

Inappropriate use of antibiotics in the treatment of pharyngo-tonsillitis in children in Khartoum, Sudan

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ABSTRACT

Background: Pharyngo-tonsillitis represents a major public health problem all over the world. Recent studies in Sudan have revealed alarming results reporting antibiotics over prescription in the management of acute tonsillitis.

Objectives: The aim of this study was to estimate the prevalence of Group A Beta hemolytic streptococci and document the appropriateness of using antibiotics in the treatment of acute tonsillo-pharyngitis in Jaafar Ibn Auf Pediatrics Hospital.

Materials and Methods: A cross sectional hospital based study was conducted in the period January to August 2012 in Jaafar Ibn Auf Hospital, the largest tertiary pediatrics hospital in Sudan. The sample size was 100 including children aged 2-17 years and got antibiotics treatment for their current sore throat. A pharyngeal swab was collected at presentation from tonsils and posterior pharynx. Gram staining was done first, and then Group A Beta hemolytic streptococci were isolated and identified in the laboratory by their growth characteristics. All children included in the study were assessed clinically and subjected to a structural questionnaire. Data were analyzed by SPSS version 19.

Results: The estimated prevalence of Group A Beta hemolytic streptococci tonsillitis and/or pharyngitis was 22%, nevertheless the proportion of antibiotic prescription was 100%.

Conclusion: Most children were treated inappropriately regarding the need for using antibiotics, the type of antibiotics used and the duration of management. As many studies suggested that increased using of antibiotics may be due to uncertainty of diagnosis, requesting scoring system or rapid diagnostic test can contribute to the reduction of the rate of antibiotics prescription.

Keyword: Pharyngo-tonsillitis, inappropriate, children, antibiotics, Sudan

Acute tonsillo-pharyngitis is a very common upper respiratory tract infection and might cause serious morbidity and even mortality if not handled properly. It is one of the most frequent illnesses for which pediatricians, internists, and other primary care physicians are consulted^{1,2}. Although the etiologic agent is mostly viral, several clinical studies revealed that group A beta hemolytic Streptococcus (GAS) is the most important bacterial agent, with a frequency of 15-30% in the pediatric age group^{3,4,5}.

Recent research reported that the prevalence rates of GAS disease and carriage varied by

age; children who were younger than 5 years had lower rates of throat cultures that were positive for GAS. The largest proportions (15% to 40%) of children and young adults (30% to 60%) who have tonsillo-pharyngitis have viral infections. Furthermore about 8% to 40% of children and 5% to 9% of adolescents who have sore throat, fever, and tonsillo-pharyngeal inflammation have GAS infection^{4,6,7,8}.

GAS tonsillo-pharyngitis cannot be diagnosed on clinical grounds alone in most patients. The patient who has a classic GAS throat infection exhibits fever, tonsillo-pharyngeal erythema and exudate, swollen and tender anterior cervical adenopathy, absence of rhinorrhea and cough, and an elevated white blood cell count during mid-winter to early spring. Several studies have shown that when this group of symptoms present, the

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likelihood of GAS infection approaches 60% to 70% in children and 20% to 30% in adolescents^{9,10,11}. Therefore, when a clinician evaluates a patient with acute sore throat, the most important clinical task is to decide whether or not the patient has “strep throat.” The primary care physician needs to identify those patients with acute pharyngitis who require specific antimicrobial therapy and to avoid unnecessary and potentially deleterious treatment in the large majority of patients who have a benign, self-limited infection that is usually viral^{4,9}.

