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Prevalence of Group A beta- hemolytic streptococcal carriers in school going children

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Abstract:
Group A Streptococci (GAS) are one of the common pathogens responsible for causing tonsillitis and pharyngitis in both children and young adults. The asymptomatic pharyngeal carriage of GAS in children may lead to spread of respiratory infection in the community. Children aged 5 to 15 years with no signs and symptoms of upper respiratory tract infections and no history of antibiotic therapy within last two weeks were included in study. Throat swabs collected were cultured on blood agar. GAS was identified by conventional method and serogrouped using latex agglutination assay. GAS was isolated from 7 children, out of 250 children. The carrier rate was 3.6% which correlated well with other South Asian studies. Our study showed the importance of surveillance programme to keep carriers in check.

Key words: Group A Streptococci, beta-hemolysis

Introduction:

The beta haemolytic Streptococci particularly group A causes a wide variety of infections in humans which range from mild upper respiratory and skin infections to severe suppurative and invasive conditions like necrotizing fasciitis and toxic shock syndrome.[1] It is one of the commonest bacterial pathogens that causes acute pharyngitis among school aged children living in lower socioeconomic conditions.[2] Beta-hemolytic Streptococci colonize the throat of healthy carriers or commensals serving as a reservoir for pathogen transmission.[3]

Children are the major reservoirs of the Group A Streptococci (GAS) with recurrent episodes of pharyngitis; suppurative and non-suppurative complications are caused by Group A Streptococci.[1] This in children may lead to spread of infections in the community.

Studies that determine the carriage rate of beta-hemolytic streptococci among children are important to public health practise to aid in the prevention of infections and their serious complications such as rheumatic fever, rheumatic heart disease, nephritis and local and systemic infections.[3]

So, this study was designed to detect the carrier rate of Group A beta-hemolytic Streptococci among children in the age group of 5 to 15 years.

Materials and Methods:

Schools were randomly selected for streptococcal screening after obtaining permission from the school authorities in Heggere, Tumkur district. The consent was obtained from parents of children. They were informed about the role of Beta-hemolytic Streptococci colonisation and their potential to cause disease. Children with no signs and symptoms of upper respiratory tract infections and no history of antibiotic therapy within the last two weeks were enrolled for the study.

Throat swabs collected from the students were immediately cultured on 5% sheep blood agar. The inoculated plates were incubated at 37°C in a CO_2 incubator and were observed for beta hemolysis after 24 hrs. All plates with haemolytic colonies were microbiologically processed and Group A Streptococci was identified by conventional method and confirmed by serological method. Beta haemolytic Streptococci with grading of 3+ were processed by gram stain, catalase test and bacitracin disc (0.04 units) sensitivity.[4] They were sero-grouped using latex agglutination assay (MASTASTREP, UK).

Procedure and interpretation of serogrouping:

1. MASTASTREP reagents were brought to room temperature before use and extraction enzyme was reconstituted with 10 ml of distilled water.
2. Using sterile loop, suspected streptococcal colonies were emulsified in 0.4ml of reconstituted extraction enzyme.
3. Mixture was then incubated at 37°C for 10 minutes in water bath.
4. Each latex reagent was shaken well to suspend the particles and one drop was added to each corresponding circle on test card.
5. One drop of suspension was then put in each circle on the test card.
6. Fluid was mixed thoroughly over whole area of circle and card was rotated and rocked gently for 1 minute.
7. A positive result was indicated by visible aggregation of latex particles.

Susceptibility of isolates to Penicillin-G (10 U),Erythromycin (15µgm), Cephalexin (30 µgm), Gentamicin (10 µgm), Amikacin (30 µgm), Trimethoprim-sulphamethoxazole (TMP-SMX) (1.25/23.75 µgm), and Chloramphenicol (µgm), Vancomycin (30 µgm), Linezolid (30 µgm) were evaluated by the Kirby-Bauer disk diffusion method on blood agar plate. The antibiotic discs were obtained from Hi-Media and zone diameters were interpreted as susceptible, intermediate or resistant using Clinical Laboratory Standard Institute (CLSI) guidelines[5].

Results:

Two hundred and fifty school going children students were screened. Group A beta-hemolytic Streptococci was isolated from seven samples. Male to female ratio of obtained isolates was 4:3. Maximum isolates were found to be in the age group of 7-8 yrs (Table I). 100% sensitivity was shown to penicillin and macrolides. (Table II).

