients who underwent tonsillectomy for asymmetric tonsil enlargement between 2019 and 2024. Clinical data including age, sex, and tonsil grade were collected. All specimens underwent histopathological examination with hematoxylin and eosin staining to identify Actinomyces colonization.

Results: Actinomyces colonization was identified in 18 of 132 patients (13.64%). The mean age of Actinomyces-positive patients was significantly higher than Actinomyces-negative patients (58.78 ± 19.43 vs. 41.05 ± 18.47 years, p=0.0009). Age-stratified analysis showed progressive increase in prevalence with age, reaching 34.38% in patients ≥61 years. No significant sex difference was observed (p=0.447). Higher tonsil grades were strongly associated with Actinomyces colonization, with Grade 4 tonsils showing prevalence rates of 31.25% (right) and 37.50% (left).

Conclusions: Tonsillar actinomycosis should be considered in the differential diagnosis of asymmetric tonsil hypertrophy, particularly in older patients with higher grade enlargement. Histopathological examination remains essential for accurate diagnosis and appropriate management.

Keywords: Actinomyces, Hypertrophy, Palatine Tonsil/pathology, Tonsillectomy

INTRODUCTION

Actinomyces species are Gram-positive, anaerobic, filamentous bacteria that exist as part of the normal flora of the oropharynx and gastrointestinal tract (1). While these organisms typically remain nonpathogenic, they can cause opportunistic infections when mucosal barriers are disrupted or local tissue conditions favor bacterial proliferation (2,3).

Cervicofacial actinomycosis represents the most common form of actinomycotic infection, accounting for approximately 55% of cases (4). Within the head and neck region, tonsillar involvement has been documented with varying prevalence rates ranging from 0.8% to 61.6% across different studies (2). This wide variation has been attributed to differences in patient populations, diagnostic techniques, and histopathological examination protocols.

The clinical significance of Actinomyces colonization in tonsillar tissue remains controversial. While some authors consider it merely a saprophytic colonization without pathological significance, others have suggested a potential etiological role in tonsillar hypertrophy and recurrent tonsillitis (5-8). The pathogenesis is thought to involve proteolytic enzymes released by Actinomyces that diminish the oxidation-reduction potential in tonsillar crypts, leading to bacterial proliferation and tissue inflammation (9).

Asymmetric tonsil enlargement presents a diagnostic challenge for clinicians, as it may indicate various pathologies ranging from benign inflammatory conditions to malignancies such as squamous cell carcinoma or lymphoma (10,11). In rare cases, actinomycosis can cause massive unilateral tonsillar hypertrophy that mimics neoplasia (12,13). The diagnosis is often made incidentally upon histopathological examination of tonsillectomy specimens.

Several factors have been associated with tonsillar actinomycosis in previous studies. Advanced age has been consistently reported as a risk factor, with higher prevalence observed in adults compared to children (14). Additionally, associations with tonsil size, degree of hypertrophy, and certain systemic conditions have been suggested, though findings remain inconsistent across studies (7,9).

Despite numerous reports on tonsillar actinomycosis, comprehensive data specifically focusing on patients with asymmetric tonsil enlargement are limited. Understanding the prevalence and clinical characteristics of actinomycosis in this specific patient population is crucial for appropriate clinical decision-making and patient counseling. This study aimed to determine the prevalence of tonsillar actinomycosis in a cohort of patients with asymmetric tonsil enlargement and to identify associated demographic and clinical factors.

METHODS

Study Design and Setting

This retrospective cohort study was conducted at our tertiary referral center between 2019 and 2024. The study protocol was approved by the institutional ethics committee. We included all adult patients (age ≥18 years) who underwent tonsillectomy for asymmetric tonsil enlargement. Exclusion criteria were age <18 years and absence of histopathological examination results.

Patient Selection

A total of 132 patients met the inclusion criteria and were enrolled in the study. Clinical data including age, sex, tonsil grade (1-4 scale), and histopathological findings were retrospectively collected from medical records. Tonsil grade was assessed clinically by the operating surgeon using the Brodsky grading system[26] (Grade 1: tonsils hidden within pillars; Grade 2: tonsils extending to pillars; Grade 3: tonsils extending beyond pillars; Grade 4: tonsils significantly obstructing oropharyngeal airway).