Group A streptococcus (GAS) is certainly the only cause of sore throat that needs antibiotics treatment. The potential aims of treatment are symptoms reduction, prevention of transmission, and prevention of supportive and non-supportive streptococcal sequel, particularly acute rheumatic fever as suggested in previous studies on the treatment of tonsillo-pharyngitis^{12,13,14}. The impact of using antibiotic or not in the management of acute tonsillitis has been a subject to many studies^{15,16}. The benefits of antibiotics in primary prevention of rheumatic fever outweigh the side effects of antibiotics, possibility of emergence of bacterial resistance and the cost of antibiotics¹³. For this reason, cheap and narrow spectrum antibiotics are preferred. Penicillin is the drug of choice in streptococcal tonsillo-pharyngitis. Unfortunately, greater use of antibiotics during the past 50 years has exerted selective pressure on susceptible bacteria and may have favored the survival of resistant strains, some of which are resistant to more than one antibiotic as reported by many studies on antibiotics consumption^{5,17,18,19}. If excessive antibiotic use can be reduced, the expectation is that resistant bacteria may be replaced by susceptible bacteria because resistant bacteria may be less ‘fit’ than susceptible bacteria⁴. Furthermore, research suggests that increased consumption of antibiotics may not only produce greater resistance at the individual patient level but may also produce greater resistance at the community^{5,20}. The aim of this study was to determine the

prevalence of group A beta hemolytic streptococci and to estimate the proportion of the antibiotic prescription in the management of acute tonsillo-pharyngitis in Jaafar Ibn Auf Hospital.

MATERIALS AND METHODS:

A cross sectional, hospital-based study, was conducted in Jaafar Ibn Auf hospital which is the largest tertiary pediatrics hospital in Sudan. Study populations were children who presented to Jaafar Ibn Auf Hospital with sore throat whom age less than 17 years, from January - August 2012.

Sample size was 100 which was calculated according to the equation:

$$\text{Sample size} = \frac{4pq}{L^2}$$

P = estimated prevalence (percentage); **Q** = 1-p;

L = allowable error; **P** = 20%.

We estimated the errors within 8% of the true value. $4(20)(100-20) \div 8^2 = 100$

All children included in the study were assessed clinically and subjected to a structural questionnaire which contains demographic data, history of illness, and use of antibiotics for their current sore throat, physical examination and pharyngeal swab for culture. Informed consents were taken from children and their parents for both examination and pharyngeal swab. A pharyngeal swab was collected at presentation from each child from both tonsils and posterior pharynx without touching any part of the mouth and immediately placed in charcoal transport medium. Specimens were transported to the laboratory within 24 hours at temperature 37°C. Culture was performed in blood agar media prepared in the laboratory. Gram staining was done first, and then Group A Beta hemolytic streptococci was isolated and identified in the laboratory by its growth characteristics. Bacitracin was added to dishes that showed characteristics of GAS.

Data was interpreted and analyzed by SPSS version 19. Children who were found to be GAS positive by culture were informed by telephone so as to continue antibiotics for 10 days as recommended by W.H.O.

RESULTS:

The children enrolled in the study were

divided into 4 age groups, Male accounted for 57% of the study population while female accounted for 43% of the study population. Regarding antibiotic prescription, Penicillins (Penicillin G and Penicillin V) were prescribed 5 and 14 times respectively, Aminopenicillins (Amoxicillin and Ampicillin) were prescribed 11 and 0 times respectively, Amoxicillin + Clavulanic acid was prescribed 51 times (Figure.1), Cephalosporins (1st, 2nd and 3rd generations) were prescribed 1,1,9 times respectively, while other drugs were prescribed as follows: Erythromycin 6 times, Azithromycin 1 time, and Clarythromycin 1 time (Figure.1). Regarding the culture result, 22% of children result was positive for group A beta hemolytic streptococci, while 78% have negative results (Figure 2).The drug was prescribed for 1-3 days for 82% of children, 4-6 days for 7% of

children and for 7-10 days for 11% of children (Figure 3).A peak of GAS bacterial isolates was noticed in the 6-10 years age group. Table 1 showed that children age group 6-10 years had the highest percentage of positive results (32.4%), then age group 11-15 (17.6%), then age group less than 5 years (14.6%). P value was 0.06 using One-Way Anova test.

Table (1): Correlation between age and GAS culture results of the studied children.

