

RHEUMATIC FEVER PREVENTION PROGRAMME

LABORATORY DIAGNOSIS AND ANTISTREPTOPOLYSACCHARIDE

By M. Okuni, S. Fujikawa, H. Kasagami and H. Kubota

I would like to talk about two topics concerning the laboratory diagnosis for rheumatic fever. The first is laboratory tests for streptococcal antibodies that are necessary as a supporting evidence of preceding streptococcal infection. The second is the significance of antistreptopolysaccharide in the clinics and pathogenesis of rheumatic fever.

At first I would like to talk about the measures for streptococcal antibodies. As you know, revised Jones' criteria in 1966 is widely used for the diagnosis of rheumatic fever. In this criteria supporting evidence of preceding streptococcal infection is a prerequisite for the diagnosis of rheumatic fever. For this purpose measurement of ASO, antistreptokinase, antihyaluronidase or throat culture for Group A streptococci are usually performed.

ASO measurement is usually performed by Rantz-Randall's method. For the measurement of Antistreptokinase, Christensen method Kaplan's method or other methods have been used, but generally speaking these techniques for determination are too complicated to use in general practice.

In Japan we are using a kit for the determination of ASK called "Kinase test". This method was developed by Kumagai and the Kits are on the market in Japan. The principle of this method is hemmagglutination of formalin preserved sheep erythrocytes sensitized with varidase. Normal distribution of ASK titre by this method is shown in the slide, and the titre of twenty five hundred and fifty units or more is considered to be increased. Because of the high sensitivity of the test higher serum ASK titres are obtained as compared with Christensen method. This Kinase test is considered to have utility value in the clinics of rheumatic fever.

In Japan a kit for the determination for antihyaluronidase titre is also on the market. The technics for the test is not so complicated, too.

The significance of simultaneous determination of ASO, ASK and AHT for the diagnosis of streptococcal infections specially for rheumatic fever is well known.

The slide shows Dr. Tosu's results in Japan. He measured ASO, ASK and AHT simultaneously in healthy carrier of Group A streptococci in preschool children. They found that thirty per cent of the cases showed an elevation of all three titres, and another thirty per cent showed an increase of two titres. Twenty six per cent of the cases revealed an elevation of only one antibody in three measurements, and the rest, fourteen per cent of the cases revealed negative streptococcal antibody test, that is, in opposition, in eighty-six per cent of the cases increase of streptococcal antibody is demonstrated by the simultaneous measurement of three antibodies.

In contrast, you can see the result of single measurement of streptococcal antibody on the slide. ASO sixty-five per cent, AHD forty per cent and ASK forty per cent. These results agree with the results of Dr. G. Stollerman in the case of rheumatic fever and suggest the importance of two or more streptococcal antibody determinations in the clinic of rheumatic fever.

The second topic is antistreptopolysaccharide, that is, ASP.

The presence of common antigens between human cardiac tissue and cell substance of Group A streptococ-

ci has been recognized since the epoch-making study of Dr. M.H Kaplan. The next slide shows common antigens found between human body tissue and Group A Streptococci.

In 1967, Dr. I.B. Goldstein found a specific immunological relationship between the streptococcal polysaccharide and glycoproteins of the human cardiac tissue, especially of cardiac valve and aorta. Therefore increased antibody for the streptococcal polysaccharide could be considered to have a specific injurious action on the cardiac valve.

As you know, the most characteristic features in rheumatic carditis are valvulitis causing a valvular heart disease and myocarditis accompanied with Aschoff's body. Therefore this streptococcal polysaccharide could be one of noteworthy subjects in considering the pathogenesis of rheumatic fever.

The slide (Fig. 1) shows the immunoprecipitation method for the determination of antibody level for streptococcal polysaccharide. We used C-labelled streptococcal polysaccharide obtained from Group A, type 5 streptococci.

