# **Original Research Article**

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# Microbiological profile of common bacterial isolates from acute tonsillitis in pediatric age group patients

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#### **ABSTRACT**

**Background:** The paediatric age group are more prone to tonsillitis. The management of tonsillitis mainly based on understanding of microbiological and pathological features. This study aimed to discuss the microbiological profile of acute tonsillitis in children.

**Methods:** Children fewer than 16 years age group was included in this study and the children underwent tonsillectomy or in antibiotics for at least one month were excluded from study. The throat swabs were taken for microbiological diagnosis.

**Results:** A total of 150 children were diagnosed as acute tonsillitis during the period of 1 year from January 2019 to December 2019. The mean age group of children were 9.6 years. There were total 70 males and 80 females. The most common isolates were *Streptococcus viridians* group, Group A  $\beta$ -hemolytic *Streptococci*. There were only 3 cases with polymicrobial growth. The histopathological examination reported acute tonsillitis with follicular hyperplasia in all children.

**Conclusions:** The understanding of microbiological profile could help in management of acute tonsillitis. The pathological profile can help us to identify the organisms which are difficult to culture.

Keywords: Acute tonsillitis, Bacteria, Histopathology

#### INTRODUCTION

The tonsils are suggestive as subepithelial lymphoid tissue growth in the oropharynx, between the platopharyngeal wall posterior and platoglossal wall anterior. Tonsils are the most common region where more numbers of microorganisms were found. Usually microorganisms enter in to the tonsillar tissue through the epithelium and then involve in the lymphatic system, which leads to tonsillitis. Therefore, it is important to understand the various organisms causing tonsillitis. Children are most commonly infected by tonsillitis. In case of recurrent tonsillitis in children, most common surgical procedure performed is tonsillectomy. The immunological activity of the tonsil is found higher in

age group of 3-10 years. Due to this, the tonsils are more perfect in this period and later age-dependent involution.2 In school age group children one or more attacks of tonsillitis are common. The common symptoms are like, dysphagia, sore throat and fever with or without upper respiratory tract infection. In case of recurrent tonsillitis, children develop enlarged tonsillar crypts with tissue debris, dilated blood vessels on the surface of tonsil and persistent congestion of tonsils. Tonsillitis effect on other anatomical sites like, paranasal sinuses, middle ear cleft and upper aerodigestive tract.<sup>2,3</sup> In case of chronic tonsillitis, organisms isolated from tonsil surface may not be pathogenic organisms but could be the normal flora or colonizers. Hence, core isolation of organisms from tonsil would be more reliable. Therefore, understanding of

microbiological and pathological profile of tonsillitis is an important entity for the case management.

#### **METHODS**

The descriptive study was included children fewer than 16 years age group and the children underwent tonsillectomy or in antibiotics for at least one month were excluded from study. The throat swabs were taken for microbiological diagnosis. This study was conducted in MNR Medical College and Hospital during the period of 1 year from January 2019 to December 2019. All the samples were collected aseptically and processed as per the standard microbiological and pathological protocol.<sup>4-7</sup> Before collected the throat swab, all patients and attendees were informed the overall sample collection procedure. Two throat swabs were collected from each patient by sterile swab (Hi-Media, Navi Mumbai, India) from the posterior pharyngeal wall and epiglottis. The throat swab was immediately transferred to laboratory for analysis. In microbiology lab direct Grams stain was performed to find out pus cells, epithelial cells and possible pathogenic organisms. Another swab was cultured in to blood agar, macConkey's agar, chocolate agar and incubated it at 37-degree temperature for 18-24 hours. After growth appeared in culture plate precede it for identification of organisms and antibiotic sensitivity testing. Kirby Bauer disc diffusion method was applied for antibiogram of various pathogenic organisms. Haematoxylin and eosin staining was performed for histopathological diagnosis. The institutional ethical committee approved the study. All data were analyzed by statistical software SPSS 20.0.