Age	Results of culture & sensitivity	
	GAS	No Growth
0-5 year	7%	41%
6-10 year	11%	23%
11-15 year	3%	14%
>15yer	1%	0%
Total	22%	78%

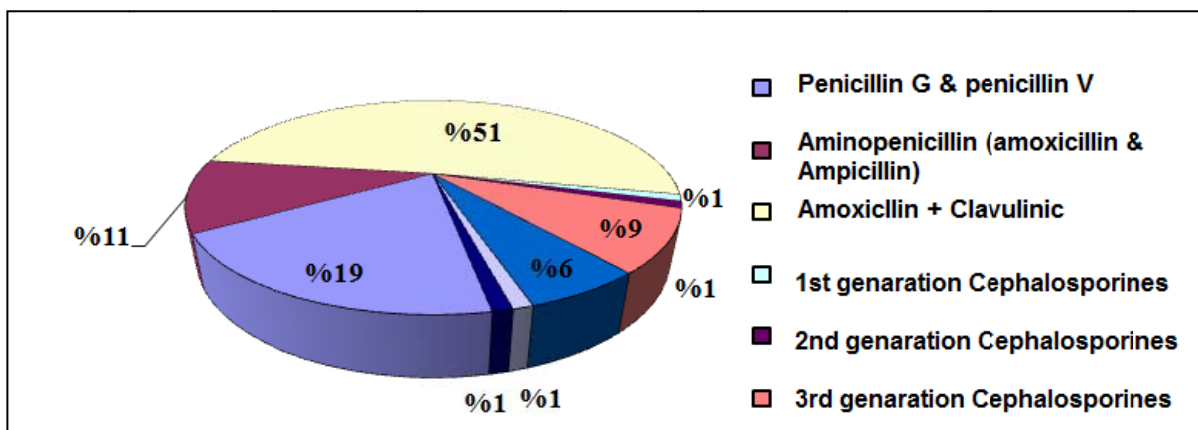


Figure (1): The type and percentage of antibiotics prescribed to studied children

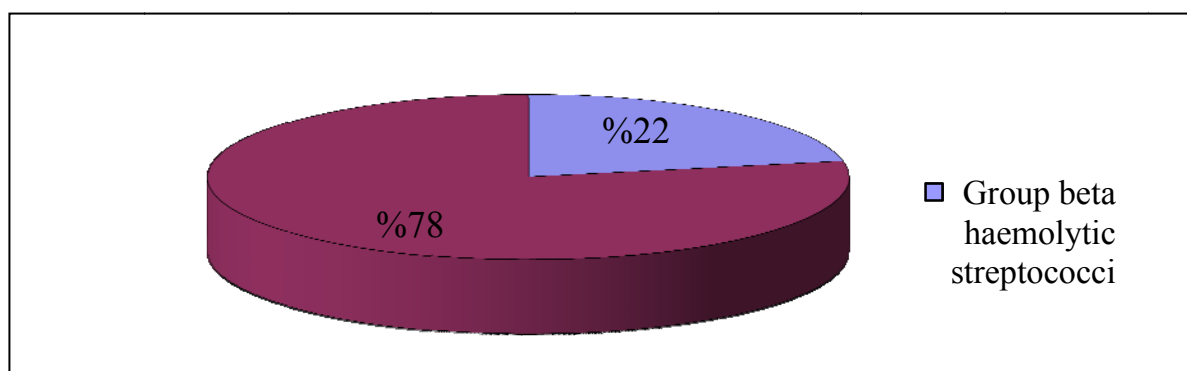


Figure (2): Results of culture and sensitivity among the studied population.

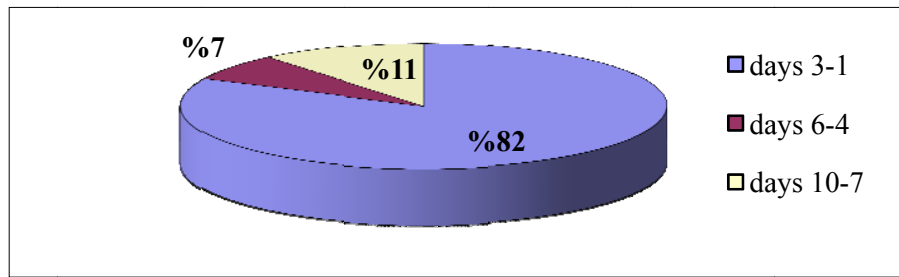


Figure (3): Duration of the treatment among the studies patients.

