

STREPTOCOCCAL PHARYNGITIS IN A PRIMARY CARE CLINIC

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ABSTRACT

A study to determine the sensitivity and specificity of the Directogen Group A Streptococcal Test was carried out in a primary care clinic in University Hospital, Kuala Lumpur. The study also looked at the prevalence of streptococcal pharyngitis in the clinic. We found that the rapid test has a sensitivity of 90.9% and a specificity of 90.7%. Viral pharyngitis is the commonest form (63%) of pharyngitis followed by Group A Beta haemolytic streptococcal pharyngitis (14.2%). The presence of exudates, tonsillar enlargement and the presence of tender cervical lymph nodes have a significantly higher association with streptococcal pharyngitis.

Keywords: streptococcal pharyngitis, rapid antigen test, prevalence

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INTRODUCTION

Pharyngitis due to Group A beta haemolytic streptococcus remains a major diagnostic concern for primary care doctors in the management of these patients. For many years physicians have used the throat culture as the gold standard but as the result of the throat culture takes time, investigators have introduced the use of rapid tests to detect the streptococcal antigen. The result for rapid test is available within 5 minutes. The rapid test should improve the management by decreasing both the morbidity and the inappropriate use of antibiotics⁽¹⁾. We report an investigation designed to determine the sensitivity and specificity of the rapid test and to determine the prevalence of pharyngitis in the primary care setting.

METHODOLOGY

This study was carried out in a primary care clinic at Polyclinic C, University Hospital, Kuala Lumpur during 1990. The study population consisted of patients aged 12 and above with upper respiratory illness with sore throat as one of the complaints. Patients who had their illness treated with antibiotics by other general practitioners were excluded. The medical officers recorded clinical information and obtained throat swabs from all patients seeking care for sore throat. The throat swabs

were collected by a research assistant and sent to the laboratory on the same morning. Demographic data collected include the patient's age, sex and race. The medical officers recorded the clinical features in the recording form provided (Fig 1): running nose, cough, fever, temperature, injected throat, enlarged tonsils, pharyngeal exudates, and tender cervical nodes. Based on the clinical findings, the medical officers used a flow chart (Fig 2) to help decide whether to prescribe antibiotics using a predetermined criteria⁽²⁾. Patients were considered to have high risk of streptococcal pharyngitis if they had a combination of either pharyngeal exudates, fever more than 38°C or tender cervical lymph nodes. The research assistant inocu-

Fig 1 - Recording Form

Instructions: Please Circle or fill in				
A. Identifying Data (to be filled in by the nurse)				
1. Date:				
2. NRIC:				
3. Name:				
4. Tel no.				
5. Age (in years):				
6. Race: 1=Malay	2=Chinese	3=Indian	4=Others	
7. Sex: 1=male	2=female			
B. Clinical Features				
	present	absent		
1. Running Nose/sneezing	1	2		
2. Cough	1	2		
3. fever	1	2		
1. temperature: 1=<37.2°C	2= 37.2- 38°C	3=>38°C		
2. throat examination	present	absent		
- injected throat	1	2		
- enlarged tonsils	1	2		
- tonsillar exudates	1	2		
3. tender cervical nodes (anterior)	1	2		
Risk Group: 1=high	2=moderate	3=low		
C. Investigations				
	positive	negative	no results	others
1. Rapid antigen test	1	2	3	4
2. Throat culture (GABHS)	1	2	3	4
Outcome (for office use)				
1. Group A beta haemolytic streptococcus				
2. Non - Group A beta haemolytic streptococcus				
3. Klebsiella				
4. Haemophilus influenzae				
5. Staphylococcus aureus				
6. Normal throat flora				