Next slide (Fig. 2) shows the age distribution of antipolysaccharide level, which is called ASP, in con-

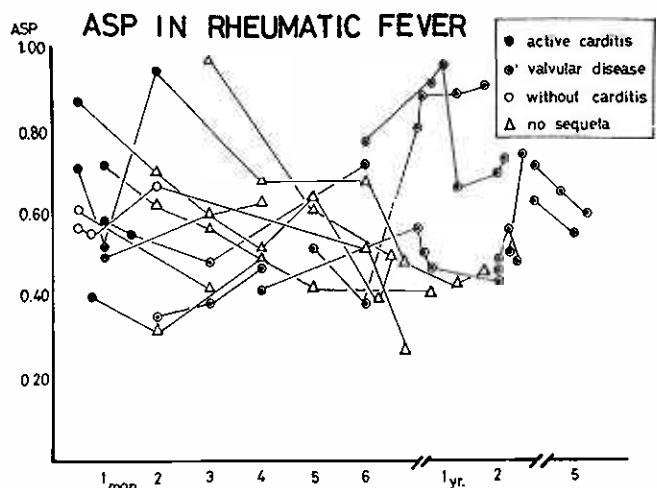


Fig. 1.

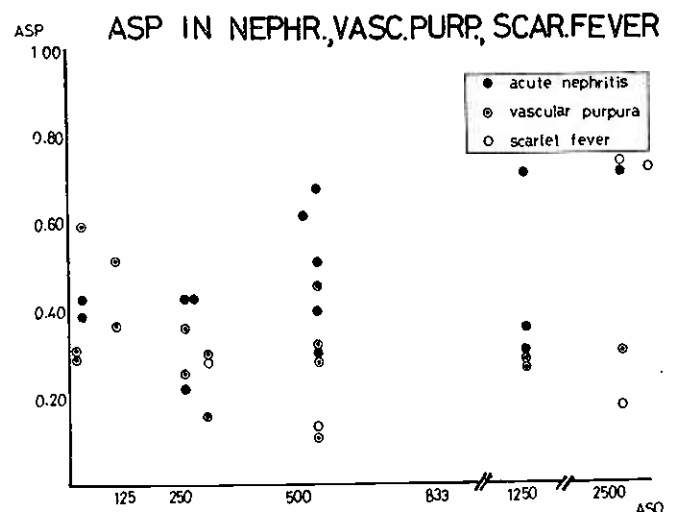


Fig. 2.

trol subjects. In almost all cases serum ASP level was below 0.4 and the mean value was 0.24. No age difference in ASP level was obtained.

On the next slide, you can see the ASP level in the patients of acute rheumatic fever and rheumatic valvular heart disease. The patients were classified into four groups; 1, acute phase with carditis, 2, rheumatic valvular heart disease, 3, rheumatic fever without carditis and 4, patients who had definitive history of rheumatic fever with or without carditis but having no sequential valvular disease at the time of examination. The slide shows the relationship between ASP and ASO in the patients of rheumatic fever. You can see on the slide that ASP levels are distinctly high in the patients who have carditis or valvular heart disease. Usually ASO titre decreased soon after the acute phase of the illness, but ASP level remained elevated even after ASO level went down.

Changes of the ASP levels in each phase of the rheumatic fever are shown in the next slide. ASP level remained high from six months to several years after the onset of the disease.

On the contrary, ASP levels in the cases of acute glomerulonephritis, vascular purpura and scarlet fever

are different from the results in rheumatic fever, as shown on the next slide. In some of the cases, moderately high ASP level was obtained, but in almost all cases ASP Level decreased before or at the time ASO titre went down.

ASP titre in nonspecific streptococcal infections accompanied with high ASO titre is shown on the next slide. In spite of increased ASO titre, ASP levels was found to be in normal range.

As a summary, ASP level was found to be high in the cases of acute rheumatic fever, and the elevated ASP level persisted long time particularly in the cases of rheumatic heart disease. On the contrary, normal ASP level was obtained in almost all cases of acute glomerulonephritis, scarlet fever, vascular purpura and other nonspecific streptococcal infections even when they are accompanied with high ASO level. Therefore, ASP test can be used as a useful measure for differentiating rheumatic heart disease from bacterial endocarditis.

As a conclusion, streptopolysaccharide is considered to have a special role in the pathogenesis of rheumatic fever.