#### **RESULTS**

A total of 150 children were diagnosed as acute tonsillitis during the period of 1 year from January 2019 to December 2019. 95 patients were belonging to age group of 4-10 years and 55 children were from 11-15 years. There were total 70 males and 80 females (Table 1). The most common isolates were Streptococcus viridians group (30%), Group A-β-hemolytic Streptococci (24.6%),Streptococcus pneumoniae (17.9%),Staphylococcus aureus (13.7%) and least isolated was Pseudomonas aeruginosa (0.95%). There were only 3 cases with polymicrobial growth (Table 2 and 3). The histopathological examination reported in 2 cases with tonsil crypt by actinomycotic colonies (Figure 1).

Table 1: Socio-demographic data of 150 tonsillitis patients.

Demographic data	Total number
Sex	
Male	70
Female	80
Age group (in years)	
4-10	95
11-15	55

Table 2: List of aerobic organisms isolated from 150 tonsillitis specimen.

Organisms isolated	Number in percentage (%)
Streptococcus viridans	94 (30)
Group A Streptococci	77 (24.6)
Streptococcus pneumoniae	56 (17.9)
Staphylococcus aureus	43 (13.7)
Haempphilus influenzae B	21 (6.7)
Haemophilus spp	4 (1.3)
Diptheroid spp	13 (4.1)
Coagulase negative Staphylococci	2 (0.6)
Pseudomonas aeruginosa	3 (0.95)
Total	313

Table 3: List of anaerobic organisms isolated from 150 tonsillitis specimens.

Anaerobic isolates	Number in Percentage (%)
Bacteroids spp	37 (24.6)
Peptococcus spp	49 (32.7)
Fusobacterium spp	31 (20.7)
Lactobacillus spp	17 (11.3)
Peptostreptococcus spp	14 (9.3)
Actinomycetes spp	2 (1.3)
Total	150

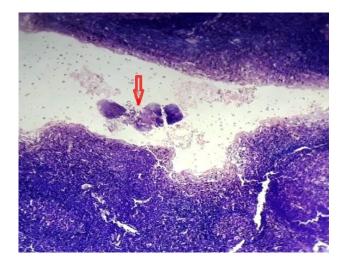


Figure 1: Histopathological examination showed tonsillar crypt by actinomycotic colonies.

### DISCUSSION

Previous studies mostly concentrated on microbiological profile of tonsillitis mainly find out the aerobic bacterial isolates. The role of anaerobes in acute or chronic tonsillitis is less studied, because of mostly anaerobes are normal commensal of oropharynx. Therefore, isolates taken from the surface of tonsil can mislead. In this

present study role of both aerobes and anaerobes were recorded. Specimens were also taken from deep tonsillar tissue to study the disease-causing organisms. In this study common bacterial isolates were such as, Streptococcus viridians, Group A Streptococci, Streptococcus pneumoniae, Staphylococcus aureus, Haemophilus influenza type B and diphtheroid spp. According to the study done by Agarwal et al most isolates were, Streptococcus viridans, Staphylococcus aureus, Enterococcus, Pneumococcus, Bacteroid fragilis and Corynebacterium spp. and without and anaerobes isolates.8 The different study done by Omer et al. reported facultative anaerobes such as coagulase negative Staphylococci, alpha-hemolytic Streptococci, and diptheroids. In case of obligate such as Propionibacterium Peptostreptococcus anaerobius and Prevotella melanino genica. In our study common anaerobic bacteria isolates were Bacteroid spp, Peptococcus spp, Fusobacterium spp, Lactobacillus spp, Veillonella spp and Pepto streptocuccus spp. The histopathological examination showed non-specific follicular hyperplasia in all children. Actinomyces was related with follicular hyperplasia in 2 specimens, which indicates Actinomyces are causative organism causing tonsillitis. Actinomycosis is commonly associated with liver, breast, spleen, parotid, pulmonary, craniofacial and ileocecal areas. 10 Tonsillar actinomycosis has been reported in various studies. 11,12 But, Gaffney et al. reported there was no association between tonsillitis and actinomycosis and concluded Actinomyces are saprophytes in the tonsillar tissue. 12 Another study done by Kansu et al. reported Actinomyces are pathogenic organisms in tonsillitis.<sup>14</sup> Actinomyces colonization in the crypts can be diagnosed by H & E staining. 15,16

