Detection of Anti-streptolysin O antibodies among Rheumatic fever patients in Tripoli.

Abdulbaset M.E. Abusetta[1], M. A. B. Gamal [2] and Fathia A. Ben saed[3]

[1.]Pathology Department, Faculty of Medical Technology, Tripoli University, Tripoli, Libya.
[2.]Microbiology Department, Faculty of Pharmacy, Al-Azhar University, Cairo, Egypt.
[3.]Tripoli Health Care, Ministry of Health, Libya.

Abstract: Background: Diagnosis of acute rheumatic fever based on a raised antistreptolysin O titer (ASO) is not uncommon in endemic areas. **Objective:** Serum levels of (ASO) in the routine evaluation of patients with rheumatic conditions. Prevalence of elevated serum ASO titer in patients which were coming in Espeia Hospital with various clinical conditions. **Method**: This study, was performed in the central laboratory of Microbiology and Immunology at Espeia Hospital during period from October 2012 to October 2013. The serum samples were tested for (ASO) antibodies by latex agglutination test. Total 150 patients including (40%) male and (60%) female were tested for ASO serum levels. Also out of 50 control group involved in the study, 24 were males (48%) and 26 (52%) were females. **Results**: 114 (**76.0**%) were positive and 36 (**24.0**%) were negative. In 114 positive cases, 44 (**73.3**%) were male patients and 70 (**77.7**%) were female patients. Also the results indicated that out of 50 apparently healthy control involved, only 7.0 (**14.0**%) were positive and 43 (**86.0**%) were negative for ASO test. Out of those 7.0 ASO test positive control, 3.0 (**12.5**%) were male patients and 4.0 (**15.4**%) were female patients. The results indicated that in case of male patients the highest positive cases were found in the age group of 21- 30 (66.7%). However, in case of female patients the highest positive cases were found in the age group of 21- 30 (50%). Statistically significant difference observed between the ASO in patients with repeated streptococcal infection attacks (**76.0**%) and control group whom did not suffer any complain from sore throat for at least one year before investigation (**14.0**%). **Conclusion:** The presence of elevated (ASO) titers in such a population, which probably reflects a high background prevalence of streptococcal infections, should be taken into consideration when evaluating the role of the group A streptococcus in non-purulent complications of infections.

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Introduction:

Streptococcus pyogenes is one of the most common and ubiquitous human pathogens. It causes a wide array of infections, the most frequent of which are acute pharyngitis (''strep throat'') and impetigo (pyoderma). Other manifestations of infection with *Streptococcus pyogenes* include sinusitis, otitis, peritonsillar abscess, pneumonia, scarlet fever, erysipelas and cellulitis and the severe soft tissue infections myonecrosis and necrotizing fasciitis. It is also associated with two main non-suppurative sequelae: acute rheumatic fever and acute glomerulonephritis **(1&2)**.

Acute rheumatic fever is common in the developing world and among aboriginal populations. It has been estimated that worldwide 15.6 million people have rheumatic heart disease. Regions of major public health concern include the Middle East, the Indian subcontinent, and some areas of Africa and South America. The prevalence of rheumatic heart disease was reported to be 5.1 per 1000 in school children in Egypt. In addition, the course of Acute rheumatic fever was found to be severe and aggressive in different parts of the country where rheumatic fever is still one of Egypt's major public health problems **(3&4)**.

Materials:

Patients:

Serum samples were collected in clean, sterile, small test tube from clinically and laboratory diagnosed patients with repeated streptococcal infections attending outpatients and in-patients departments at Espeia Hospital. from 150 patients between the periods from October 2012 to October 2013.

Control group:

Fifty apparently healthy individuals were included in the current study. Those persons did not suffer any complain from sore throat for at least one year before investigation.

ASO kit:

Rheu- majet ASO kit was product of Biokit SA (Barcelona, Spain). The instructions, reagents and accessories to follow were supplied with the kit.

Method:

The sera of both healthy controls and patients were tested according to the instruction of the manufacturer of Rheu- majet ASO kit.

ASO titer more than 200 IU was considered significant.

Results:

ASO levels vary with age group of the study population and geographical distribution. In the present study we aimed to analyzed the prevalence of ASO in hospitalized patients in Espeia Hospital.

In the present study a total number of 150 patients clinically and laboratory diagnosed with streptococcal infections and 50 apparently healthy persons were involved.

Table (1), showed the distribution of patients and control groups according to their age and sex. Out of 150 patients 60 were males (40%) and 90 were females (60%) were females. Also out of 50 control group 24 were males (48%) and 26 were females (52%) were females.

The results presented in the current study indicated that out of 150 patients involved, only 114 (**76.0**%) were positive and 36 (**24.0**%) were negative for ASO test. Out of those 114 ASO test positive cases, 44 (**73.3**%) were male patients and 70 (**77.7**%) were female patients (table 2).

Also the results presented in the current study indicated that out of 50 apparently healthy control involved, only 7.0 (**14.0**%) were positive and 43 (**86.0**%) were negative for ASO test. Out of those 7.0 ASO test positive control, 3.0 (**12.5**%) were male patients and 4.0 (**15.4**%) were female patients (table 3).

