

ORIGINAL RESEARCH

INCIDENTAL HISTOPATHOLOGICAL DIAGNOSIS OF TONSILLAR ACTINOMYCOSIS: 1 YEAR STUDY

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ABSTRACT

Actinomycosis in the tonsils is rare, despite the fact that the bacteria causing it are normally present in the mouth and throat and can colonize the tonsillar crypts, potentially leading to infection even in healthy individuals. Diagnosis is often incidental in tonsillectomy specimens sent to the pathology department for varied diseases. This study over the course of one year examined tonsillectomy samples and tonsillar biopsies that were initially diagnosed with chronic tonsillitis. The specimens were fixed in formalin, embedded in paraffin, and stained using various methods: haematoxylin and eosin (H&E) for general tissue structure, Gomori's Methenamine Silver (GMS) to highlight fungal and certain bacterial elements, and Periodic Acid-Schiff (PAS) to identify polysaccharides and specific bacteria.

The study aimed to detect actinomycosis in tonsillectomy specimens and tonsillar biopsies, as this infection is often found by chance. Using various staining techniques enhances the chances of identifying actinomycosis, which might be missed with routine methods. Accurate diagnosis and treatment depend on recognizing this infection, highlighting the importance of detailed histopathological examination.

Out of 23 tonsillectomy specimens and tonsillar biopsies, four cases of tonsillar actinomycosis were identified. Histological examination revealed distinctive eosinophilic granules with peripheral radial projections, accompanied by microabscesses. Although tonsillar actinomycosis is commonly diagnosed incidentally, clinicians should maintain a high level of suspicion in cases of recurrent tonsillitis or unexplained tonsillar hypertrophy.

Keywords: Actinomycosis, Tonsillar actinomycosis, Chronic tonsillitis

INTRODUCTION

Tonsillar enlargement, often due to various oropharyngeal conditions that cause obstructive symptoms such as snoring and sleep apnea, is a leading reason for tonsillectomy. Although tonsillar actinomycosis is rare, actinomycotic infections in cervical-facial, thoracic, and abdominal tissues are more frequently encountered in clinical practice.^{1,2} Hari et al. have reported cases of reactive tonsillar hypertrophy due to actinomycosis that required tonsillectomy.³ Von Langenbeck was the first to document human actinomycosis, despite the fact that *Actinomyces* species are normally found in the oropharynx. Lord later identified these organisms in the tonsillar crypts.⁴ The colonization rate of the tonsillar crypts, among other oropharyngeal areas, ranges from 6.7% to 35% in the general population.⁵ Actinomycosis does not show a regional, gender, or racial bias,

although some studies suggest a higher prevalence in adult males and a rarity in children under 10, with no gender preference in this younger age group.⁶ This report presents our findings of four cases of actinomycosis in tonsils over a one-year period in a pathology laboratory.

Objectives

- 1) To estimate the proportion of actinomycosis causing chronic tonsillitis using histopathological evidence.
- 2) To describe the histopathology of all routine tonsillectomy specimens as well as tonsillar biopsies in order to identify the difference in histopathology of tonsils affected with actinomyces.

MATERIALS & METHOD

This is a cross sectional study conducted in the department of Pathology, GMC Patiala. We analysed the data of patients who underwent tonsillectomy and tonsillar biopsies during the period from June 2023 to July 2024. We applied the following inclusion and exclusion criteria.

Inclusion Criteria

Patients of the age of 5-75 years with recurrent episodes of tonsillitis undergoing tonsillectomy and tonsillar biopsies.

Exclusion Criteria

- 1) Immunocompromised patients.
- 2) Patients presenting with peritonsillar abscess.

