Prevalence of group C and G streptococcus in pediatric acute tonsilopharyngitis in Turkey

Medine Aysin TASAR (*), Ilknur BOSTANCI (*), Ayşe Esra KARAKOC (**), Beray SELVER (*), Mustafa DEMİRİNİMLEK (**), Yıldız DALLAR (*)

** Department of Medical Microbiology, MoH Ankara Training and Research Hospital, Ankara-TURKEY

Introduction

Group A streptococcus (GAS) is the most common cause of acute bacterial pharyngitis, rheumatic fever and rheumatic heart disease. GAS is isolated in 15-30% of all acute pharyngitis cases in children (1). Certain strains of group C streptococcus (GCS) and group G streptococcus (GGS) have been increasingly reported to cause infections similar to those caused by GAS such as pharyngitis, sepsis, skin and soft tissue infections, toxoid shock, reactive arthritis, and postinfectious glomerulonephritis (2-4). GCS is reported for pharyngitis in adults, school and family epidemics in children (5-8). GCS and GGS can cause infection by drinking non pasteurized cow milk and brushing teeth and the gum. In GCS and GGS infections fever, sore throat, pharyngeal exude and lymphoid hyperplasia are the symptoms like GAS (9).

The most common diagnostic laboratory method in streptococcal pharyngitis is throat culture. In recent years rapid antigen test is also used commonly for this purpose. GAS are determined with high sensitivity by rapid antigen tests. But it is reported that GCS and GGS cannot be determined by any of these tests (9,10).

There are reports the prevalence of GCS and GGS infections in children between 1.7 – 13.5 per cent in English literatures (5,6,10). There are few studies conducted in Turkey concerning acute tonsillopharyngitis in childhood. In a retrospective study, non- group A streptococcus was detected in 10.8% of children with acute tonsillopharyngitis (11). In another study, GCS prevalence was found to be 16.5% among children with acute tonsillopharyngitis (12).

Our aim is to determine the prevalence of group C and G streptococcus in children with acute tonsillopharyngitis.

Methods and results

From December to May, 200 children who had the diagnosis of acute tonsillopharyngitis participated in this cross sectional study. The study was approved by the Local Ethics Committee.

Acute tonsillopharyngitis was diagnosed by Centor criteria (presence of two or three of the following: fever, pharyngeal exudate and erythema, cervical lymphoid hyperplasia, non-productive cough) (13). Children who had received antibiotics for three or more days were not accepted in the study.

Throat culture samples were collected by a sterile swab from tonsillary area and posterior pharynx. Samples were inoculated on 5% sheep blood agar (OR-BAK, Turkey) without any delay. Plates were incubated in 37oC in aerobic atmosphere...
for 48 hours. Growth of the bacteriae were checked twice after 24 and 48 hours. The samples which had no growth of beta hemolytic streptococcus were reported as normal throat flora. The samples which had beta hemolytic streptococci were tested with 0.04 units of Bacitracin disc for susceptibility. All beta hemolytic streptococci which showed bacitracin resistance were grouped according to Lancefield latex agglutination test (Omega Diagnostics, Scotland, United Kingdom).

All data analyses were conducted using SPSS for Windows, version 15 (SPSS Inc, Chicago, IL). We compared categorical variables using the chi-square and the others by non-parametric Mann-Whitney U Test. A value of p ≤ 0.05 was considered statistically significant.

Result

The age interval of children who were included in this study was 1 - 15 years (mean age 8.2 ± 3.0) and the ratio of girls to boys was 0.9.

Symptoms were sore throat in 122 (61%) and fever in 66 (33%) of children. The time between the onset of symptoms and the application to the hospital was 2.0 ± 1.0 day.

In systematic examination, we found sore throat in 196 (98.0%) of children, fever in 187 (93.5%). In the physical examination exudative tonsillitis was detected in 150 (75.0%) patients and lymphadenopathy in 75 (37.5%).

At the time of diagnosis, acute otitis media was detected in 19 patients (9.5%), deep neck infection in 12 patients (6.0%), acute rheumatic fever in one patient (0.5%).

Acute tonsillopharyngitis was most common (33.5%) in March.

Children lived in apartment houses in 102 (51%) of the cases and in shanty houses in 96 (48%). The median of the people who lived in the house was five (3-9) and the median number of siblings was two (1-5).

Throat culture findings were group A in 21% (n=42), group C in 3% (n=6), group B in 2% (n=4), group F in 2% (n=4), group G in 1% (n=2).