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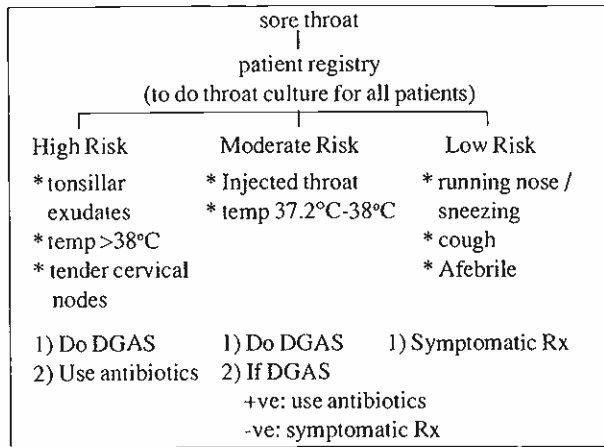
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Fig 2 - Flow Chart of Study Design



lated the rayon swabs onto agar plates containing 5% sheep blood. She streaked the plate and incubated one plate aerobically and the other anaerobically, both at 35°C. Using the same rayon swab, the research assistant then performed the Directogen Group A Streptococcal Test (DGAS) as outlined by the manufacturer, paying particular attention to the procedure and timing of the tests results.

The sensitivity and specificity of the DGAS were then calculated using the throat culture as a gold standard. The clinical data from patients who had throat culture were analysed to determine their association with streptococcal pharyngitis using chi-square tests.

RESULTS

We collected throat swabs from 106 patients at the primary care clinic. 65 (61.3%) were male and 41 (38.7%) were female. The mean age of the patients was 29.3 years, range from 12 to 65 years. The distribution was as follows: 57 Malays (53.8%), 25 Chinese (23.6%), 22 Indians (20.8%) and 2 other races (1.8%).

The sensitivity of DGAS was calculated to be 90.9% and a specificity of 90.7%. The positive predictive value was 58.8% and the negative predictive value was 98.6% (see Table I).

The prevalence of pharyngitis in the study population is tabulated in Table II. Viral pharyngitis appear to be the commonest form of pharyngitis in our study (63.2%), followed by Group A beta haemolytic streptococcal pyogenes (14.2%). Other causes of pharyngitis in our study include non-group A beta haemolytic streptococcus (10.4%), klebsiella (3.8%), H. influenzae (2.8%), Staph aureus (3.8%). There were 2 cases of mixed infection (1.8%). By means of chi square tests, we found that the presence of tonsillar exudates, tonsillar enlargement and tender cervical lymph nodes were highly significantly associated with streptococcal pharyngitis (p < 0.05). Cough, running nose, fever and temperature have a minimal bearing on the aetiological diagnosis.

In terms of antibiotic sensitivity all the strains of GABHS were sensitive to penicillin V. Only one out of 15 strains was resistant to erythromycin (93%). Sixty percent of the strains were resistant to tetracycline (see Table III).

Table I - Distribution of patients by throat culture and rapid test (DGAS) results

Rapid Test	positive throat culture	
	present	absent
+ve	10	7
-ve	1	68

sensitivity = 10/11 = 90.9%
 specificity = 68/75 = 90.7%
 positive predictive value = 10/17 = 58.8%
 positive predictive value = 68/69 = 98.6%

Table II - Prevalence of Pharyngitis in the study population

	No	%
1. Group A beta haemolytic strep	15	14.2
2. Non group A beta haemolytic strep	11	10.4
3. Klebsiella	4	3.8
4. Haemophilus influenzae	3	2.8
5. Staph aureus	4	3.8
6. normal throat flora	67	63.2
7. mixed infections	2	1.8
Total	106	100

Table III - Antibiotic sensitivity to GABHS and non-GABHS

	GABHS		non-Gp A beta haemolytic strep	
	no	%	no	%
oral penicillin	15/15	100	9/9	100
erythromycin	14/15	93	8/9	89
tetracycline	6/15	40	5/8	63
cephaloridine	12/12	100	5/7	71

Table IV - Computation of chi square test for the various clinical features

clinical features	GABHS Pharyngitis	other bacterial pharyngitis	normal flora	p value
cough (p)	7	14	45	0.301
(a)	8	10	22	
sneezing (p)	4	9	30	0.408
(a)	11	15	37	
fever (p)	14	16	50	0.163
(a)	1	8	17	
temp 38.7°C	5	15	34	0.385
37.2°C-38°C	6	7	24	
38°C	4	2	9	
throat injected (p)	13	22	63	0.612
(a)	2	2	4	
tonsils (p)	9	14	16	<0.001
(a)	6	10	51	
exudates (p)	7	10	8	<0.001
(a)	8	14	59	
nodes (p)	11	6	8	<0.001
(a)	4	18	59	

(p) denotes present
 (a) denotes absent
 all have 2 degrees of freedom except temp which has 3.

