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ISOLATION OF BETA HEMOLYTIC STREPTOCOCCI AND ASO TITRES IN SCHOOL GOING CHILDREN

Medical Science

Dr. P. Suseelakumari Rangaraya Medical College, Kakinada

Dr. K. Lavanya* Associate Professor, Rangaraya Medical College, Kakinada *Corresponding Author

Dr. K. R. L. Surya Kirani Professor and HOD, Rangaraya Medical College, Kakinada

ABSTRACT

Streptococcus pyogenes is one of the most common and ubiquitous human pathogens.. A total no of 215 children screened for beta haemolytic streptococci from throat swabs and all culture positives are grouped by enzymatic extraction method and all children were estimated for ASO titers. All results were analysed statistically. Out of 215 throat swabs 22.5% positive for beta haemolytic streptococci with highest percentage with group A(56.5%) and ASO titers estimated with 400IU/ml base line titers. The mean ASO titers obtained from test and control groups were 933 IU/ml and 686 IU/ml respectively. There is a statistical significance between case and controls p=< 0.05 there is a positive correlation (r =0.80) between high ASO titers and culture positives for BHS.

The study established a high prevalence of BHS in the throat of children with predominant group A Streptococci leads to evident risk of RF and RHD

KEYWORDS

β haemolytic streptococci, Rheumatic fever, Antistreptolysin O antibodies ASO, pharyngitis.

INTRODUCTION

Streptococcus pyogenes is one of the most common and ubiquitous human pathogen. It causes a wide variety of human diseases ranging from non-invasive disease to severe invasive disease. The group A streptococcus infection leads to non suppurative sequelae, such as rheumatic fever, which usually causes throat infection and glomerulonephritis[1]

Rheumatic heart disease(RHD)and rheumatic fever(RF)remain significant causes of cardiovascular disease and mortality in children particularly in the developing countries[2]. Most of the children in the age of 5-15 yrs are commonly affected with bacterial pharyngitis. Factors influencing the transmission are mainly over crowded living conditions.

Rheumatic fever is estimated to affect 20 million people and is a leading cause of death during the five decades of life. It is endemic in developing countries with annual incidence of 100-200 cases per 100,000 school age children[3,4].

The most common routes of entry of Streptococcus pyogenes is the upper respiratory tract which is usually the primary site of infection and also serve as a focus for other types of infections. Spread from person to person is by respiratory droplets or by direct contact with infected wounds or sores on the upper respiratory tract, but carriage rate in young school children is just over 10% it may be considerably higher before or during an epidemic[5]

Rheumatic fever leaves no lasting damage to the brain, joints or skin however, damage to the heart valves, particularly the mitral valves, may persists 2-3 weeks after an acute episode has resolved this involvement of the cardiac valves is known as Rheumatic Heart Disease.[2,5,6]

The beta haemolytic streptococci group C and G have also been reported as causing acute pharyngitis but their involvement in RF is still countroversial.[7,8,9]

The diagnosis of rheumatic fever is not usually possible through recovery of streptococci from throat swab cultures alone as it may indicate acute infection or a carrier state seen in 2.5- 3.5% of individuals .The evidence of host immune response to group A streptococcus antigens is required to confirm the diagnosis. The assay for ASO is widely used, 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 streptococcus particularly C and G[10].

MATERIALS AND METHODS

The study was done among 215 children in the age group of 5-15 years attending paediatric outpatient and inpatient wards of Government General Hospital, Rangaraya medical college Kakinada for a period of 24 months. 50 healthy children included as controls in our study.

Throat swabs (tonsillar and posterior pharyngeal area) and blood samples were collected and samples were processed according to standard techniques.

Throat swabs were cultured aerobically on 5% sheep blood agar crystal violet blood agar medium, incubated at 37°C under 5-10 % co_2 for 24 - 48 hrs .Colonies were identified by their haemolytic pattern on blood agar and Grams staining.

Grouping was done to all β–haemolytic streptococci isolates by enzymatic extraction method (streptococcal grouping latex test kit plasma tech) Anti-Streptolysin O (ASO) levels in the blood of all the samples was determined using Latex Agglutination test kit (Life screen tm -ASO)

RESULTS

A total no of 215 were formed as study group .Out of 215 samples (22.5) 45were culture positives for beta haemolytic streptococci and were grouped by Lancefield serogroups as A, C, G.