DISCUSSION:

The characteristics of the demographic data of the study showed that under five years children dominate the study sample (48%) which mean that this age group was the most frequent age to present to the hospital with sore throat for treatment. Followed by 6-10 years old children and this is in agreement with the fact that bacterial sore throat is common in this age group, so it is expected to represent a high percentage of the study sample²¹⁻²³. The reason of the occurrence of the peak prevalence at this age group is not well established yet, but it could be related to the increased activity of children at this age, giving a higher chance for the exposure to infection than other ages. Regarding gender there was no significant difference in male: female ratio of the study sample. The ratio was 1.3: 1. Other studies also showed male predominance²⁴⁻²⁶.

A recent study conducted in Yemen in 2009 to determine the prevalence of GAS pharyngitis showed a bit higher prevalence (28,6%)²⁴, but this difference can be justified because that study was conducted in winter in which the prevalence of GAS is higher⁴.

As this study shows only 22% of children who presented to Jaafar Ibn Auf hospital with sore throat were in need for antibiotics, 78% of children received unnecessary antibiotics- as antibiotics were prescribed for all children who present with sore throat. The clinical difficulty in separating the symptomatic patients with positive culture into those who have true infection and into those who have pharyngitis due to some other agents (streptococcal carriers) leads most physicians to treat such

patients with antibiotics and that is in consistent with findings from other previous studies^{1,27}.

It is inappropriate to treat acute pharyngitis routinely with antibiotics because only a minority of patients with pharyngitis is infected by GAS. The mass treatment for all children with sore throat without the use of throat swabbing is very expensive and result in unnecessary antibiotic treatment of many patients who do not have GAS pharyngitis^{6,7}.

This practice has the associated dangers of adverse events and emergence of antibiotic-resistance in organisms such as pneumococci.

The utilization of antibiotic in the management of acute tonsillitis also depends on prevalence of GAS tonsillitis. The prevalence of GAS pharyngo-tonsillitis differs from country to country. Increasing or decreasing in the prevalence of GAS in different regions in the world is a matter of extreme complexity as there are unlimited number of factors that can affect this rate including the socioeconomic states, sanitation level, endemicity of certain strains, climatic variation, crowded conditions, age, gender, technical and human errors and many others²⁴.

The drug recommended for treatment of G.A.S acute pharyngo-tonsillitis is Penicillin V for 10 days because of its proven efficacy, narrow spectrum, safety and low cost^{1,28}.

This drug was prescribed for 14 children; their swab results showed that only 2 swabs grew GAS, and 12 swabs did not grow GAS. Aminopenicillins which has broad spectrum activity was prescribed for 11 patients; none of them have positive culture result. Amoxicillin+ clavulanic acid was the most drug prescribed. It was prescribed for 51

patients, while their swab results showed only positive culture for 15 children. Cephalosporins were prescribed for 11 children; none of them have positive swab culture. The duration of treatment varied from 1-10 days, but only 11% received the treatment for the appropriate duration^{29,30}.

CONCLUSION:

It can be concluded that pharyngo-tonsillitis caused by Group A Beta hemolytic streptococci estimated to represent 22% of children with sore throat presenting to Jaafar Ibn Auf hospital.

Antibiotics were prescribed in a proportion of 100% of sore throat patients; therefore 78% patients received antibiotics inappropriately. The cost effect of strategies for treatment of GAS pharyngitis is very important. Swabbing all children is not practical because of high cost and the time needed for culture. Therefore, further work needs to be done to adapt an evidence based scoring system for diagnosing GAS tonsillo-pharyngitis on clinical basis and to establish a proper diagnostic laboratory test.

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