

## Is it Necessary to initiate antibiotic therapy in children with pharyngitis?

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### ABSTRACT

Streptococcus Beta Hemolytic Group A is the most important pathogen causing which may lead to purulent and non purulent angina. Rheumatic fever is the most important complication that is the cause of 30% to 40% of cardiac disease and disablement. This study was performed to evaluate prevalence of Streptococcus Beta Hemolytic Group A and estimate role of clinical findings in children with Streptococcus angina diagnosis. antibiotic resistance was also assessed evaluated in the patients with bacterial pharyngitis. Throat culture was performed on 104 patients referred to Amiralmomenin hospital of Semnan at the age range of 5 to 15 years having angina without begin on antibiotic treatment after the completion of the questionnaire. A frequency of 1% have been assessed for Streptococcus Beta Hemolytic Group A, coagulase -positive Staphylococci and non-group A Streptococcus frequencies were 10.6% and 17.3% respectively. 100% of patients had pharyngeal erythema, 72% had fever, 55% had exudates and 52% had cervical adenopathy. The diagnosed Streptococcus was sensitive against penicillin, erythromycin and amoxicillin and resistant against cotrimoxazole. In examining Staphylococcus aureus antibiotic-resistance, only 40% of cases were sensitive to clindamycin and 40% were also sensitive to vancomycin. Very low frequency of group A Streptococcus has undermined the routine use of antibiotic and show that the clinical based diagnosis alone is not reliable and rational use of antibiotics requires the use of other diagnostic methods such as throat culture and rapid antigen test (RATs). Also in analyzing coagulase -positive Staphylococci antibiotic resistance, we can see increased cases of resistance against neomycin and clindamycin which indicates the necessity of rational treatment of patients afflicted by streptococcal infections.

**Key words:** Streptococcus Beta Hemolytic Group A; pharyngitis; Penicillin

### INTRODUCTION

Upper respiratory infection that includes acute pharyngitis is one of the most common causes of patients' referral to physicians. In most of cases, virus is the basic cause but the most important bacteria factor is Streptococcus Beta Hemolytic Group A [1]. 30 to 45% of pharyngitis cases among children and 10 % of adults are a result of Streptococcus Beta Hemolytic Group A (piogen) and also during some periods piogen Streptococcus can cause half of angina cases among children [2].

Some of the Streptococcus pharyngitis signs include localized pus such as abscesses around the pharynx and other deep fascial infections and non

purulent signs such as rheumatic fever and active glomerular nephritis [3].

Although the prevalence of rheumatic fever has declined [4] but the relationship between purulent angina and acute rheumatic fever as the most common cause of acquired cardiac disease is undeniable and apparent [5]. Streptococcus pharyngitis signs are rapid and associated with intense angina and moderate to high fever. Headache, nausea, vomiting and abdominal pain are common; in some acute cases, pharynx would become red and tonsils become large and covered with yellow exudate and bleeding, anterior cervical lymph nodes are enlarged and sensitive to touch, however the clinical signs of the patient is extended

[3]. Low frequency of Streptococcus Beta Hemolytic Group A (SBHGA) among the patients who are treated by penicillins under Streptococcus pharyngitis indicates that clinical signs-based treatment is not reliable and it is better to use methods such as pharynx culture which is applied as golden standard method. Throat culture that is collected and treated properly is the most sensitive and most specific tool available for detailed diagnostics [2].

In the usual course of Streptococcal pharyngitis without complication, the symptoms are resolved after 3 to 5 days, if treated, the disease course becomes a little shorter, the treatment in the first place is provided for the prevention of infectious and rheumatic fever, the prevention of rheumatic fever is emphasized on eradicating organisms from throat rather than a simple resolution of symptoms and requires a 10-day using 10 days treatment with oral peniciline and a single dose of intramuscular benzatin peniciline G injection. In the treatment of people who are allergic to penicillin, erythromycin or azithromycin is recommended [2]. Erythromycin and other macrolide-resistance is widespread in Spain, Italy, Finland, Japan and Korea. In areas where the resistance is more than 5 to 10% the macrolid treatment should be prevented unless it is specified in sensitiveness test [2]. In a study that was carried by Dr. Habibollahi in Shahrekord, 15 and 11% were resistant against SBHGA and penicillin respectively [4]. As mentioned above, rheumatic fever is the most important sign of Streptococcus pharyngitis that in the event of infection and prevalence of the related cardiac problems we will witness the patient's disablement in low ages which besides increasing the burden on society, will be followed by psychological and economic problems [5].

