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RESEARCH ARTICLE

SEROPREVALENCE OF ANTISTREPTOLYSIN O ANTIBODIES IN A TERTIARY HEALTH CARE CENTRE IN NORTH INDIA

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ABSTRACT

Background: A raised Antistreptolysin O titre (ASO) level is one of the most relevant retrospective serological indices of antecedent Group A-Beta Hemolytic Streptococci (GAS) infection. A single titre of more than 200 IU/ml is considered as a raised value. Serum ASO titre is raised when there is an infection of any organ of the body by GAS,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, Haryana for the detection of ASO, over a period of two years. The test was carried out by latex agglutination rapid test kit by Aspen.
Results: A total of 4063 samples were received in the laboratory during the study period. Of these, 832 (20.4%) were found to be positive for the presence of ASO having titre of >200 IU/mL.
Conclusion: 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.

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INTRODUCTION

Streptolys in O is one of the two haemolytic exotoxins liberated during the bacterial infections caused by GAS. This stimulates the production of ASO antibodies in the human serum (Batzloff, 2004). Rheumatic Fever (RF) is an auto immune consequence of infection of the throat (pharyngitis) with GAS which causes an acute generalized inflammatory response and an illness that selectively affects the heart, joints, brain and skin (Manase, 2011). However, damage to the heart valves, particularly the mitral and aortic valves, may persist 2-3weeks after an acute episode has resolved. This involvement of the cardiac valves is known as Rheumatic Heart Disease (RHD), the most significant sequelae of Acute Rheumatic Fever (Gerber, 2009; Manase, 2011; Krishna, 2013). People who have had RF previously are much more likely to have subsequent episodes, and these recurrences may cause further damage to the cardiac valves. The diagnosis of RF is not usually possible through recovery of streptococci from throat swab cultures alone as it may indicate acute infection or a 2.5-35.4% of carrier state seen in individuals (Sharma, 2016). Moreover positive throat cultures are obtained in only about 11% individuals at the time of presentation of RF (Kaplan, 2001). Therefore, evidence of host immune response to GAS antigens is required to confirm the diagnosis. The assay for ASO is widely used (Alyaa, 2012), although it has been shown to be non-specific. This is because antibodies to streptolysin are produced by both group A and non group A streptococci particularly the C and G groups (Johanson, 2002). ASO 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]. 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 GAS (Carapetis, 2005). Present study conducted this study to determine the seroprevalence of ASO in a tertiary care health centre in Haryana, India.

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MATERIALS AND 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 two years (July 2016-July2018). 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 4063 samples were received in the laboratory during the study period. Of these, 832 (20.4%) 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 (29.2 %). The ratio of Females to Males was 3:2 . Majority of the samples were from the OPD (47.2%).

Table 1 Age wise distribution of patients

Age group years	Number of patients	Titre >200IU/ml	Percentage
0-10	1356	80	5.9%
10-20	2462	719	29.20%
20-30	202	30	14.8%
>30	43	3	6.97%
Total	4063	832	20.4%

DISCUSSION

Streptococcal antibodies tests are used for the diagnosis of antecedent infections caused by the GAS and are particularly useful for the diagnosis of acute rheumatic fever and acute post streptococcal glomerulonephritis. The sequelae are thought to be autoimmune-mediated diseases; that is, the damage is due to the host's immune response. Rheumatic heart disease (RHD) and rheumatic fever (RF) remain significant causes of cardiovascular disease and mortality in children particularly in the developing countries (Gerber, 2009). RF is estimated to affect 20 million people and is a leading cause of death during the first five decades of life (Carapetis, 2005). It is endemic in developing countries with annual incidence of 100-200 cases per 100,000 school aged children (Batzloff, 2006). Particularly frustrating has been the fact that RF and RHD are theoretically preventable but still remains a problem in these countries. Reason most advanced is that these countries cannot afford the economic and social cost involved (Ismail, 2006 and Gerber, 2009). There are well documented data on prevalence, serogroups of GAS and ASO titres levels in asymptomatic carriers elsewhere in the world (Johanson, 2002; Noel, 2005 and Charmaine, 2006). While a number of tests utilize different antigens of GAS, the most frequently performed tests are those that determine the 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 two-fold 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]. ASO is the best standardized & practical test for detecting a preceding streptococcal infection (Kaplan, 2001). 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 (Alyaa, 2012). 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 (UNL) 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 hyperlipedemias such as hepatic, biliary obstruction and nephrosis and myeloma due to monoclonal immunoglobulins (Noel, 2005). In most situations standardization of UNL 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 UNL 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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