Histopathological Examination

All tonsillectomy specimens were fixed in 10% formalin and processed routinely for histopathological examination. Sections were stained with hematoxylin and eosin. The presence of Actinomyces colonies was determined by experienced pathologists based on characteristic morphological features including basophilic filamentous aggregates arranged in a radial spoke-like pattern within tonsillar crypts, the so-called 'ray-fungus' appearance15. Histopathological diagnoses were categorized as follows: chronic inflammation, chronic inflammation with follicular hyperplasia, Actinomyces colonization, and other pathologies including malignancy, lymphoma, and tuberculosis.

STATISTICAL ANALYSIS

Continuous variables were expressed as mean ± standard deviation (SD) and median with range. Categorical variables were presented as frequencies and percentages. The normality of distribution was assessed using visual inspection and Kolmogorov-Smirnov test. Mann-Whitney U test was used to compare continuous variables between Actinomyces-positive and Actinomyces-negative groups, as the data did not follow a normal distribution. Chi-square test or Fisher's exact test was applied for categorical variables, as appropriate. The relationship between tonsil grade and Actinomyces colonization was analyzed using Mann-Whitney U test for comparing mean grades and chi-square test for comparing proportions across grade categories. Age groups were created using the following cutoffs: 18-30, 31-40, 41-50, 51-60, and ≥61 years. Prevalence rates with 95% confidence intervals were calculated for each subgroup. A p-value <0.05 was considered statistically significant. All statistical analyses were performed using Python 3.12 with pandas, numpy, and scipy libraries.

RESULTS

Patient Characteristics

A total of 132 patients with asymmetric tonsil enlargement who underwent tonsillectomy were included in this study. The mean age was 43.47 ± 19.51 years (range: 18-85 years, median: 39 years). The cohort consisted of 66 male (50.0%) and 66 female (50.0%) patients. Histopathological examination was performed on 126 (95.5%) right tonsils and 121 (91.7%) left tonsils.

Actinomyces Prevalence

Actinomyces colonization was identified in 18 of 132 patients (13.64%). Specifically, 8 patients (6.35%) had Actinomyces in the right tonsil, 12 patients (9.92%) in the left tonsil, with some patients showing bilateral involvement. The distribution of histopathological findings is presented in **Table 1.**

Age and Actinomyces Colonization

The mean age of Actinomyces-positive patients was significantly higher than that of Actinomyces-negative patients (58.78 ± 19.43 years vs. 41.05 ± 18.47 years, p=0.0009, Mann-Whitney U test). Age-stratified analysis revealed a progressive increase in

Table 1. Histopathological Distribution in Right and Left Tonsils

Histopathological Diagnosis	Right Tonsil n (%)	Left Tonsil n (%)	Total n (%)
Chronic inflammation	91 (72.2)	96 (79.3)	187 (75.7)
Chronic inflammation + follicular hyperplasia	11 (8.7)	9 (7.4)	20 (8.1)
Actinomyces colonization	8 (6.3)	12 (9.9)	20 (8.1)
Other pathologies*	16 (12.7)	4 (3.3)	20 (8.1)
Total	126 (100)	121 (100)	247 (100)

Table 2. Age Distribution and Actinomyces Prevalence by Age Group

Age Group (years)	Total n	Actinomyces (+) n	Prevalence (%)
18-30	46	3	6.52
31-40	17	0	0.00
41-50	26	2	7.69
51-60	24	4	16.67
≥61	19	9	34.38
Total	132	18	13.64

Actinomyces prevalence with advancing age, with the highest prevalence observed in patients aged ≥61 years (34.38%) compared to the youngest age group of 18-30 years (6.52%) (**Table 2**).

Sex Distribution and Actinomyces Colonization

Actinomyces colonization was observed in 11 of 66 female patients (16.67%) and 7 of 66 male patients (10.61%). Although the prevalence was numerically higher in females, this difference did not reach statistical significance (p=0.447, chi-square test).

Tonsil Grade and Actinomyces Colonization

A strong association was identified between tonsil grade and Actinomyces colonization in both right and left tonsils. The mean tonsil grade was significantly higher in Actinomyces-positive patients compared to Actinomyces-negative patients (right tonsil: 3.62 vs. 2.18, p=0.0002; left tonsil: 3.33 vs. 1.88, p<0.0001, Mann-Whitney U test). Actinomyces colonization was not detected in Grade 1 tonsils in either the right or left side. The prevalence increased progressively with higher grades, reaching 31.25% in Grade 4 right tonsils and 37.50% in Grade 4 left tonsils (**Table 3**).