RESULTS

A total of 23 tonsillectomy specimens and tonsillar biopsies fixed in 10% formalin were received in the pathology department over a 1-year period (2023–2024). These specimens were processed in paraffin wax and stained using haematoxylin and eosin. There were 17 males and 06 females with a male-to-female ratio of 2.8:1 (Table 1) and an age range from 5 yrs to 73 years. Majority of the patients falls under the age group of 1 to 10 years (Table 2). Of these, three male patients aged 16 years, 25 years, 28 years and one female aged 19 years were diagnosed with tonsillar actinomycosis in a background of reactive tonsillar hyperplasia. The four patients presented with varying symptoms of recurring fever, recurrent sore throat, difficulty with breathing, dysphasia, odynophagia, harsh snoring and sleep disturbances.

Out of these, six patients diagnosed with adenoid hyperplasia, one with keratinizing squamous cell carcinoma and one of the patient showing HSV cytopathic effect.

One of the patient who was diagnosed with keratinizing squamous cell carcinoma was 52 years old male.

Out of 15 cases diagnosed with chronic tonsillitis, actinomycosis was seen in 4 cases. P value came out to be > 0.05, which is not significant (Table 3,4).

Symptoms durations varied from few months to 2 years. A clinical diagnosis of acute and recurrent tonsillitis was made for all the cases following clinical examinations, which revealed Grades 3 and 4 tonsillar enlargements. Histology of the tonsillar specimens was similar in four cases and showed unremarkable stratified squamous epithelium overlying variably sized lymphoid follicles having reactive germinal centres. Foci of eosinophilic amorphous materials with peripheral radial protuberances surrounded by microabscesses (Splendore–Hoepli phenomenon) were seen within and around follicles. Other areas showed extensive fibrous-tissue deposition (Figures 2,3,4,5,6).

Table1: Distribution of gender in the study population

Gender	Frequency	%
Male	17	74
Female	06	26
Total	23	100

Table 2: Distribution of the age group in the study population

Age Group	Frequency	%
0 -10	9	39.1
11 -20	8	34.8
21-30	4	17.4
31-40	0	0
41-50	0	0
51-60	1	4.35
61-70	0	0
71-80	1	4.35
Total	23	100

Table 3: Distribution of tonsillar actinomycosis in the study population

No. of cases	Frequency	%
Actinomyces +	04	17.4
Actinomyces -	19	82.6
Total cases	23	100

Table 4: Comparison of histopathological findings with actinomycosis

Histopathological diagnosis	Actinomycosis	Actinomycosis	Total	P value	Significance
	+	-			
Chronic Tonsillitis	04	11	15	0.107	NS
Adenoid Hyperplasia	00	06	06	0.190	NS
KSSC	00	01	01	0.638	NS
HSV Cytopathic effect	00	01	01	0.638	NS
Total	04	19	23		