Distribution of β- hemolytic Streptococci and ASO titers of test samples by age were tabulated. Antistrepto lysine O titres as well as hemolytic Streptococci throat colonization of test samples correlated positively with age (table-1)

Distribution of β – haemolytic streptococci and ASO test by age

Age	β -HS isolation	Mean ASO
<6yrs	2	600
7-9yrs	8	750
10-12yrs	22	1000
13-15yrs	13	984

Lowest β- haemolytic Streptococci isolation rate seen among children 6yrs age group. There is increased isolation rate with age group and peaked in age group of 10-12 yrs then declined in age group of 13- 15 yrs.

The distribution of isolates by lancefield grouping shows group A 25 (56.5%), group C 14(31.1%) and group G 6(13.3%). From the 50 control samples 17 β- haemolytic streptococcus isolates were obtained group A 12(70.5%) group C 4(23.5%) and group G 1 (5.8 %)

The mean ASO titers obtained from test and control groups were 933 IU/ml and 686 IU/ml respectively. There is a statistical significance

between case and controls p = < 0.05 there is a positive correlation (r =0.80) between high ASO titres and culture positives for β-hemolytic streptococci. Specifically 25/45 (55.5%) and 13/17 (76.4) of the ABS isolates respectively in test and controls were associated with ASO titers of 800 IU/ml.

The most predominant sero group in the study for test and control samples were A and mainly associated with titers of 800 IU/ml 1600 IU/ml.table -2

Distribution between ASO titres and β –hemolytic streptococci grouping of test and controls.

ASO titre	NO.of isolates of test groups				Control group			
<200	A	C	G	TOTAL	A	C	G	TOTAL
	2	0	0	2	0	0	0	0
200	0	0	0	0	0	0	0	0
400	2	3	2	7	0	2	0	2
800	12	10	3	25	12	0	0	12
1600	9	1	1	11	2	0	1	3

DISCUSSION

The prevalence rate of β-hemolytic Streptococcus were 22.5% among study group. In other study it was reported as 20.6% Mandor Baki in calabar , Nigeria[11] and (13.3%) in Lagos Nigeria[1]A Charmine[13] reported 21.4 in Chennai and 15.4 % were reported n Tri – islandstatic grenda[14]

β - haemolytic streptococci and ASO titers in this study increased with age and peaked at the age group 10-12yrs .There is significant association between age of the children and culture positivity p value less than 0.05 similar study was conducted[15] high prevalence rate at 10 age group. Other studies had demonstrated the same age –associated rise in ASO but had different peak age groups PD Gunatillake[16] a peak at age 9 and 10 yrs while S.Sunil et.al[17] observed at 11-15 yrs.

Sex of the children not influenced by ASO titers and β-hemolytic streptococcus isolation of study group same was observed with calabar[11] and JT Benoy[18] reported that tonsillitis occurs both sex equally.

Distribution of isolates increased with highest number seen group A (56.5%) 25/45, group C 14/45, (31.1%) group G (13.3%) 6/45 A Mosta fa[19]has similarly group A predominance and high carrier rate by calabar [11]. With group C and G streptococci. Common cause of tonsillitis Samir[8, 9, 20] were reported as group C and G in tropical region while A common in temperate countries[21].

The predominance of ASO titers of less than or equal 400IU/ml in up to 51.5children with only 5.6 % isolates of β-hemolytic streptococci may suggest that these titers are neither associated with past infection nor recent.

The mean ASO titer of test and controls are 933IU/ml and 686IU /ml respectively indicate that carriage of β-hemolytic streptococci is associated with high ASO titers[22].

CONCLUSION

This study found high prevalence (22.5%) of β-hemolytic streptococci in the throat apparently healthy children with group A identified as the common streptococcal group. ASO titers of 400IU/ml were the baseline titres for this study population. Highest incidence of beta haemolytic streptococci in 10 -13 yrs age group positively correlated with ASO titres and evident risk to Rheumatic fever &Rheumatic heart disease.

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