Therefore, due to dangerous and irreparable side effects in this type of pharyngitis and the performed evaluation in Semnan and pediatrician experiences in this area where most of cases were resistant against peniciline, reports on cases of resistance to penicillin and other antibiotics in some parts of the country and the world [2 and 4], we decided to evaluate the outbreaks of Streptococcal pharyngitis, its symptoms and the sensitivity of bacteria to antibiotics especially penicillin) in our community so that besides preventing the use of inappropriate and incorrect

use of antibiotics, we could help to diagnose this type of pharyngitis and its sensitivity to antibiotics to control the symptoms.

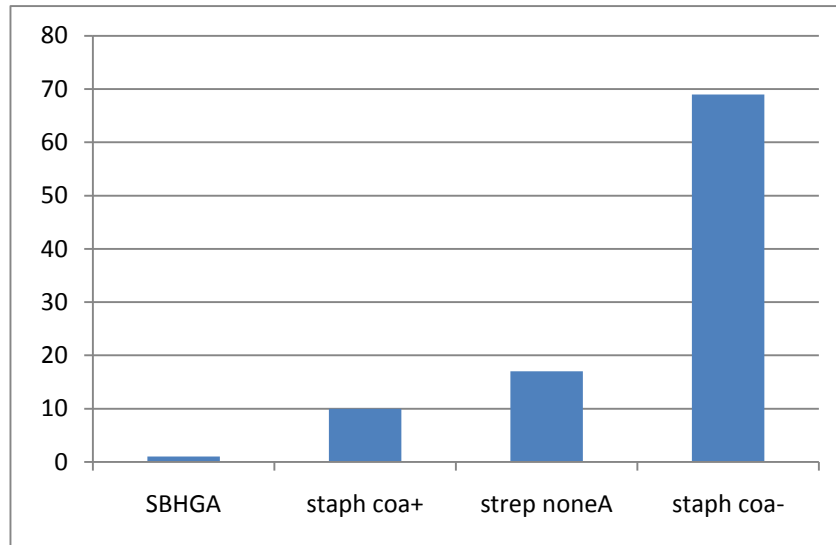
## **MATERIALS AND METHODS**

In this cross sectional study 104 patients within 5-15 years old who referred to University Hospital clinic and emergency ward of Amiralmomenin hospital- Semnam University of Medical Sciences because of angina during December 2009 to May 2011 who had no record of disease and antibiotic treatment were studied. Demographic information and symptoms of all patients have been recorded using a standardized questionnaire. Then using swab samples were collected from back pharynx and tonsil and the samples were cultured on blood agar and incubated for 24 to 48 hours in 37 degree of Celsius. Then samples were evaluated by the experts in terms of the presence of hemolyze and the smear of the samples in which bacteria colonies have been grown in was taken and staining been performed using Gram method.

After applying microscopy, confirmation of Streptococcus existence, reference to primary culture media and confirmation of B hemolytic, using bacitrasin disc and re-passaging the samples on blood agar, the type of Streptococcus have been determined as group A. In case of observing staphylococ in the prepared smear, coagulase test was conducted. Finally antibiogram was performed on Streptococcus Beta Hemolytic Group A and coagulase -positive Staphylococci groups. Data analysis was performed using Chi-square test at a significance level of 5% using SPSS 17 software.