DISCUSSION

This retrospective study of 132 patients with asymmetric tonsil enlargement demonstrates a 13.64% prevalence of tonsillar actinomycosis, with a strong association between advanced age, higher tonsil grade, and Actinomyces colonization. Our findings contribute to the literature examining the clinical significance of Actinomyces in tonsillar pathology and highlight important considerations for the differential diagnosis of asymmetric tonsil enlargement.

The prevalence of tonsillar actinomycosis in our cohort (13.64%) falls within the wide range reported in the literature (0.8-61.6%) (2). This variability across studies likely reflects differences in patient populations, indications for tonsillectomy, and histopathological examination protocols. Studies focusing specifically on patients with obstructive symptoms or tonsillar hypertrophy have generally reported higher prevalence rates (7,8). Our study focuses on asymmetric tonsil enlargement, a clinical presentation that often raises concern for malignancy and warrants careful evaluation.

The strong association between advanced age and Actinomyces colonization observed in our study is consistent with multiple previous reports (9,16). The mean age of Actinomyces-positive patients in our cohort was 58.78 years, significantly higher than the 41.05 years observed in Actinomyces-negative patients. Age-stratified analysis revealed a striking increase in prevalence from 6.52% in the 18-30 age group to 34.38% in patients ≥61 years. This age-related pattern has been attributed to cumulative exposure to predisposing factors, age-related changes in tonsillar tissue architecture, and potential alterations in local immunity (17). The tonsillar crypts in older individuals may provide a more favorable anaerobic environment for Actinomyces proliferation.

A particularly noteworthy finding of our study is the strong correlation between tonsil grade and Actinomyces colonization. Grade 4 tonsils demonstrated prevalence rates of 31.25% (right) and 37.50% (left), while no Actinomyces was detected in Grade 1 tonsils on the right side and only 7.69% on the left side. This gradient suggests a potential pathogenic role for Actinomyces in tonsillar hypertrophy, supporting the hypothesis proposed by Pransky et al. and Kutluhan et al. who demonstrated similar associations (7,8). The absence of Actinomyces in lower-grade tonsils and its increasing prevalence with higher grades argues against purely saprophytic colonization and suggests active participation in the hypertrophic process.

Several mechanisms have been proposed to explain how Actinomyces might contribute to tonsillar hypertrophy.

Table 3. Tonsil Grade and Actinomyces Colonization

Tonsil Side	Grade	Total n	Actinomyces (+) n	Prevalence (%)
Right	1	39	0	0.00
Right	2	35	0	0.00
Right	3	42	3	7.14
Right	4	16	5	31.25
Left	1	60	0	0.00
Left	2	26	2	7.69
Left	3	30	4	13.33
Left	4	16	6	37.50

Lord first suggested in 1910 that toxins produced by Actinomyces could cause tonsillar enlargement (18). More recent studies have focused on the role of proteolytic enzymes secreted by these organisms, which diminish the oxidation-reduction potential in tonsillar tissue, creating favorable conditions for bacterial proliferation and inducing lymphoid hyperplasia through chronic antigenic stimulation (9). The formation of characteristic sulfur granules and associated inflammatory response may further perpetuate tissue enlargement.

Contrary to earlier studies by Pransky et al. and Bhargava et al. who reported higher prevalence in males, our study found no significant sex difference (p=0.447) (7,9). While females showed numerically higher prevalence (16.67% vs. 10.61%), this difference lacked statistical significance. The discrepancy with previous studies may reflect variations in patient selection criteria, as our focus on asymmetric enlargement might select for a different patient population compared to studies examining recurrent tonsillitis or obstructive symptoms alone.

An important clinical implication of our findings relates to the differential diagnosis of asymmetric tonsil enlargement. While malignancy remains a primary concern in such presentations, our data suggest that actinomycosis should be considered, particularly in older patients with high-grade enlargement. In our cohort, 10 patients showed squamous cell carcinoma (8 right tonsils, 2 left tonsils), emphasizing the need for histopathological examination in all cases of significant asymmetric enlargement. Several case reports have documented actinomycosis mimicking tonsillar neoplasia (12,13,19). The clinical challenge lies in distinguishing between these entities preoperatively, as imaging findings are often nonspecific.

