

Research Article

Seroprevalence of antistreptolysin O antibodies in a tertiary health care centre in Haryana, India: a three year retrospective study

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ABSTRACT

Background: Presence of antistreptolysin O antibodies in a patient's sera may be an isolated evidence of recent infection by group A or less commonly, group C or G Streptococcus, especially in patients suspected of having a non suppurative sequel to this infection.

Methods: A retrospective study was done on the sera samples received in the Department of Microbiology, PGIMS Rohtak, India for the detection of ASO, over a period of three years. The test was carried out by latex agglutination rapid test kit by Aspen.

Results: A total of 4632 samples were received in the laboratory during the study period. Of these, 1058 (22.8%) were found to be positive for the presence of ASO having titre of >200 IU/mL.

Conclusions: The prevalence of ASO was found to be highest in the age group 0-20. The presence of elevated streptococcal antibody titres in such a population reflects a high background prevalence of streptococcal infections. Thus, determination of ASO antibodies should be taken into consideration when evaluating the role of group A streptococcus in non-purulent complications of infections.

Keywords: Antistreptolysin O antibodies, Seroprevalence, ASO titer

INTRODUCTION

Streptococcus pyogenes, or group A *Streptococcus* (GAS), causes a number of acute, common pyogenic infections, including pharyngitis and skin infections. In addition, the organism is responsible for certain non suppurative diseases, such as acute rheumatic fever and post *streptococcal* glomerulonephritis, which occur weeks after the acute infectious process.

The sequelae are thought to be autoimmune-mediated diseases; that is, the damage is due to the host's immune response. Although the pyogenic infections are best diagnosed by isolation of the organism in culture, the non suppurative diseases occur at a time when the organism may no longer be present. Thus serologic diagnosis is usually performed.¹ In addition, it may be necessary to

diagnose infections by serology after antimicrobial therapy has been initiated. The ASO antibody test is commonly used to demonstrate serologic response to *S. pyogenes*.²

In infections caused by beta- haemolytic *streptococci*, streptolysin O is one of the two haemolytic exotoxins liberated from the bacteria. This stimulates the production of anti-streptolysin O (ASO) antibodies in the human serum.³ Antistreptolysin-O titer has been shown to vary with age, geographical location, season and site of infection. Hence a single specimen when available requires to be compared with a predetermined baseline value or upper limit of normal (ULN) in a particular geographical area.⁴ Present study conducted this study to determine the seroprevalence of antistreptolysin O antibodies in a tertiary care health facility of Haryana.

METHODS

A retrospective study was done on the blood samples received in the Department of Microbiology, PGIMS Rohtak, Haryana, India for the detection of ASO, over a period of three years (July 2012-June 2015).

Serum was separated by centrifuging the samples at a speed of 1500 rpm for 10 minutes. The test was carried out by latex agglutination rapid test kit by Aspen. This test method is based on an immunological reaction between exo-enzymes bound to biologically inert latex particles and streptococcal antibodies in the test sample. Positive and negative controls, provided along with the kit, were put up with every run of the test process.

A positive test is indicated by the presence of agglutination in the sera sample, within 2 minutes of adding the latex reagent. The sensitivity of the latex reagent has been adjusted to yield agglutination when the level of ASO is greater than 200 IU/ mL. This cut off has been determined by epidemiological and clinical studies.

RESULTS

A total of 4632 samples were received in the Laboratory during the study period. Of these, 1058 (22.8%) were found to be positive for the presence of ASO having titre of >200 IU/mL. Maximum seropositivity, with ASO titre >200 IU/ml were seen in 10-20 years of age group (31.17%). The ratio of Females to Males was 3:2. Majority of the samples were from the OPD (45.6%).

Table 1: Age wise distribution of the patients.

Age group (years)	Number of patients	Titre >200 IU/ml
0-10	1354	89
10-20	3031	945
20-30	204	21
>30	43	3
Total	4632	1058

DISCUSSION

Streptococcal antibodies tests are used for the diagnosis of antecedent infections caused by the group A streptococcus (GAS) and are particularly useful for the diagnosis of acute rheumatic fever and acute post-streptococcal glomerulonephritis.

Acute rheumatic fever is an autoimmune disease that follows infection with GAS; however, the isolation of GAS is uncommon (<15%), and so confirmation of the diagnosis often relies on streptococcal antibody tests.⁵ While a number of tests utilize different antigens of GAS, the most frequently performed tests are those that determine the anti-streptolysin O (ASO) titer and the anti-DNase B (ADB) titer. Ideally, it is recommended that the

titer be determined in the acute phase and then determined in the convalescent phase 14 to 28 days later, with a positive result defined as a rise in titer of twofold or more. However, it is not always practicable to obtain a second sample for titer determination, particularly in developing countries, where acute rheumatic fever is the most common.

Therefore, it is generally accepted that if only a single specimen is available, a titer greater than the upper limit of normal at the initial testing can be considered presumptive evidence of a preceding streptococcal infection.⁶ Antistreptolysin-O (ASO) is the commonest, best standardized & practical test for detecting a preceding streptococcal infection.⁷ The appearance of ASO in serum of a patient or an increase in the ASO titer is usually indicative for a recent streptococcal infection.

This is especially true when considering the diagnosis of nonsuppurative sequelae of GAS infection. Although ASO titer has provided a useful guideline to physicians, but this has been shown to vary with age, geographical location and site of infection.⁸

ASO titer has a utilitarian role in the diagnosis of Acute Rheumatic Fever. Even a single ASO titer is a useful investigative tool aiding in the confirmation of the diagnosis. The ASO titers are elevated in the acute phase and show a subsequent lower titer levels as the disease progresses.⁹

The estimation of ASO antibodies is a simple, cost-effective way for detecting antecedent streptococcal infection. However, the results should be interpreted judiciously keeping the upper normal limits of ASO titer, for the given geographical area, in mind. Increased ASO titers support but do not prove the diagnosis of rheumatic fever.

Falsely high titers of ASO may be seen in conditions associated with hyperlipidemias such as hepatic, biliary obstruction and nephrosis and myeloma due to monoclonal immunoglobulins.¹⁰ In most situations standardization of ULN is not done and laboratories resort to cut-off values given in the kit insert. This is not desirable because such cut-off values are based on ULN standardized in western countries where prevalence of GAS infections is much less.

CONCLUSION

The present study was done to estimate the seroprevalence of ASO antibodies. However, since this was a retrospective study, co relation with the socio-economic status, clinical outcome and follow-up could not be done, which is a drawback of the study.

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