## **RESULTS**

In this study, 47 subjects were girls (45.2 %) and 57 subjects were boys (54.8%). They ranged between 5-14 years old. Mean  $\pm$  SD age of children was  $3/2 \pm 4/7$  years and 85% of patients aged 5-9. Based on pharynx culture test, one patient had Streptococcus Beta Hemolytic Group A (1%). The frequency of coagulase -positive Staphylococci was 10.6 and coagulase -negative Staphylococci and non- group A Streptococcus frequencies were 69.2 % and 17.3 % respectively. Therefore the most wide spread culture result was associated with coagulase -negative Staphylococci (Figure 1).

**Figure 1.** Result of Throat Culture in 5-15 year old children suffering from pharyngitis in Semnan

SBHGA:Strep Beta Hemolytic Group A  
 Staph coa+:Staphilococ Coagolase Posetive  
 Staph coa-:Staphilococ Coagolase Negative

**Table 1.** The prevalence of each of the clinical symptoms in children 5-15 years old with complaints of sore throat

Clinical signs	symptom	SBHGA (%)	Staph coa+ (%)	Staph coa- (%)	Strep none A (%)
Fever	yes	100	81.8	77.8	88.9
	No	0	18.2	22.2	11.1
Exoda	yes	100	63.6	56.9	77.8
	No	0	36.4	43.1	22.2
LAP	yes	0	45.5	69.9	72.2
	No	100	54.5	43.1	27.8
Pethtia	yes	0	36.4	13.9	11.1
	No	100	63.6	86.1	88.9
Coagh	yes	0	54.5	40.3	22.2
	No	100	45.5	59.7	77.8
ND	yes	0	27.3	37.5	22.2
	No	100	72.7	62.5	77.8
Congictivitse	yes	0	0	11.1	23.5
	No	100	100	88.9	76.5

**Table 2.** The results of antibiotic sensitivity of coagulase positive staph (Staph aureus)

Anti biotic	Result of Anti biogram		
	Sensitve	Resistant	Intermediate
clindamycin	40%	50%	10%
vancomycin	40%	30%	30%
Penicilin	0%	90%	10%
Erithromycin	100%	0%	0%
Amoxicilin	22.2%	55.6%	22.2%

Based on the disease records all patients suffered from angina and 37.5 % of them suffered from coughing. Based on examination, 72% of them suffered from fever, 100% had Pharyngeal erythema and 55.2 % of patients had exudative, among patients who suffered from exudative throat culture findings showed that one subject (1.6%) had group A Streptococcus and 7 subjects (10.9%) had coagulase -positive Staphylococci.

52.6% of patients had cervical adenopathy but the only patient afflicted by Streptococcus Beta Hemolytic Group A had no cervical adenopathy among 11 patients with coagulase -positive Staphylococci 5 cases had cervical adenopathy. Frequencies of other signs are shown in (Table 1).

In evaluating antibiotic resistance against Streptococcus Beta Hemolytic Group A only one case of SBHG was sensitive to penicillin, erythromycin, vancomycin, cefixime and amoxicillin and resistant to Cotrimoxazole. Also in evaluating antibiotic resistance against coagulase -positive Staphylococci (*Staphylococcus aureus*) 90% of cases were resistant against penicillin and 10% were intermediate. 100% of cases were sensitive to erythromycin and in the analysis of resistance against amoxicillin sensitive, resistant and intermediate cases were 22.2%, 55.6% and 22.2% respectively.

In relation to resistance against clindamycin sensitive, resistant and intermediate cases were 40%, 50%, and 10 % respectively. It is necessary to point that in case of vancomycin only 40, 30 and 30% of cases were sensitive, resistant and intermediate respectively. (Table 2).

## **DISCUSSION**

Our findings indicated that the prevalence of Streptococcus Beta Hemolytic Group A in children aged 5-15 who refer with complaints of pharyngitis was 1%. However the prevalence of Streptococcus Beta Hemolytic Group A has been varied in various regions during different years. Based on an evaluation performed in Philadelphia in 1999 on 297 patients within the age range of 6 months to 18 years suspected of having Streptococcal pharyngitis, Streptococcus Group A was obtained to be 29% [6].