There were no positive culture findings for the cases under four years of age.

The mean age of cases who had no positive culture findings was 7.9 ± 2.9 years, who had positive group A beta hemolytic streptococcus was 9.1 ± 2.8 years and who had positive culture of other streptococci was 9.4 ± 2.8 years. The difference between the mean ages of children with positive and negative culture findings was significant (p = 0.026).

There were no statistical difference between groups of positive and negative culture findings in terms of physical examination, social factors and symptoms (p > 0.05).

Fever, sore throat and exudative tonsillitis were detected in children with positive cultures for GCS and GGS. There was no difference between GCS, GGS or GAS in terms of symptoms and findings.

Discussion

Group C and group G streptococcus have been increasingly reported to cause infections similar to those caused by Group A streptococcus (GAS) (2-4,14). The reported prevalence of GCS/GGS carriage and incidence of related disease varies greatly worldwide specially in temporal climate regions (14,15).

Group C streptococcus is more common in adolescent and adult pharyngitis, school epidemics and family endemics (9). In Spain, streptococcus prevalence was determined among children who had symptoms of tonsillopharyngitis under two years of age and group A streptococcus was isolated in 12.0%, group C streptococcus in 5.2% (16). In physician’s practice, group G streptococcus pharyngitis was detected at 25% (8). Patil et al (17) evaluated a total of 100 patients of acute pharyngitis, among them 17 patients proved positive for beta-haemolytic streptococci. Out of 17 isolates, 13 (76.47%) belonged to group A and 2 (11.76%) belonged to each of the group C and group G.

In a retrospective study conducted in Turkey, non-group A streptococcus was detected in 10.8% of children with acute tonsillopharyngitis (11). In another study, GCS prevalence was found as 16.5% among children with acute tonsillopharyngitis (12).

In our study, group A, C and G streptococcus were not isolated in children under 4 years of age. The reason for this may be due to the small number of cases.

It is believed that the role of group G and C streptococcus in streptococcal disease burden is under-recognized by clinicians and microbiologists, and suggested that pharyngitis resulting from GGS/GCS should also be treated actively (18). Lindboek et al. (19) showed that symptoms of group C-G streptococcus and group A streptococcus were similar. Moreover they defined prevalence ratio as 1/5. In this study group C and G streptococcus prevalence was in a ratio of 1/5 with group A streptococcus (n=40). Little et al. (20) showed that 33% were non-group A streptococci, mostly C (n = 29), G (n = 18) and B (n=17).

Non-group A strains commonly cause streptococcal sore throat, and present with similar symptomatic and clinical features to group A streptococci. The best features to predict streptococcal sore throat presenting in primary care deserve revisiting (8). Also in our study there were no difference between group C, G and A streptococcus either in terms of age or symptoms.

In all of the world prevalence of acute rheumatic fever (ARA) differs according to communities. The lowest ratios are reported from USA and European countries (9.5-18/100000) and the highest ratios are reported from Australia -New Zealand Aborigins (80-508/100000) (21). In Aborigins ARA is common but pharyngitis of group A streptococcus is uncommon. Trait of group A and G streptococcus are common and relation with ARA is questioned (22).

In our country ARA is still common and it is a public health problem (23). But the prevalence of group C and G streptococcus are not known in Turkey. In cases which applied with acute tonsillopharyngitis symptoms and had positive culture findings, we established 16% group C and G streptococcus.

In Bangladesh, in a study of 2175 children who had tonsillopharyngitis; positive culture findings were determined in 428 cases and dispersion of these cases were 74% group C,
21.5% group A. It was reported that advanced studies were necessary (24).

Peritonsillar abscess, wound infection, perirectal abscess, septic arthritis, cellulitis, reactive arthritis, keratouveitis, which were caused by group C and G streptococcus (10, 25-27). All of these children were older than 12 years of age and it was reported that the authors did not know the reason of this. In our study group C streptococcus caused deep neck infection and group G streptococcus caused acute otitis media in one child each.

Our study is first in this area and in cases who applied with acute tonsillopharyngitis symptoms and had positive culture findings. We emphasize that group C and G streptococcus should be isolated from throat cultures. Not only school age and adolescents but also in preschool age, streptococcus may cause endemic or sporadic infections.

References


25. Nataneili N, Aguilera ZP, Rosenbaum PS, Goldstein T,
