

Short Communication

Identification of the Bacteria that causes Childhood Tonsillitis

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A B S T R A C T

Introduction: Tonsillitis is the most common infectious condition after viral nose and throat infections. Millions of new infections every year are recorded globally. Young people under the age of 15 are disproportionately affected by acute tonsillitis. This study aimed to isolate the bacteria causing tonsillitis in children.

Methods: One hundred thirty throat swabs were taken from a variety of individuals who were clinically determined to have tonsillitis with purulent discharges at the ENT clinic at Kuthospital. Isolates were tested for their gram stain response and biochemical features after being promptly transported to the laboratory and streaked directly on blood agar, which was incubated aerobically for 24 hours at 37°C. The following antibiotics were tested on all isolates using the disc diffusion technique: penicillin (10 units), gentamicin (10 mcg), vancomycin (30 mcg), erythromycin (15 mcg), ciprofloxacin (10 mcg), cephalothin (30 mcg), and chloramphenicol (30 mcg). Isolates were classified as sensitive or resistant based on the widths of zones of inhibition.

Results: Thirty-four strains of *Streptococci*, 14 strains of *Staphylococcus epidermidis*, 32 strains of *Staphylococcus aureus*, 15 strains of another *Staphylococcus* spp., and 9 strains of *Haemophilus parainfluenzae* were detected. The current results showed that most isolates were sensitive to ciprofloxacin, chloramphenicol, and vancomycin, while most isolates showed resistance to penicillin and gentamycin.

Conclusion: *Streptococci* and *S. aureus* showed to be the most common bacterial causes of tonsillitis in children who were sensitive to ciprofloxacin, chloramphenicol, and vancomycin.

Keywords: Bacteria, Tonsillitis, Children, Antibiotics

Introduction

Many medical terms, like “tonsils,” are derived from the almond shape of the organ. The anatomical name for these structures is “palms,” and they may be found inside the throat. The tonsils are situated midway between the upper (nasal, sinus, digestive, and auricular) and lower (tracheal) airways. The adenoid is a clump of lymphoid tissue found in the middle of the mucosa. The nasopharynx roof and posterior wall are its locations.¹

However, the most common infectious condition after viral nose and throat infections is tonsillitis. There are millions of new infections every year across the globe, and they occur every season.² The peak season is from November to April, although new infections may be observed at any time. Sore throats are responsible for 2.1% of all ambulatory visits in the United States.³ Young people under the age of 15 are disproportionately affected by acute tonsillitis.

Group A beta-haemolytic streptococci tonsillitis affects 15-30% of kids and 5-15% of adults with a sore throat.⁴⁻⁶ It also poses a significant risk due to its susceptibility to complications (especially in its bacterial form).⁶

Pathogens (viruses, germs, parasites, and fungi) may live and thrive in the mouth and, in particular, the tonsils.⁷ All these bacteria, however, are part of the fleeting flora that has developed symbiotic interactions with both other organisms and humans.⁸ More than a hundred different bacteria were identified in the tonsils of children and adults with and without recurrent tonsillitis in research by Jensen et al. On average, roughly 52 distinct bacterial strains were found in each patient, regardless of age or health status. They account for 90% of all pathogens.⁹

Bacterial infections are among the worst kinds, with *Streptococcus pneumoniae* being responsible for the vast majority of cases. *Staphylococcus*, *Streptococcus*, and *Staphylococcus aureus* infections of the urethra in adult men and syphilis are also possible, albeit they are far less common. The data reveal that 5% of the population has *Streptococcus pneumoniae* germ (in the pharynx), but they do not display any symptoms of infection (they fall into the group of healthy germ carriers), and they may spread the germ to others, particularly youngsters and babies (this is why it's best to avoid smacking kids in the face). Ovarian infections caused by these bacteria account for 25-40% of all bacterial ovarian infections in kids and tweens (3-12 years of age). The sickness seems to be an epidemic at the moment. For babies, in particular, heat coming from the ground seems to be the sole detectable source.^{10,11}

This study aimed to isolate the bacteria causing tonsillitis in children.

Materials and Methods

A diagnostic study was performed from Feb. 2022 to May

2022. An ethical clearance was obtained from Wsit province health coordinate, Ministry of health, Iraq. One hundred and thirty throat swabs were taken from a variety of individuals who were clinically determined to have tonsillitis with purulent discharges at the ENT clinic at Kut Hospital

As per Barrow and Feltham,¹² isolates were tested for their gram stain response and biochemical features after being promptly transported to the laboratory and streaked directly on blood agar, which was incubated aerobically for 24 hours at 37°C.

The following antibiotics were tested on all isolates using the disc diffusion technique: penicillin (10 units), gentamicin (10 mcg), vancomycin (30 mcg), erythromycin (15 mcg), ciprofloxacin (10 mcg), cephalothin (30 mcg), and chloramphenicol (30 mcg). According to the guidelines of the National Committee for Clinical Laboratory Standards,¹³ isolates were classified as sensitive or resistant based on the diameter of the inhibition zone.