#### **CONCLUSION**

The understanding of microbiological profile could help in management of acute tonsillitis. The pathological profile can help us to identify the organisms which are difficult to culture. The limitation of this study is smaller sample size and short duration of study.

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Ethical approval: The study was approved by the

Institutional Ethics Committee

#### REFERENCES

 Johnston J, Hoggard M, Biswas K, Astudillo-García C, Waldvogel-Thurlow S, Radcliff FJ, et al. The bacterial community and local lymphocyte response

- are markedly different in patients with recurrent tonsillitis compared to obstructive sleep apnoea. Int J Pediat Otorhinolaryngo. 2018;113:281-8.
- 2. Jovic M, Avramovic V, Vlahovic P, Velickov A, Petrovic V. Expression of CD34 and CD146 vascular markers contributes to the immunological function of the human palatine tonsil. Histol Histopathol. 2018;33:281-68.
- 3. Parker NP, Walner DL. Trends in the indications for pediatric tonsillectomy or adenotonsillectomy. Int J Pediatr Otorhinolaryngol. 2011;75:282-5.
- 4. Ramos SD, Mukerji S, Pine HS. Tonsillectomy and adenoidectomy. Pediatr Clin. 2013;60:793-807.
- Gysin C: Indications of pediatric tonsillectomy. ORL J Otorhinolaryngol Relat Spec. 2013,75: 193-202.
- 6. Brook I, Foote PA. Isolation of methicillin resistant Staphylococcus aureus from the surface and core of tonsils in children. Int J Pediatr Otorhinolaryngol. 2006,70:2099-102.
- 7. Brook I, Foote PA: Recovery of methicillin-resistant Staphylococcus aureus from the surface and core of tonsils in children. Pediatr Infect Dis J. 2006;25:757-8.
- 8. Agrawal A, Kumar D, Goyal A, Gupta R, Bhooshan S: Bacteriological evaluation and their antibiotic sensitivity pattern in tonsillitis. Indi Socie Oilsee Resea. 2014;13:51-5.
- Develioglu ON, Ipek HD, Bahar H, Can G, Kulekci M, Aygun G. Bacteriological evaluation of tonsillar microbial flora according to age and tonsillar size in recurrent tonsillitis. Eur Arch Otorhinolaryngol. 2014;271:1661-5.
- 10. Hasan M, Kumar A. Actinomycosis and tonsillar disease. Britis Med J Cas Rep. 2011;12:2011.
- 11. Bhargava D, Bhusnurmath B, Sundaram KR, Ramana R, Al Okbia HM, Al Abri R, Date A: Tonsillar actinomycosis: a clinicopathological study. Acta Trop. 2001;80:163-8.
- 12. 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;18:268-71.
- 13. Toh ST, Yuen HW, Goh YH. Actinomycetes colonization of tonsils: a comparative study between patients with and without recurrent tonsillitis. J Laryngol Otol. 2007;121:775-8.
- 14. Kansu L: Relation of actinomyces with tonsillar hypertrophy and antibiotic use. Turk Arch Otorhinolaryngol. 2017;55:17-21.
- 15. Van Lierop AC, Prescott CA, Sinclair-Smith CC. An investigation of the significance of Actinomycosis in tonsil disease. Int J Pediatr Otorhinolaryngol. 2007;71:1883-8.
- 16. Hussein MR. Mucocutaneous Splendore-Hoeppli phenomenon. J Cutan Pathol. 2008,35:979-88.

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