To identify clinical signs of Streptococcus Beta Hemolytic Group A in Egypt during 2000, 578 patients within the age range of 1-15 who suffered

from pharyngitis had a pharynx culture that Streptococcus Group A and non group A Streptococcus were observed in 17 and 11.9% of the cases [7]. Based on a study in Iran, (Boshehr) during 2003, 100 3 to 20 year old patients suspected to have Streptococcal pharyngitis, Streptococcus A frequency was 6% and non group A Streptococcus was 5% [8].

According to another study conducted in Qazvin in 2000 to determine Streptococcus group A pharyngitis epidemic the level of prevalence was 15.9% [9]. According to the study conducted in Semnan in 1999 group A pharyngitis Streptococcus epidemic was 20% [4].

In 2003 in England pharynx culture was conducted on the samples taken from 416 children that in 29.6% of cases the reason of pharyngitis was viral and in 17.5% of cases the reason of pharyngitis was bacterial and in 1.7% of cases Streptococcus Beta Hemolytic Group A was reported [10].

Although in recent study group A Streptococcus was close to our study, but based on the records of Iran (5-20%) and Semnan (28%) it seems that its prevalence have been decreased which might be due to improved health of the society. The 1% prevalence of group A Streptococcus and lack of significant relationship between clinical symptoms and results of throat culture shows that Streptococcal pharyngitis diagnosis based on clinical symptoms alone is not reliable and it is better to use clinical diagnostic algorithm presented by associations such Infectious Diseases Society of America. clinical approach, other diagnostic methods such as rapid antigen test (RATs) and throat culture and since throat culture is ready within 24-48 hours, it is possible to use RATs method the result of which is determined quickly [11] to increase correct diagnosis of Streptococcal pharyngitis percentage. In reviewing the results of a throat culture high incidence of non-group A. Streptococcus (17.3%) was obtained while this ratio is increased which is in contrast to Streptococcus Group A, although we did not determine the antibiotic resistance type in this study, it could be used to justify the lack of response to treatment to prescribed penicillin according to the mentioned resistance to penicillin in non-group A Streptococcus. Other findings of the study was the coagulase -negative

Staphylococci is not a pharyngitis factor based on microbiological point of view but clinical proving of this claim requires studies on the control group. In antibiogram evaluation Streptococcus group A was sensitive to penicillin, amoxicillin, erythromycin, cotrimoxazole and cefixime and it was resistant to co-trimoxazole that is consistent with the figures provided in References [12]. Accordingly penicillin is an effective drug in the treatment of Streptococcus group A and case of hypersensitivity using erythromycin or amoxicillin is also permitted.

Also in analyzing antibiotic resistance against coagulase -positive Staphylococci:

In case of clindamycin the sensitive, resistant and intermediate cases were 40, 50 and 10%, respectively. But the remarkable thing is using vancomycin that only 40, 30 and 30 cases were sensitive, resistant and intermediate.

Among the restrictions of this plan was the lack of sufficient numbers of patients and the distance between the place of sampling and examination.

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Conclusion. Given that most of our patients were diagnosed by their physicians to have Streptococcal pharyngitis and prescribed penicillin, only 1 case (1%) really had Streptococcal pharyngitis. It is important to note that the unexpected low prevalence of Streptococcus group A in this series of patients who were prescribed penicillin with Streptococcal pharyngitis diagnosis, which undermines the necessity of using antibiotics in pharyngitis and its type of prescription.

Since both vancomycin and clindamycin are the selected antibiotics in Staphylococcus aureus infections resistant to other types of drugs, the point has to be considered in dealing with patients with staphylococcal infection and we should seek to replace these drugs with new drugs and try to find the reason of resistance. The high prevalence of Staphylococcus aureus cases resistant to clindamycin and vancomycin confirms the indiscriminate and overuse of antibiotics leading to resistant cases.

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