

Group A streptococcal tonsillopharyngitis burden in a tertiary Turkish hospital

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SUMMARY Özkaya-Parlakay A, Uysal M, Kara A. Group A streptococcal tonsillopharyngitis burden in a tertiary Turkish hospital. Turk J Pediatr 2012; 54: 474-477.

Acute tonsillopharyngitis is a very common upper respiratory tract infection and might cause serious morbidity and even mortality if not handled properly. Although the etiologic agent is mostly viral, group A beta hemolytic streptococcus is the most important bacterial agent, with a frequency of 15-30% in the pediatric age group. In this article, as the social burden for this infection is notable and almost one-third of costs are estimated to be non-medical, we applied a questionnaire to the parents of 100 proven group A tonsillopharyngitis patients to describe the social cost of this infection.

Key words: group A beta hemolytic streptococcus, burden, tonsillopharyngitis, child.

Acute tonsillopharyngitis is one of the most common reasons for doctor visits and medical care demands, especially in the pediatric age group. According to United States (US) data, approximately 7.3 million outpatient physician visits attributable to sore throat occur each year among children in the United States, and group A streptococcus (GAS) is responsible for 15% to 36% of cases¹. Group A streptococcus is an important pathogen responsible not just for suppurative complications, necrotizing fasciitis and streptococcal toxic shock syndrome, but also nonsuppurative ones such as acute rheumatic fever (ARF), post-streptococcal glomerulonephritis (PSGN), and reactive arthritis. It is estimated that around 9700 invasive diseases and 1300 deaths can be attributed to GAS each year in the US².

Considerable similarity between GAS strains causing pharyngitis in school-aged children and isolates from cases associated with invasive disease in the community indicates this age group serves as a reservoir of infection^{3,4}.

Nonsuppurative complications of GAS, ARF and PSGN, are also important aspects of streptococcus infection. The incidence of ARF varies according to geographic area, and the overall mean incidence rate of first attack of ARF ranges from 5 to 51/100,000, with a higher incidence (>10/100,000) documented in Eastern Europe, Middle East (highest), Asia,

and Australasia⁵. PSGN is the most common form of postinfectious glomerular injury. The disease occurs in 5% of those infected with streptococcal sore throat and may occur in 25% of infections with nephritogenic strains of beta-hemolytic streptococci. It is estimated that over 470,000 cases of acute PSGN occur annually. The incidence rate in children in less developed countries was found to be 24.3 cases per 100,000 person-years⁶.

In human and animal experiments, it has been demonstrated that recombinant multivalent vaccines containing aminoterminal M protein fragments from as many as 26 different serotypes of GAS evoked opsonic antibodies in animals and humans^{7,8}, and the same group also demonstrated that a new 30-valent vaccine containing M protein elicited significant levels of bactericidal antibodies against 24 of 40 non-vaccine serotypes of GAS⁹. If these phase I/II trials prove the vaccine as efficacious, a common reason for antibiotic prescriptions and antibiotic resistance will be diminished, and hopefully invasive diseases due to GAS will be prevented. The more commonly encountered GAS tonsillopharyngitis cases are also expected to decrease in number.

Before the debates start, including regarding the advantages and disadvantages of vaccination, the burden of GAS tonsillopharyngitis should be weighed. Unfortunately, there is no well-

coordinated data input demonstrating the burden of GAS in our country. We thus aimed to describe the medical and non-medical costs in proven GAS tonsillopharyngitis patients.

Material and Methods

Parents of children proven to have GAS tonsillopharyngitis admitting to Hacettepe University Pediatric Hospital between January 2007 and December 2008 were enrolled. Parents of the patients were considered eligible if the patient had, in addition to fever, any complaint such as sore throat, headache, abdominal pain, or rash, and a proven GAS tonsillopharyngitis with a throat culture but not considered to be carrier. A telephone survey was completed with parents within 2-4 weeks after the initial visit. Name, surname, age, gender, visit type (emergency department or outpatient clinic), month of admittance, symptoms and duration, infection in last month and last six months, sibling number, antibiotic, parental forgetfulness in giving medications, child's willingness to take medicine, side effect of the medication (diarrhea, vomiting, allergy, etc.), antipyretic usage, means of obtaining medication (with insurance, personal resources, etc.), means of transportation, school day loss, and work day loss of mother and father, if employed, were noted. Work day loss was calculated according to the Turkish Statistics Institute work day cost research reports¹⁰, and transportation costs were obtained by questioning the parents and calculated according to data gathered from families and also data supported by the Anatolian Agency¹¹.

Results

Of 187 potentially eligible cases, 100 parents could be enrolled in our study (exclusions were due to wrong contact information or incomplete survey). The mean age of the patients was 8.1 ± 3.18 years (range: 1-19) (Fig. 1), and 56% of the patients were male. Of 100 patients, 19 attended a daycare center, 71 attended primary school, and 7 were not in school. Of the patients, 73.4% admitted in winter, 14.3% in fall and 12.2% in spring (Fig. 2). Fever was present in all of the patients, sore throat in 74%, abdominal pain in 38%, headache in 30%, and rash in 14%. Children experienced fever with a mean of 2.28 ± 1.72 days, sore throat

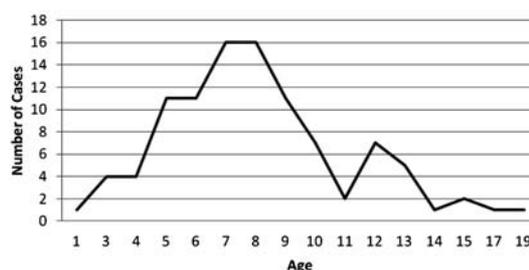


Fig 1. Age distribution of GAS cases.