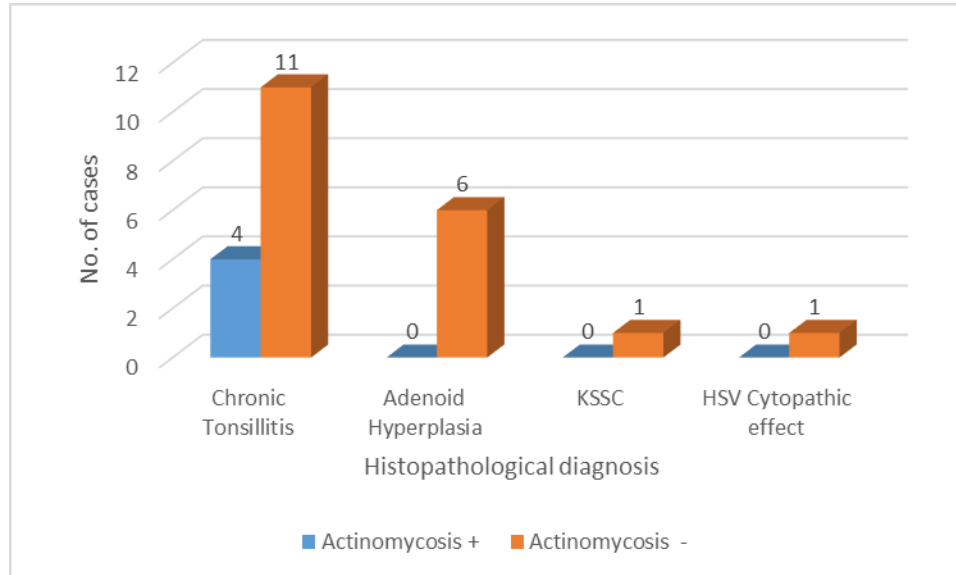


Figure 1: Comparison of histopathological findings with actinomycosis

DISCUSSION

Actinomyces species are Gram-positive, anaerobic, non-acid-fast, branching filamentous bacteria that cause chronic suppurative infections, commonly affecting the lungs, ovaries, and skin, though they can involve any tissue⁷. Historically classified as fungi, *Actinomyces* species often appear in mixed infections with other actinomycetes and fungi, such as *Nocardia asteroides* and *Madurella mycetomatis*, leading to actinomycetoma in various organs. In the oropharyngeal tract, non-pathogenic species include *Actinomyces naeslundii*, *Actinomyces bovis*, *Actinomyces eriksonii*, *Actinomyces viscosus*, and *Actinomyces odontolyticus*. Pathogenic forms like *Actinomyces israelii* and, to a lesser extent, *Actinomyces propionicus*, are often implicated in oral and tonsillar infections, although they are difficult to distinguish microscopically.⁸

While Group A streptococcus (*Streptococcus pyogenes*), *Streptococcus pneumoniae*, and various viruses (e.g., influenza, parainfluenza, adenoviruses) and fungi (e.g., *Candida albicans*) are common causes of tonsillitis, tonsillar actinomycosis presents with non-specific symptoms like obstructive issues, including breathing difficulties, snoring, and sleep apnea, which were observed in our patients. Tonsillar enlargement, frequently accompanying recurrent tonsillitis, often leads to tonsillectomy, particularly for obstructive sleep apnea or recurrent infections, as seen in our cases with Grades 3 and 4 tonsillar enlargement. Halitosis and tonsilloliths, which can cause further discomfort, were not present in our patients.

Brodsky classified tonsillar enlargement into Grades 1-4 based on the extent of tonsil protrusion into the tonsillar fossa and pillars, with Grade 3 (>50% to <75%) and Grade 4 (>75%) representing significant enlargement.⁹ Gingival infections, dental manipulations, and trauma are considered risk factors for tonsillar actinomycosis.⁷ However, none of our patients had these histories. Gender distribution in tonsillar actinomycosis varies, with some studies noting a male predominance, while others find no gender preference; however, our study included only female patients.

Histopathological diagnosis of tonsillar actinomycosis relies on identifying amorphous eosinophilic granules with bulbous peripheral filaments and surrounding microabscesses, characteristic of the Hoeppli-Splendore phenomenon.⁸ This phenomenon, resulting from proteolytic enzymes that disrupt phagocytosis, is not exclusive to actinomycosis and can be seen in other chronic and granulomatous infections. Differentiation involves identifying specific

diagnostic criteria, such as schistosome ova or fungal elements, and recognizing microabscesses as indicators of active disease. Peripheral filaments help distinguish between *A. israelii* and *A. propionicus*. Histological fibrosis suggests chronic inflammation.⁸ Less sensitive diagnostic methods include tissue cultures and imaging studies, which are useful for identifying tissue enlargement or masses but are non-specific.