Discussion:

The prevalence of asymptomatic carriage of Group A beta-hemolytic Streptococci in different parts of India has been reported to be in the range of 11.2-34%[2]. The carrier rate of Group A beta-hemolytic Streptococci in our study was 3.6%. It correlated well with the findings of other studies which were done in South India (Table III).

In our study, Group A beta-hemolytic Streptococci most frequently colonized the age group of 7 – 8 yrs. It can be speculated that a contributing factor to a lower colonization rate among older children may be related to host immunity that

increased over time. The prevalence of Group A beta-hemolytic Streptococci was not significantly different between males and females.

Table I: Age wise distribution of isolated samples.

Age (in years)	No. of positive isolates
5-6	none
7-8	4
9-10	2
11-12	1
13-14	none
15	none

Table II: Antibiotic sensitivity pattern of isolates.

Antibiotics	Sensitivity(%)
Penicillin	100
Erythromycin	100
Gentamicin	100
Cephalexin	100
Amikacin	100
Vancomycin	100
Linezolid	100

Table III: Comparison of group A Streptococci carrier rate in India.

Study	Carrier rate (%)
Muthusamy D et al[1]	5.09
Menon et al[6]	5.2& 8.4
Koshy et al[7]	2.3
Charmaine ACL et al[8]	8.4
Our study	3.6

The GAS isolated from carriers could cause acute throat infections. The GAS has been reported to be found in the tonsillar epithelial cells in carriers, thus suggesting a reservoir status with potential to cause reinfection.[1] Penicillin is used most often as the drug of choice for streptococcal pharyngitis. The emergence of resistance to this antibiotic would therefore be a major public health concern. The Group A beta-hemolytic Streptococci in our study were 100% sensitive to penicillin, similar to observations in other south Indian studies.[6,7,8,9] Macrolides are used only in case of penicillin allergy. However all the strains were sensitive to erythromycin. However macrolide resistance has been observed in south Indian studies.[1,10]

Conclusions:

The surveillance programme is important to control the Group A beta-hemolytic streptococcal infections and their carriers. Healthy carriers of Group A beta-hemolytic Streptococci are sources for bacterial dissemination, are able to communicate the disease and even lead to

severe epidemics.[11] The children who are found to be carriers can be treated with antibiotics and prevent the development of non-suppurative lesions.

References:

1. Muthuswamy D, Boppe A, Suresh SP, Journal of Clinical and Diagnostic Research. 2012 Sep; 6(7): 1181-83.
2. Nandi S, Kumar R, Ray P, Vohra H, Ganguly NK. Group A streptococcal sore throat in a peri-urban population of northern India: a one-year prospective study. Bulletin of the World Health Organization, 2001; 79: 528-33.
3. Devi U, Borah PK, Mahanta J, The prevalence and antimicrobial susceptibility patterns of beta-hemolytic streptococci colonizing the throats of schoolchildren in Assam, India. J Infect Dev Ctries 2011; 5(11): 804-08.
4. Mohan CR, Lehman DC, Manuselis G. Textbook of Diagnostic Microbiology. 4th ed. China: Saunders Elsevier; 2011.
5. Performance Standard for Antimicrobial Susceptibility Testing. Clinical Laboratory Standard Institute. Wayne.PA.2011; M100-S 21: 31(1).
6. Anbu M, Thangam M. Biotyping of the Group A Streptococci which were isolated from normal school children in south India. Indian Journal for the Practising Doctor. 2005:17-18.
7. Koshi G, Benjamin V. Surveillance of the streptococcal infections in children in a south Indian community--a pilot survey. Indian J Med Res 1977; 66: 379-88.
8. Charmaine ACL, Swarna EJ, Thangam M. Pharyngeal carriage of the group A streptococci in school children in Chennai. Indian J Med Res. 2006; 124: 195-98.
9. Navaneeth BV, Ray N, Chawda S, Selvarani P, Bhaskar M, Suganthi N. Prevalence of beta haemolytic streptococcus carrier rate among school children in Salem. Indian J Pediatr. 2001; 68: 985-86.
10. Brahmadathan KN, Anitha P, Gladstone P. The increasing resistance among the Group A Streptococci which caused tonsillitis in a tertiary care hospital in southern India. Clin Microbiol Infect 2005; 11: 335-37.
11. Gurung R, Budhathoki S, Amatya R, Poudyal N, Shreestha S, Baral R.Group-A beta-hemolytic Streptococcus infection presenting with sore throat at paediatric OPD. Health Renaissance, May-Aug 2010; Vol 8 (2): 90-92.

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