



## **β-HEMOLYTIC STREPTOCOCCAL PHARYNGITIS; DIAGNOSING GROUP A β-HEMOLYTIC STREPTOCOCCAL PHARYNGITIS (STREP THROAT) BY BRISK ANTIGEN DETECTION**

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**ABSTRACT ... Background:** Strep throat is also known as Streptococcal Pharyngitis. It is an infection in back of the throat including tonsils which reasoned by group A Streptococcus (GAS). General signs like fever, red tonsils, sore throat and grow lymph nodes in the neck. Nausea, headache and vomiting may also happen due to Streptococcal Pharyngitis. **Objective:** The aim of study is to conclude the correctness in discover Group A β-Hemolytic Streptococci (GABHS) through brisk antigen testing evaluate with throat culture methods which are generally used. **Materials and Methods: Study Design:** Cross-sectional study. **Setting:** Sir Ganga Ram Hospital Lahore. **Period:** 1<sup>st</sup> July 2016 to 31<sup>st</sup> December 2016. At first throat culture, Streptococcal select agar or sheep blood agar, performed on 192 patients with severe strep throat and after that brisk antigen detection tests, Directigen Group A Strep, was also executed. Statistical investigation contained sensitivity, specificity, positive predictive value, negative predictive value as well as its prevalence. **Results:** The prevalence of group A β-hemolytic streptococci is 13.54%. Sensitivity is 96.15%, specificity is 95.18%, positive predictive value is 75.76% along with negative predictive value is 99.37% which shows that a very low percentage of patients with Group A β-Hemolytic Streptococci as <1%. **Conclusion:** This showed that a very low percentage as <1% of patients with Group A β-Hemolytic Streptococci evade findings by brisk screening test methods.

**Key words:** A β-Hemolytic Streptococcal pharyngitis, Antigen detection, Throat culture, Strep throat, growing lymph nodes

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### **INTRODUCTION**

About 5% to 15% of severe pharyngitis cases are reasoned by group A β-hemolytic streptococcus (GABHS).<sup>1,2</sup> Herein Pakistan, severe pharyngitis is the most important cause for physician visits.<sup>3</sup> Recently A β-hemolytic streptococcus contamination in addition to his late effect is never measured as important health issue. Still as numerous as 4% of unprocessed and unsuccessfully treated cases might lead to severe rheumatic fever.<sup>4</sup> In many areas of Pakistan, severe rheumatic fever is increase as pointed out in many published reports linked with many precise streptococcal surface M proteins.<sup>5-7</sup> Acute A β-hemolytic streptococcus infections from all around the world have been reported recently.

The most excellent approach to notice and treat all cases of group A β-hemolytic streptococcus

residue disputable. Some set down antibiotic for patients who have symptoms or signs of severe pharyngitis. Reports from different countries determine that antibiotic is advise in 75% cases.<sup>8-10</sup> This technique resulted in needlessly treating approximately 85% to 95% of patients.<sup>1,2</sup> Acute infection of GABHS recently reported from all over the world with the help of press media. The detection as well as treatment in the best way of all cases of streptococcus pharyngitis remains contentious. Some physicians generally advise antibiotics for patients who have symptoms of severe strep throat. This fruitless exercise resulted in treatment of approximately 80% to 95% patients with severe streptococcus pharyngitis. By the use of antibiotics some other inauspicious reactions, allergic reactions as well as resistance of antibiotics take place. This method also increased the cost of treatment.

Due to the use of different antibiotics, there are other reactions and diseases may also occur in the patients. On the other hand, some clinicians acquire throat cultures of patients who have severe pharyngitis. Comparatively this exercise is expensive and time consuming for getting proper results from throat cultures. Approximately, 24 to 48 hours time period are required for obtaining results. Before recommending treatment or throat culture, many physicians kept in view the clinical attributes like exudates, oral petechiae and fever. The severe streptococcus pharyngitis (GABHS) has non-specified signs. This infection takes place due to highly natural variations and their outcomes. Comprehensive evaluation of clinical correctness is about to 5%.<sup>11-14</sup>

In many patients, acuteness of the complication of make treatment conclusion who expect instant antibiotic treatment to lessen signs of severe pharyngitis. To satisfy the patients according to their wish for use of antibiotics, physicians feel bound to prescribed antibiotics. The quick and comparatively less expensive method for screening is brisk antigen screening method. The sensitivity of screening tests stated, however, array from 50% to 100% while evaluate by regular culture methods<sup>15-18</sup> and 31% to 50% while evaluate by methods of two plate culture.<sup>19</sup> If these reports are accurate, a lot of patients having A  $\beta$ -Hemolytic Streptococcal Pharyngitis would go unprocessed when brisk antigen screening test is only the treatment root. Brisk screening tests used in coincidence with throat cultures regularly, where all screening tests with negative are cultured. This indicative choice added a large expense to the charges of majority patients. The treatment of pharyngitis on clinical results stand on many factors: (i) diagnosis cost (throat culture or brisk screening), (ii) consumption of time for analysis and his treatment, (iii) test sensitivity to shun absent patients with disease, as well as (iv) test specificity to avoid treatment of patients without need. The necessity occurs for testing technique that addresses these concerns. This study of group A  $\beta$ -Hemolytic Streptococcal Pharyngitis conducted to determine whether accurateness of clinical outcomes i.e. soaring sensitivity & specificity might be quick and

economically obtained by brisk antigen test.