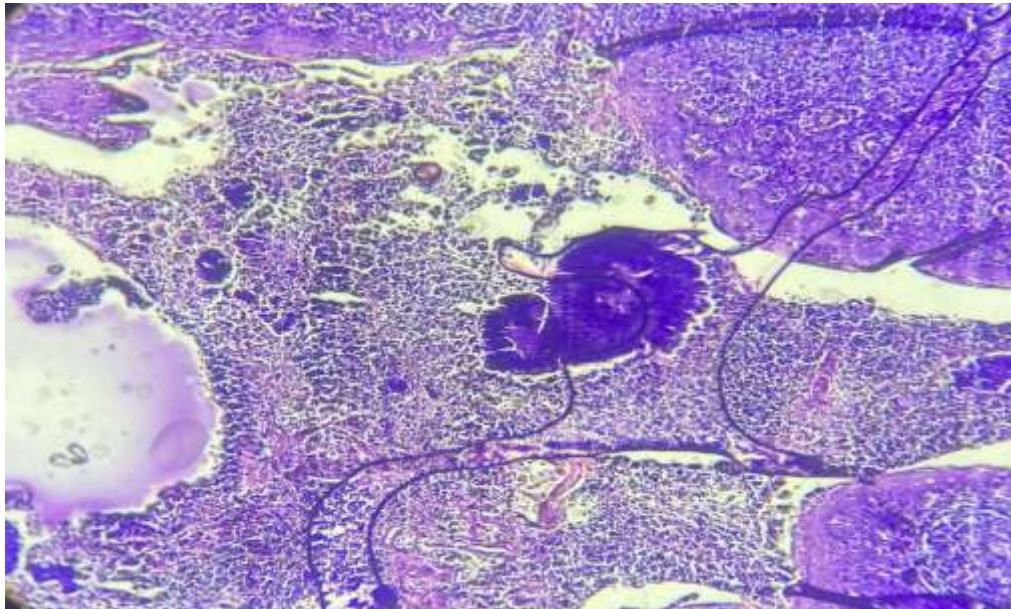


Figure 2: Actinomycotic colonies seen on the surface of epidermis (H&E,X100)

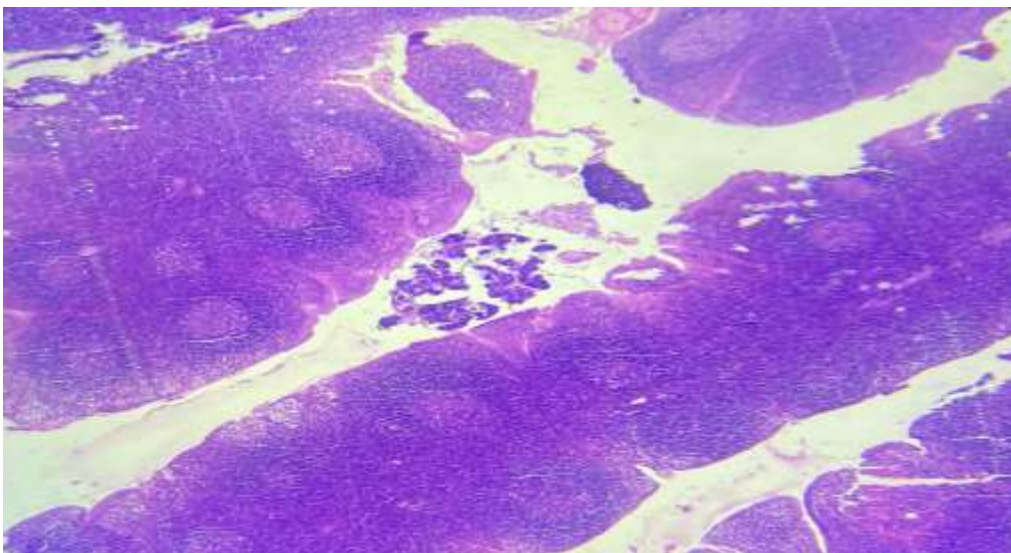


Figure 3: Actinomycotic colonies surrounded by lymphoid follicles with germinal centres and stratified squamous epithelium (H&E,X100)