The current study demonstrated a statistically significant difference between the ASOT in patients with repeated streptococcal infection attacks (**76.0**%) and control group whom did not suffer any complain from sore throat for at least one year before investigation (**14.0**%).

Tables (4 & 5), showed the distribution of ASO positive patients and control groups according to their age and sex. The results indicated that in case of male patients the highest positive cases were found in the age group of 21- 30 (66.7%), followed by age group of 11-20 (27.3%), age group of 31-40 (6.8%) and finally the lowest positive cases were found in the age group of > 10 (4.5%). Meanwhile no ASO positive cases detected in the age group of 41-50 years old.

However, in case of female patients the highest positive cases were found in the age group of 21- 30 (50%), followed by age group of 11-20 (31.4%), age group of > 10 (11.4%), age group of 31-40 (5.7%) and finally the lowest positive cases were found in the age group of 41-50 (1.5%).

Table(1): Distribution of patients and control groups according to their age and sex.

Age (years)	Patients group				Control group			
	Males		Females		Males		Females	
	No.	%*	No.	%*	No.	%*	No.	%*
10 >	8.0	5.3	16.0	10.7	4.0	8.0	6.0	12.0
11-20	16.0	10.7	24.0	16.0	5.0	10.0	5.0	10.0
21-30	30.0	20.0	38.0	25.3	5.0	10.0	5.0	10.0
31-40	4.0	2.7	6.0	4.0	5.0	10.0	5.0	10.0
41-50	2.0	1.3	6.0	4.0	5.0	10.0	5.0	10.0
Total	60	40.0	90	60.0	24.0	48.0	26.0	52.0

N.B. *Percentage was correlated to the total number of each group (patients & control).

Table(2): Distribution of ASO positive patients according to their sex.

Sex	Antistreptolysin-O test				Total	
	Positive		Negative			
	No.	%*	No.	%*	No.	%*
Male	44	73.3	16.0	26.7	60	100
Female	70	77.7	20.0	22.3	90	100
Total	114	76.0	36.0	24.0	150	100

N.B. *Percentage was correlated to the total number of each group (males & females).

Table(3): Distribution of ASO positive control group according to their sex.

Sex	Antistreptolysin-O test				Total	
	Positive		Negative			
	No.	%*	No.	%*	No.	%*
Male	3.0	12.5	21	87.5	24	100
Female	4.0	15.4	22	84.6	26	100
Total	7.0	14	43	86	50	100

N.B. *Percentage was correlated to the total number of each group (control males & females).

Table (4): Distribution of ASO positive patients according to their sex and age.

Age (years)	Patients group			
	Males		Females	
	No.	%*	No.	%*
10 >	2.0	4.5	8.0	11.4
11-20	12.0	27.3	22.0	31.4
21-30	27.0	61.4	35.0	50.0
31-40	3.0	6.8	4.0	5.7
41-50	0.0	0.0	1.0	1.5
Total	44	100	70	100

N.B. *Percentage was correlated to the total number of each group (males & females).

Table (5): Distribution of ASO positive control cases according to their sex and age.

Age (years)	Control group			
	Males		Females	
	No.	%*	No.	%*
10 >	0.0	0.0	0.0	0.0
11-20	0.0	0.0	1.0	25.0
21-30	2.0	66.7	3.0	75.0
31-40	1.0	33.3	0.0	0.0
41-50	0.0	0.0	0.0	0.0
Total	3.0	100	4.0	100

N.B. *Percentage was correlated to the total number of each group (males & females).

Concerning ASO positive cases in control groups, three male cases; two cases in the age group of 21- 30 and one case in the age group of 31-40 years. However, four female cases were found to be ASO positive; three cases in the age group of 21- 30 and only one case in the age group of 11-20 years.

Also the results indicated that there was a significant difference in ASOT according to age in groups with repeated streptococcal infection both in males and females and the highest positive cases were found in the age group of 21- 30 years old.

Discussion:

The serological test for streptolysin O antibodies (ASO) is commonly used to aid in the diagnosis of post-streptococcal such as acute rheumatic fever and glomerulonephritis. Since streptococcal infections are related to some rheumatic conditions, family physicians and rheumatologists measure ASO titers as a predisposing factor for rheumatic diseases or as an additional acute-phase reactant in order to evaluate the severity and activity of these diseases. Conventional laboratory practice is to measure levels of antibodies to various combinations of the extra-cellular antigens: (ASO, DNase B an streptokinase antibodies. However, Blyth *et al*. showed that the addition of anti-streptokinase antibodies measurement did not increase the sensitivity and specificity of serological testing for the diagnosis of acute post-streptococcal disease[5].

Many Authors have studied the ASOT in different populations. It was 333 Todd's units in Minnesota, USA[6], 240 IU/mL in another study conducted in different American states [7], 326 IU/mL in Korea [8], 305 IU/mL in Mombai [9], 239 IU/mL in a different region of India [10], 200 IU/mL in Tanzania [11], and 200 Todd's units in Sweden [12]. Most of these values exceeded the normal level set by laboratories which is 200 IU/mL.

The increase in the levels of ASO with age was also demonstrated in many other studies [10 & 13]. In contrast, in 2005, Danchin *et al.* found that the mean titer of ASO in children over ten years of age was significantly lower than those between five and ten years, although it was higher than those below five years [14].

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