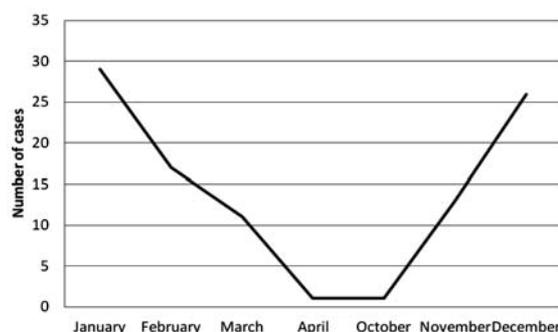


Fig 2. Monthly distribution of GAS cases.

with a mean of 2.20 ± 1.81 days, abdominal pain with a mean of 0.9 ± 0.49 days, and headache with a mean of 0.7 ± 0.41 days. Antibiotic was prescribed in 64% of patients due to throat culture and in 22% at admittance, and no antibiotic was prescribed in 14%. In 42% of the patients, intramuscular therapy was preferred. The emergency department was the place of admittance in 56% of patients, and 44 of them admitted to the general clinic. Sixty patients admitted only once, whereas 11 had 2 visits and 2 had 3 visits. Seventy-three patients had a sibling, and 33% of them were also sick.

Parents used their own resources to obtain medication in 25% of the cases. Personal vehicles were preferred by 40% of the parents, 40% used public transportation, 17% used taxi, and 3% came on foot. Of 90 patients either attending daycare center or primary school, 10 did not have any school day loss, and 80 had school day loss ranging between 1-10 days (mean: 2.56 ± 2.61).

Ninety-three percent of the fathers were employed; 13% of them had work day loss, ranging between 1-3 days (mean: 0.3 ± 0.89 days). Thirty-six percent of mothers were employed and had work day loss ranging between 1-2 days (mean: 0.09 ± 0.35).

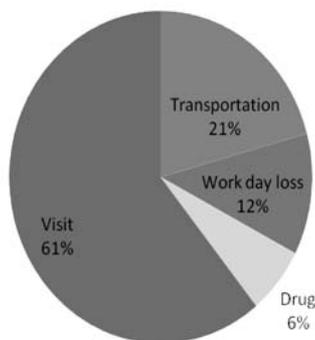


Fig 3. Distribution of cost of GAS.

Expenditure for transportation was determined as 22.8 Turkish lira (TL) (12.26 USD) per child, cost of work day loss per child was 12.98 TL (6.98 USD), drug expense per child was 7.18 TL (3.86 USD), and visit cost per patient was 66.9 TL (35.93 USD) (including throat culture), bringing the total cost per patient to 109.86 TL (59.03 USD) (Fig. 3).

Discussion

The economic burden of GAS tonsillopharyngitis is high according to studies in the literature¹². Pfoh et al.¹² found cost per case as over \$200, almost one-half attributable to non-medical costs. It was calculated as 109.86 TL (59.03 USD). We estimate the difference is high due to medical costs (doctor, hospital, tests) being far less expensive in our country; salary differences between the US and our country could also explain this difference. Other studies of vaccine-preventable diseases have declared that non-medical costs accounted for 39-83% of the total costs¹³⁻¹⁶. In our study, non-medical cost was 45.7% of the total cost.

Societal cost per case of viral respiratory infections was \$80 and \$262 for otitis media and \$397 in previous studies¹⁵⁻¹⁷. However, while the cost per case of GAS pharyngitis is lower than these costs, it is more frequent, which causes an economic burden of \$224 million to \$539 annually in the US. In this aspect, it is obvious that the burden of GAS pharyngitis would be far more than we calculated.

In previous studies, it was stated that children experienced symptoms for 4.5 days on average¹⁰, whereas children in our study had fever for 2.28, sore throat for 2.2, abdominal pain for 0.49, and headache for 0.7 days on

average. In our study, children had a 2.56 school days loss, which was higher than 1.9 days loss on average in the literature¹⁰. The bedrest of children in our study might have caused a shorter symptomatic period. Mothers of children in our study had 0.09 work day loss, and fathers had 0.09 work day loss, which is less than the 1.8 days in literature¹². This might be due to the fact that in our country, parents have other available relatives to care for their children.

Tonsillopharyngitis due to GAS has different aspects of importance, primarily its frequency, transmission and societal costs. While we calculated a societal cost of 109.86 TL (59.03 USD) per case, it should be kept in mind that GAS tonsillopharyngitis has a greater economic burden than calculated in this study, in that the attack rate in school and among relatives also cause far more damage. As our study group does not represent primary and secondary health-care centers, further studies are needed to gather data about the real burden of GAS in our country.

Rates of invasive disease and pharyngitis attributable to GAS infection in unvaccinated adults may decrease if transmission is interrupted, similar to results observed with the 7-valent pneumococcal conjugate vaccine¹⁸⁻²⁰. Thus, current ongoing studies about a candidate GAS vaccine would be important in decreasing the frequency of pharyngitis, invasive disease and acute rheumatic fever. It might also decrease unnecessary prescription of antibiotics both in children and adults, hopefully yielding lower antibiotic resistance.

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