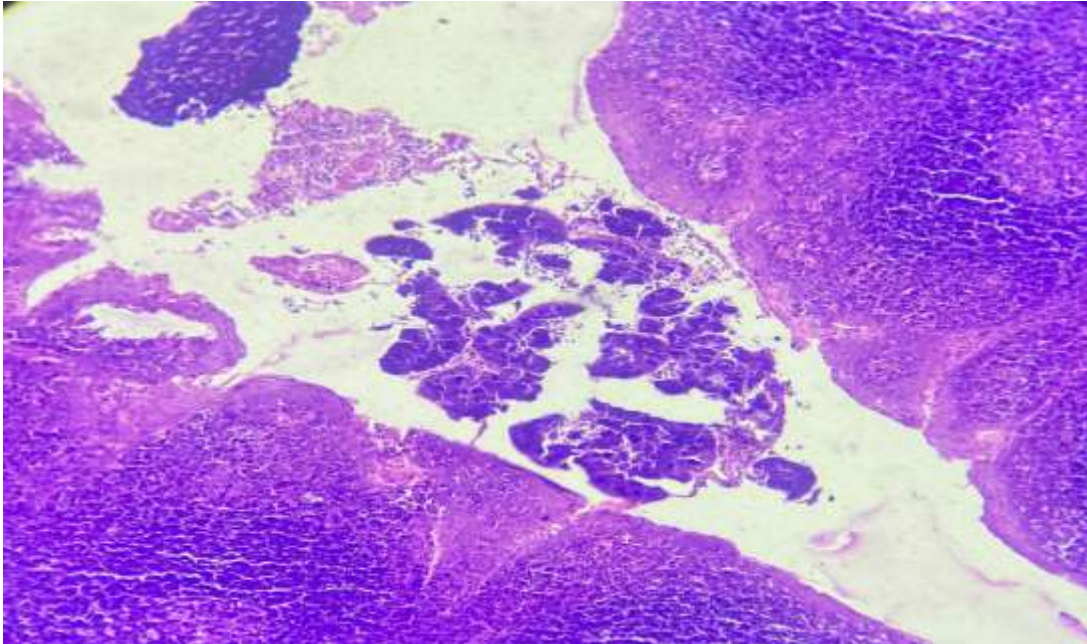


Figure 4: Actinomycotic colonies seen on the surface of epidermis (H&E,X400)