Statistical analysis was done by using SPSS version 23.

Results and Discussion

Thirty-four strains of *Streptococci*, 14 strains of *Staphylococcus epidermidis*, 32 strains of *Staphylococcus aureus*, 15 strains of another *Staphylococcus* spp., and 9 strains of *Haemophilus* were detected (Table 1).

Table 1. Isolated Bacteria from Patients with Tonsillitis

Bacteria	Number of Isolates	% of Isolates
<i>Streptococci</i>	34	32.6
<i>S. epidermidis</i>	14	13.5
<i>Staphylococcus aureus</i>	32	30.8
<i>Staphylococcus</i> spp.	15	14.4
<i>Haemophilus</i>	9	8.7
Total	104	80%

Sun et al.,¹⁴ showed that group A-haemolytic streptococci were the most frequent causes of acute suppurative bacterial tonsillitis in children (*S. pyogenes*). *S. pneumoniae*, a type of *streptococci* that is often seen in the nasopharynx of healthy people, was the other isolated species.¹⁵ Though Pyatkin et al.¹⁶ noted that *S. pneumoniae* may induce tonsillitis, it was identified less often (3.1%) in our investigation. This finding is comparable to that obtained by Walsh et al.,¹⁷ who reported that *S. pyogenes* was detected in around 55-70% of children up to 15 years of age, and only in 5% of people over 35 years of age. *Streptococcus* species were more abundant in children than in other bacteria. The current results showed that most isolates were sensitive to ciprofloxacin, chloramphenicol, and vancomycin, while most isolates showed resistance to penicillin and gentamycin (Figure 1).

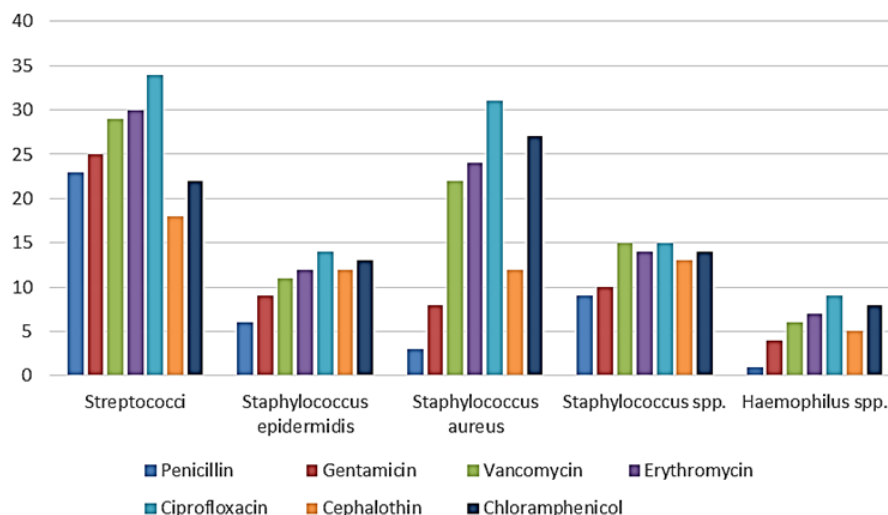


Figure 1. Number of Sensitive Strains of Different Bacteria to Different Antibiotics

According to Pratt,¹⁸ cefadroxil and phenoxymethyl penicillin can be used in the treatment of streptococcal pharyngitis. According to their single-blind randomised study, cephalosporin was superior to penicillin in treating GABHs pharyngitis. Pichichero¹⁹ investigated the reasons behind streptococcal pharyngitis treatment failures with penicillin. According to his findings, cephalosporin is more efficient than penicillin. Although penicillin is still advised as a therapy for acute and recurrent tonsillitis, it proved to be the second medication in our study since all isolated bacteria showed strong resistance to it. Erythromycin, on the other hand, was a penicillin substitute, as is well known. It outperformed penicillin in our findings. It is still the preferred medication for streptococcal throat infections, according to Kelley et al.²⁰ They explained why no isolates exhibited complete erythromycin resistance. Erythromycin is a well-established alternative treatment for GABHs, therefore it's crucial to know the prevalence of resistant organisms.

Recently, rising erythromycin resistance rates have been documented. Erythromycin resistance rates as high as 24% have been seen in Finland.²¹

Over the last ten years, antibiotic resistance has drastically grown. There have been many theories put up to explain why antibiotics have failed to cure tonsillitis, but we postulated that non-compliance may be the root cause of treatment failure. Despite antibiotics' tremendous utility, their continuing efficacy is threatened by the misuse and abuse of these wonder medications. Bacteria are more likely to evolve defence mechanisms against frequently used antibiotics.²²

Conclusion

Streptococci and *S. aureus* were seen to be the most common bacterial causes of tonsillitis in children who were

sensitive to ciprofloxacin, chloramphenicol, and vancomycin.

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Conflict of Interest: None

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