DISCUSSION

The landmark study by Wannemaker in 1951 showed that the initial attack of rheumatic fever could be prevented by adequate penicillin treatment of streptococcal pharyngitis⁽³⁾. This large scale controlled study provided the first scientific evidence for the recommendation we follow to this day which revolutionised the management of streptococcal pharyngitis. For the first time, rheumatic heart disease, the most frequent cause of acquired heart disease in young people, could be prevented. Recently we see the development of non-culture based antigen detection tests using latex agglutination tech-

niques. The sensitivity and specificity of DGAS as reported by Centor were 96% and 97% respectively⁽⁴⁾.

Even though sore throat is among the commonest symptoms seen in general practice, there have been no data concerning its prevalence. We have attempted to determine the sensitivity and the specificity of the rapid antigen test as well as to determine the clinical features that could be predictive of streptococcal pharyngitis.

Ideally one should compare the diagnostic test with a gold standard but no ideal gold standard exists for the diagnosis of Group A beta haemolytic streptococcus pharyngitis. The false negative rate for the throat culture was in the region 10-20%. A study of tonsillectomy specimens provided the most convincing evidence for false negative cultures. In that study, surgeons obtained routine throat culture just prior to tonsillectomy. They compared the results of the cultures of these swabs with cultures of the excised tonsils. Only 80% of GABHS positive tonsils had a positive culture from throat swabs. No patient had a positive swab with a negative tonsillar culture.

We found that the rapid test has a high sensitivity and a high specificity of 90.9% and 90.7% respectively. The lower prevalence rate may explain the lower sensitivity and specificity as compared to the rates reported by Centor⁽⁴⁾.

We also examined the clinical findings associated with the various combinations of the test results. The analysis showed that cough, running nose, fever, and body temperature have minimal bearing on the diagnosis. Presence of exudates, enlarged tonsils, and tender nodes have significant rates of streptococcal pharyngitis.

There were 8 false positive rapid test results, of which 4 were non-GABHS and the other 4 grew normal flora. There was only one false negative of which the clinical features do resemble GABHS pharyngitis. The negative predictive value is 98.6% compared to positive predictive value of 58.8%.

The prevalence of GABHS pharyngitis in the primary care clinic is 14.2%. There are very good reasons for diagnosing and treating GABHS⁽¹⁾. The illness is shortened with early treatment. Streptococcus is eradicated from the pharynx and cannot spread to the population. Treatment prevents suppurative complications and rheumatic fever. Prompt antibiotic therapy does not prevent non-suppurative complications of streptococcal infection or glomerulonephritis⁽⁵⁾. Primary care physicians who manage sore throats have one of three options: reassurance without testing or treatment; testing, with treatment based on the test results; or treatment based on clinical presentations without laboratory testing. Several aspects of the disease and its treatment may influence the options for an individual patient depending on its risk benefit ratio. Risk of treating include allergic reaction (especially to penicillin) and undesirable side effects (especially erythromycin).

It is recommended in the epidemic situation to treat all patients with penicillin⁽⁶⁾. In the endemic situation, we recommend that all patients having clinical signs and symptoms predicting a high probability of streptococcal pharyngitis should be treated without testing. This is especially so if the patient has enlarged tonsils, exudates and enlarged cervical nodes. If the patient is afebrile, with no enlarged tonsils, and no exudates, but with normal cervical lymph nodes, then it is appropriate to reassure without testing or treatment with antibiotics. If a physician has rapid test, then we recommend using it on all other patients, and not treating those with negative results. In many medical settings, this facility, however, is not available. We use oral penicillin as the choice of antibiotics as all strains of GABHS are sensitive to penicillin. Erythromycin is an alternative which has a 93% sensitivity rate. Tetracycline should not be used as our local strains are resistant to it (60%). Cephaloridine has a 100% sensitivity rate.

There are several limitations that need to be noted. This study was done on ambulatory adult patients and any application to other age groups need to be reassessed. Secondly, our study did not address the possibility of other organisms causing pharyngitis, eg Chlamydia and mycoplasma.

At this time, the natural history of treatment of such agents are not known however. Thirdly, we did not study the carrier rate in the population, those found positive by throat culture could be a carrier or a true infection. However, in clinical practice, one would tend to treat symptomatic patient if the throat culture is positive⁽⁷⁾.

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