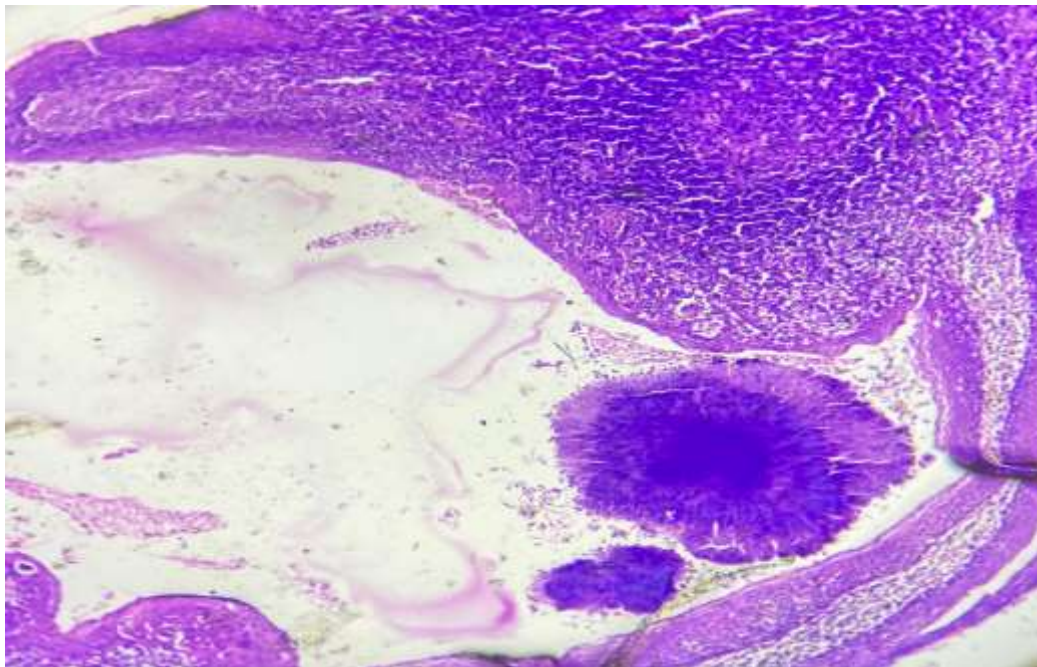


Figure 5: Actinomycotic eosinophilic granules with peripheral radial array surrounded by microabscesses (H&E,X100)

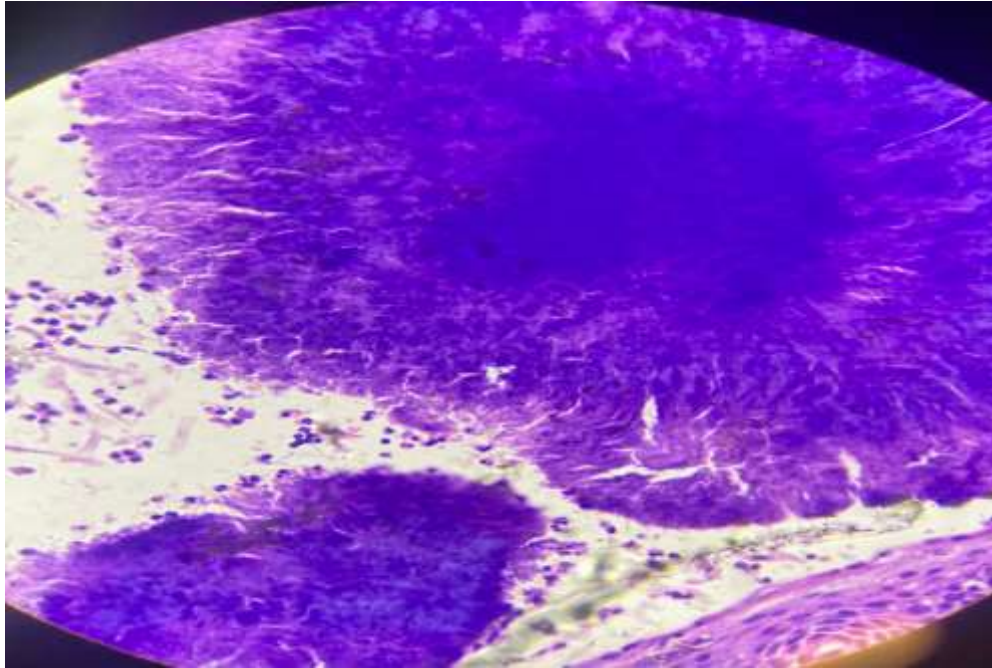


Figure 6: Actinomycotic eosinophilic granules with peripheral radial array surrounded by microabscesses (H&E,X400)

The treatment for tonsillar actinomycosis typically involves surgical excision and antibiotic therapy.^{9,10} Our patients received high-dose parenteral penicillin for 4 weeks, followed by 4 months of oral penicillin to ensure complete treatment. In summary, while tonsillar actinomycosis is often discovered incidentally, clinicians should maintain a high level of suspicion in cases of recurrent tonsillitis or unexplained tonsillar hypertrophy.

CONCLUSION

Actinomycosis of the tonsil is a rare but often missed condition due to the lack of routine histopathological examination of tonsillectomy specimens. To address this, it is recommended to routinely analyze all tonsillectomy specimens histopathologically. This would help in detecting rare conditions, understanding their prevalence, clarifying their relationship with chronic tonsillitis, and ultimately improving patient care.

Declaration of patient consent

The authors declare that they have obtained consent from patients. Patients have given their consent for their images and other clinical information to be reported in the journal. Patients understand that their names will not be published and due efforts will be made to conceal their identity but anonymity cannot be guaranteed.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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