The controversy regarding the clinical significance of tonsillar actinomycosis persists in the literature. While some authors consider Actinomyces merely a commensal organism without pathological significance, others, including Zięba et al. in a comprehensive study of 481 tonsillectomy patients, concluded that Actinomyces should be considered saprophytes of the oropharyngeal microflora with no significant relationship to tonsillar pathology (2,5,6). However, studies by Hari et al. and our current findings differ from this view, demonstrating associations between Actinomyces colonization and tonsillar characteristics (3).

Treatment considerations for tonsillar actinomycosis remain a subject of debate. Classical cervicofacial actinomycosis may require prolonged high-dose penicillin therapy (20).However, whether tonsillar colonization in the absence of invasive disease warrants such aggressive antimicrobial therapy is unclear. Most cases in our series were discovered incidentally after tonsillectomy performed for other indications. Tonsillectomy alone appears curative for localized tonsillar actinomycosis, as suggested by Bhargava et al9. However, some authors advocate for a trial of prolonged antibiotic therapy before surgery in cases of obstructive symptoms, based on the hypothesis that Actinomyces contributes to tonsillar hypertrophy (7).

Several limitations of our study warrant acknowledgment. The retrospective design limits our ability to establish causality between Actinomyces colonization and tonsillar hypertrophy. We lacked detailed information on symptoms duration, previous antibiotic use, and other potential confounding factors. The absence of microbiological culture data prevents species-level identification of Actinomyces isolates. Additionally, we did not systematically assess for histological evidence of tissue invasion versus superficial colonization, which might help distinguish pathogenic from commensal organisms. Prospective studies with comprehensive clinical and microbiological data would provide more definitive insights into the pathogenic role of tonsillar Actinomyces.

Future research directions should include prospective studies examining clinical outcomes after medical versus surgical management of patients with tonsillar actinomycosis, molecular characterization of Actinomyces species involved in tonsillar colonization, and investigation of host factors that predispose to Actinomyces colonization and potential pathogenesis. Understanding the microbiome composition of hypertrophic versus normal tonsils might reveal whether Actinomyces acts independently or as part of a polymicrobial community in promoting tonsillar disease.

CONCLUSION

Tonsillar actinomycosis is present in a significant proportion (13.64%) of patients with asymmetric tonsil enlargement, with particularly high prevalence in older individuals and those with high-grade tonsillar hypertrophy. The strong associations between Actinomyces colonization, advanced age, and higher tonsil grade suggest a potentially pathogenic rather than purely saprophytic role for these organisms in tonsillar hypertrophy.

Clinically, actinomycosis should be included in the differential diagnosis of asymmetric tonsil enlargement, especially in patients over 60 years of age with Grade 3 or 4 hypertrophy. While malignancy remains a critical consideration, histopathological examination is essential for accurate diagnosis and appropriate management planning. Tonsillectomy alone appears to be curative for localized tonsillar actinomycosis, though the role of antibiotic therapy in cases detected preoperatively requires further investigation.

These findings underscore the importance of routine histopathological examination of all tonsillectomy specimens, particularly in cases of asymmetric enlargement where the clinical suspicion for various pathologies must be carefully evaluated. Further prospective studies are needed to elucidate the exact pathogenic mechanisms of Actinomyces in tonsillar disease and to optimize management strategies for affected patients.

DECLARATIONS

Ethics Committee Aproval: The study protocol was approved by the institutional ethics committee.

Financial Disclosure: The authors declared that this study has received no financial suppor.

Author Contributions: Author approved the final version

Conflict of Interest Statement: The author has no conflicts of interest to declare.

Informed consent form: Not Applicable.

Funding source: No funding was received fort he research

Artificial Intelligence: The author declares that they have not used any type of generative artificial intelligence for the writing of this manuscript, nor for the creation of images, graphics, tables, or their corresponding captions.

