

■ *Original Article*

GROUP A α -HAEMOLYTIC STREPTOCOCCUS INFECTION PRESENTING WITH SORE THROAT AT PAEDIATRIC OPD

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Abstract

Objective: To study the prevalence of streptococcal pharyngitis in pediatric patients presenting with sore throat. **Methods:** A total of 100 patients aged 5–15 years were enrolled in the study. Verbal consent was obtained to collect specimens. The specimens were collected with the help of sterile cotton tipped swab, cultured in blood agar and chocolate agar as per the guideline. *Streptococcus pyogenes* was identified on the basis of Gram's stain and its sensitivity towards 0.04 units of bacitracin disc. Antimicrobial susceptibility testing of the isolates was performed using Kirby Bauer disc diffusion method. **Finding:** Out of 100 patients which were included, 54 were male and 46 were female. GAS was isolated from 5 patients, of which 3 were male and 2 were female. Of the 5, *S. pyogenes* strains isolated, 2(66.6%) were found to be resistant to cotrimoxazole. Ciprofloxacin resistance was seen in one isolate. No resistance was detected in gentamycin, cefalexin, penicillin, and erythromycin. **Conclusion:** The results show that the prevalence of streptococcal pharyngitis is 5% among OPD cases, further study should be conducted in the community to know the actual prevalence of streptococcal pharyngitis.

Keywords: Pharyngitis, Prevalence, *Streptococcus pyogenes*

Introduction

Sore throat remains one of the most common presentations to primary care providers, more than 225 pathogens, including about 200 viruses, are responsible for upper respiratory tract infections.^{1,2} *Streptococcus pyogenes*, or Lancefield group A α -haemolytic *Streptococcus* (GAS), is one of the commonest bacterial pathogens that causes acute pharyngitis among school-aged children living in lower socioeconomic conditions.³⁻⁵ These Gram-positive cocci are distributed worldwide and have been associated with a variety of sequelae such as impetigo, otitis media, necrotizing fasciitis, glomerulonephritis, acute rheumatic fever/rheumatic heart disease (RF/RHD).^{6,7} It has been estimated

that there may be 30 million children with RHD in developing countries, compared with only 1.5 million in developed countries.⁸ Of commonly used antibiotics for the treatment of GAS infection are penicillin and its family (including ampicillin). Judicial use of antibiotic is the mainstay for rapid treatment of streptococcal infection.

Inadequate treatment leads to development of resistance towards that antimicrobial agent,^{7,8} resulting in unsuccessful treatment and increased complications.

Pharyngeal bacterial culture is a common and efficient method for the diagnosis of GAS, and to know their antimicrobial susceptibility pattern, which in turn will lead to make an epidemiological model regarding bacterial resistance towards commonly used drugs and ultimately improves the practitioner's knowledge for effective management of the infection by GAS.

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Materials and methods

Study site: The study population included patient attending in pediatric OPD, BPKIHS, Dharan.

Study population: It was a cross sectional study conducted during August 2009 through February 2010, in a total of 100 consecutive paediatric patients with sore throat, attending pediatric OPD.

Sample Size: The sample size was calculated by taking 7 % as prevalence and 20% as allowable error.

Inclusion criteria: Pediatric patients 5-15 years presenting with sore throat to pediatric out-patient department of BPKIHS.

Exclusion criteria: The following patients were excluded from this study:

- i. Patients other than 5-15 years.
- ii. Patients on antibiotics.
- iii. Patients/ parents not giving consent to participate in the study.

Specimen collection: Study permission was secured from research committee BPKIHS. After verbal consent of the patient, pharyngotonsillar specimens were collected with sterile cotton tipped swab.