## MATERIALS AND METHODS

This cross-sectional study was carried out at Sir Ganga Ram Hospital Lahore from 1<sup>st</sup> July 2016 to 31<sup>st</sup> December 2016. Both patients adults as well as pediatric who complaining signs of sever pharyngitis were incorporated in the study. The throat culture and brisk screening tests performed on 192 continuous patients. Patients with average age of 18 to 20 years both male and female were included in our study. One of three laboratory technicians obtained throat swabs by concurrently chafing two sterile rayon tipped & applicator Abco, Milwaukee, WI over the pharynx and tonsillar fossae. From every pair, swab promptly flecked on plate of blood agar. A bacitracin disk put on primary inoculum and permits to incubate at 37°C. Examination of the plates was held after time period of 24 hours and 48 hours to detect the GABHS presence. This method of throat culture is easily copy and currently used as a quality culture method in primary care hospitals. Even availability of other culture methods which are more sensitive is obtainable, but these methods are much expensive and indicated as compared to this method. These expensive and complicated methods not essentially practical in primary care setups.<sup>9-15,17,20</sup>

Quick GABHS antigen test by Directigen<sup>1,2,3</sup> Group A Strep performed on second swab obtained from patients in accordance with the directions delivered by manufacturer. From the extracted specimen, 3 drops were moved through a layer saturated with identified antibiotics for Group A streptococcus antigen. From layer, antibody liposome nexus including pink dye was then passed through. Liposome instantly bound the present group A streptococcus antigen. Positive test was considered if a whole triangle appeared on layer/membrane. Unclear triangles were also considered as positive. If GABHS is negative then only a pink spot was present on layer. For 192 patients, statistical scrutiny incorporated sensitivity, specificity, positive predictive values, negative predictive values as well as prevalence. On the basis of culture method as mentioned previously, the results of sensitivity, specificity,

positive predictive values & negative predictive values are based on throat culture method in the light of screening test.

**RESULTS**

One hundred and ninety two patients (192) who received throat culture and brisk screening test were included. The outcomes classify in table-1 of this patient sample. In 13.54% patients, the prevalence of A β-Hemolytic Streptococci (GABHS) was found. Throat culture was found in 25 patients when patients were brisk screening. 96.15% sensitivity indicated that of all patients with A β-Hemolytic Streptococci more than 95% found. 95.18% specificity shows that all patients without GABHS, 95% were correctly classified as such. 75.76% positive predictive value shows that of all patients who screened positive, about 75% really had GABHS. The negative predictive value was 99.37%, it means that of all patients which screened negative, only the 0.63% patients who have GABHS were neglect by the screening test (Table 1).

Brisk Screening	Throat Culture		Total
	Present	Absent	
Positive	25	8	33
Negative	1	158	159
Total	26	166	192

**Table-I. Outcomes from 192 patients who received A β-Hemolytic Streptococci (GABHS) brisk screening test and throat culture**

$$\text{Sensitivity} = \frac{25}{26} \times 100 = 96.15\%$$

$$\text{Specificity} = \frac{158}{166} \times 100 = 95.18\%$$

$$\text{Positive predictive value} = \frac{25}{33} \times 100 = 75.76\%$$

$$\text{Negative predictive value} = \frac{158}{159} \times 100 = 99.37\%$$

$$\text{Accuracy} = \frac{183}{192} \times 100 = 95.31\%$$

**DISCUSSION**

The study aim is to evaluate whether clinically fruitful and correct outcomes are getting from a brisk less expensive screening test for group A β-Hemolytic Streptococci in primary care setup. Outcomes from this study shows that there are very less percentage of patients with GABHS missed findings with our test method. We conduct our study comparatively less prevalence period, due to which it is very difficult to observe the cases.

The sensitivity, specificity, positive predictive value and negative predictive value are high in our reported paper. It was conventional judgment of actual value. These outcomes contradict with foregoing studies, which comparatively reported stumpy specificity and sensitivity of brisk antigen test while juxtapose by throat culture.<sup>17-19,21-22</sup> Statistical contradictions might be result of different techniques of laboratory. For throat swab, throat culture and screening test, our technicians adopted standard techniques. Our technicians repeatedly process the throat swabbing until they were not sure about correctness of swab. The correctness of brisk screening test might be comprehended with accurate training, quality control as well as experience.

Recent suggestions for correctness of diagnostic tests for GABHS are less than 2% false negative and also less than 10% false positive.<sup>23</sup> These suggestions for accepted number of error would yield a sensitivity of ≥94%, specificity ≥89%, positive predictive value ≥73%, negative predictive value ≥98%. Our outcomes falls under the guiding principle, therefore, support investigation protocols which sourced on brisk screening test as single test for diagnostic. The need of expensive and time consuming throat culture eliminate by this single test. Following protocols have been recommended during our study; no treatment given if screening test is negative through good swabbing. On the other hand, antibiotic treatment will be started if clinical symptoms show presence of GABHS through positive screening test. There are very short patients with GABHS in which sign and symptoms are non specific and negative screening test

results, therefore, no treatment will be given to those patients. This issue prevailing with generally using throat culture methods because they neither 100% specific and sensitive.

There is an advantage using brisk screening test to diagnose GABHS is the skill to start calmativative actions instantly when the test report is positive. Infected patients with GABHS wish to recover as soon as possible. For this purpose, to generate antibodies against organism, some researchers giving preference for delaying treatment with antibiotics. No sequelae of GABHS reported by previous researchers when treatment of a patient done in nine days of sore throat beginning.<sup>24-30</sup> Outcomes from this study produce more dispute in selection of treatment schedule.

## CONCLUSION

It is concluded that to detect the cases of GABHS streptococcal agar is more specific and sensitive and should lessen the false positives which found with brisk screening test that in fact the cases of GABHS.

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
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**AUTHORSHIP AND CONTRIBUTION DECLARATION**

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2	M. Yousaf Saleemi	Data analysis.	
3	Muhammad Iqbal	Guidance in writing the manuscript.	