REFERENCES

1. Valour F, Sénéchal A, Dupieux C, et al. Actinomycosis: etiology, clinical features, diagnosis, treatment, and management. Infect Drug Resist. 2014;7:183-197. doi:10.2147/IDR.S39601
2. Zięba N, Miśkiewicz-Orczyk K, Misiołek M, Ścierski W. The clinical significance of tonsillar Actinomyces in histopathological samples after tonsillectomy. Pathogens. 2023;12(12):1384. doi:10.3390/pathogens12121384
3. Hari KR, Maharaj S, Motakef S, Essa R. The role of tonsillar actinomycosis in adult patients. Aust J Otolaryngol. 2020;3:30. doi:10.21037/ajo-19-38
4. Wong VK, Turmezei TD, Weston VC. Actinomycosis. BMJ. 2011;343:d6099. doi:10.1136/bmj.d6099
5. Gaffney R, Harrison M, Walsh M, Sweeney E, Cafferkey M. The incidence and role of Actinomyces in recurrent acute tonsillitis. Clin Otolaryngol Allied Sci. 1993;18(4):268-271. doi:10.1111/j.1365-2273.1993.tb00845.x
6. van Lierop AC, Prescott CAJ, Sinclair-Smith CC. An investigation of the significance of Actinomycosis in tonsil disease. Int J Pediatr Otorhinolaryngol. 2007;71(12):1883-1888. doi:10.1016/j.ijporl.2007.08.021
7. Pransky SM, Feldman JI, Kearns DB, Seid AB, Billman GF. Actinomycosis in obstructive tonsillar hypertrophy and recurrent tonsillitis. Arch Otolaryngol Head Neck Surg. 1991;117(8):883-885. doi:10.1001/archotol.1991.01870200077012
8. Kutluhan A, Salviz M, Yalçıner G, Kandemir O, Yeşil C. The role of the Actinomyces in obstructive tonsillar hypertrophy and recurrent tonsillitis in pediatric population. Int J Pediatr Otorhinolaryngol. 2011;75(3):391-394. doi:10.1016/j.ijporl.2010.12.014
9. Bhargava D, Bhusnurmath B, Sundaram KR, et al. Tonsillar actinomycosis: a clinicopathological study. Acta Trop. 2001;80(2):163-168. doi:10.1016/s0001-706x(01)00172-3
10. Guimarães AC, de Carvalho GM, Correa CRS, Gusmão RJ. Association between unilateral tonsillar enlargement and lymphoma in children: a systematic review and meta-analysis. Crit Rev Oncol Hematol. 2015;93(3):304-311. doi:10.1016/j.critrevonc.2014.11.003
11. Mughal Z, Jangan A, Ahmad A, Turner N, Mughal F. Assessing asymmetrical tonsils in children: an evidence-based review for primary care. Br J Gen Pract. 2024;74(739):93-94. doi:10.3399/bjgp24X736377
12. Yadav SP, Chanda R, Gathwala G, Yadav RK. Actinomycosis of tonsil masquerading as tumour in a 12-year old child. Int J Pediatr Otorhinolaryngol. 2002;63(1):73-75. doi:10.1016/S0165-5876(01)00647-4
13. Karaca R, Karaca S. Tonsillar actinomycosis that mimics tonsillar neoplasm. Oral Radiol. 2022;38(1):171-174. doi:10.1007/s11282-021-00535-5
14. Melgarejo Moreno P, Hellin Meseguer D, Marco Garrido A, et al. A correlation between age and Actinomyces in the adenotonsillar tissue of children. B-ENT. 2006;2(2):95-97.
15. Maharjan S. Actinomycosis with tonsillar diseases and its clinical significance. Glob J Otolaryngol. 2017;7(4):555714. doi:10.19080/GJO.2017.07.555714
16. Toh ST, Yuen HW, Goh YH. Actinomycetes colonization of tonsils: a comparative study between patients with and without recurrent tonsillitis. J Laryngol Otol. 2007;121(8):775-778. doi:10.1017/S0022215106003185
17. Kansu L. Relation of Actinomyces with tonsillar hypertrophy and antibiotic use. Turk Arch Otolaryngol. 2017;55(1):17-21. doi:10.5152/tao.2017.2176
18. Lord FT. The etiology of Actinomycosis the presence of Actinomycetes in the contents of carious teeth and the tonsillar crypts of patients without Actinomycosis. JAMA. 1910;55(15):1261-1263. doi:10.1001/jama.1910.04330150021008
19. Rasić D, Perić A, Vukomanović-Durdević B. A case of an unilateral tonsillar hypertrophy caused by actinomycosis. Acta Med (Hradec Kralove). 2010;53(1):31-33. doi:10.14712/18059694.2016.60
20. Herrero Martínez JA, Gómez Gómez J, García Vázquez E, Hernández Torres A. Actinomicosis. Medicina (B Aires). 2014;11(58):3419-3425. doi:10.1016/S0304-5412(14)70794-2