Bacteriological methods: The swabs collected from patient were immediately cultured in 5% sheep blood agar and chocolate agar. The culture media were incubated at 37°C in 5% carbon dioxide atmosphere and examined at 24 and 48 hours. All the plates with α -haemolytic colonies were microbiologically processed and GAS was identified by conventional methods (colony morphology, haemolysis pattern, catalase test, Gram stain and morphological observation). *Streptococcus pyogenes* was further identified by observing its sensitivity towards 0.04 units of bacitracin disc tested on sheep blood agar plate.

Antimicrobial susceptibility testing: Antimicrobial susceptibility testing of the isolates was performed by Kirby Bauer disc diffusion method following clinical and laboratory standards institute (CLSI) recommended interpretive criteria.⁹ *Streptococcus pneumoniae* ATCC 49612 was used as the quality control strain. The following antimicrobials were tested for all the confirmed isolates: penicillin (10 U), cefalexin (18ug), gentamicin (15ug); ciprofloxacin (5ug); erythromycin (15ug), and cotrimoxazole (1.25/23.75ug).

Results

A total of 100 patients were included, 54 males and 46 females. GAS was isolated from 5 patients, of which 3 were male and 2 were female. In antimicrobial susceptibility test was performed against GAS, a clear zone of inhibition (ZOI) was measured using vernier caliper. Of the 5 *S. pyogenes* strains isolated, 2(66.6%) were found to be resistant to cotrimoxazole. Ciprofloxacin resistance was seen in one isolate. No resistance was detected against gentamicin, cefalexin, penicillin and erythromycin.

Discussions

Group A α -hemolytic streptococcal pharyngitis is one of the most common bacterial diseases in human being. Treatment and prevention of dangerous complications in this disease is of great importance. Healthy carriers of GAS are sources for bacterial dissemination, are able to communicate the disease and even lead to severe epidemics. According to different studies GAS is more commonly seen in children's pharynx comparing to that of adults. Our study shows that the prevalence of GAS among school going children is 5%, studies conducted in Dhaka¹⁰ and Thailand¹¹ shows the prevalence of GAS being 22% and 18% respectively. Prevalence of pharyngotonsillitis (5%) as seen in the present study similar to findings in Pokhara.¹² Performing antimicrobial susceptibility test on GAS isolated showed that these organisms were mostly sensitive to gentamicin, erythromycin and cephalosporin, as seen in the study done in Kerman in 1995.¹³ Performing an analysis on 19 studies, Pechechero ME and coworkers claimed that oral cephalosporin had significantly higher cure rate comparing to penicillin.¹⁴ This study is very similar to a study by Nevaneeth and coworkers in India in 2001, where all samples taken from pharyngeal culture of GAS carrier children were sensitive to penicillin, erythromycin and cephalosporin.¹⁵ Despite reported penicillin tolerance, GAS continues to be exquisitely susceptible to penicillin, which therefore is the drug of choice to treat the infections caused by them. Thus in practice it is not necessary to test their susceptibility on a routine basis, however it is imperative to look for emergence of resistance to penicillin in our locality. More importantly, resistance to other antibiotics such as cotrimoxazole,

ciprofloxacin is on the rise which can be monitored only by regular testing of GAS strains in the laboratory.

Conclusion

The finding of the present study highlights the occurrence of streptococcal pharyngitis among children attending paediatric OPD to be 5%. The numbers of children attending the OPD above 5 years of age were very less, and studies shows that this age group is the most vulnerable one. The rate of case findings would have been very high, if this type of study was conducted in the community. Empirical treatment of clinical pharyngitis with various antibiotics including penicillin is very common in general practice. However, this cannot be recommended in highly endemic situations, for several reasons. Firstly, oral antibiotics do not give as much coverage as benzathine penicillin, to patients who may later go on to develop RF/RHD due to lack of adequate antibiotic protection. Secondly, over treatment with penicillin may pave way to increased penicillin tolerance and subsequent penicillin resistance. Finally, one may encounter larger number penicillin anaphylaxis which can significantly reduce patient's compliance to antibiotic treatment. Thus scientifically, it is better to institute the treatment after confirming a GAS etiology which would overcome the above problems.

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