ASO, ASK and ADNase-B Values in Rheumatic Fever, Rheumatic Heart Disease and Other Infections by Hemolytic Streptococcus

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TYPE A hemolytic streptococcus has received attention as the etiologic agent for many diseases such as rheumatic fever, acute glomerulonephritis, scarlet fever, tonsillitis and anaphylactoid purpura (Schönlein-Henoch vasculitis). In addition to ASO measurement, the most widely used serological method for the diagnosis of this disease, measurement of antistreptokinase (ASK) and anti-streptohyaluronidase (ASH) has also been started, and anti-deoxyribonuclease-B (ADNase-B) has also come into use recently. In general, measurement of ASO uncovers about 70–80% of infections by streptococcus hemolyticus, and addition of ASK and ASH is said to provide positive reaction in 90% of the patients. According to Wannamaker¹, ASO occasionally fails to rise during infection by group A streptococcus hemolyticus but ADNase-B is usually elevated, and the titer of the latter is extremely high especially in rheumatic fever.

ASO, ASK and ADNase-B were measured in 40 serum samples from patients with rheumatic fever, rheumatic heart disease, acute glomerulonephritis, anaphylactoid purpura and tonsillitis to study the mutual interrelationship, as reported below.

MATERIALS AND METHODS

ASO, ASK and ADNase-B were measured in 40 serum samples from 33 patients, 9 with rheumatic fever (4 patients in the active stage and 5

in the inactive stage), 6 with valvular heart disease, 5 with acute glomerulonephritis, 4 with anaphylactoid purpura and 9 with tonsillitis. ASO was measured by Rantz-Randall method, ASK was measured by Kinase test and ADNase-B was measured by using the Kit for streptonase-B test commercially available from Wampole Laboratories, Dist. The details of these methods were described in reference².

RESULTS

Among the 40 samples, those obtained during the inactive stage and recovery stage were included. The rate of ADNase-B positive reaction with titers above 240 times was 70%, and that with titers above 340 times, 57.5%. The rate of positive reaction was 50% for ASO and 45% for ASK. As to the correlation between ADNase-B and ASO or ASK, the rate of agreement was 65% for both ASO and ASK, when titers above 240 times of ADNase were defined as positive, and 77.5% when those above 340 times were defined as positive, also with identical values (Table I, II).

Among 6 patients with ASO < 250 × and ADNase-B < 340 ×, 1 patient had mitral insufficiency, 4 patients inactive rheumatic fever and 1 patient anaphylactoid purpura. One patient with anaphylactoid purpura and 2 patients with tonsillitis gave the result of ASO > 333 × and ADNase B < 240 ×.

Seven patients with ASK < 1280 ×, ADNase-B > 340 × included 2 with inactive rheumatic fever, 2 with acute glomerulonephritis and 3 with tonsillitis.

Key Words:

Streptococcal infection
Relation between ADNase-B and ASO
Relation between ADNase-B and ASK

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TABLE I RELATION BETWEEN ADNase-B AND ASO (40 CASES)

ASO \ ADNase-B	ADNase-B	
	<170	>240
<250	9 (22.5%)	11 (27.5%)
>333	3 (7.5%)	17 (42.5%)

Coincidence Rate 65.0%

ASO \ ADNase-B	ADNase-B	
	<240	>340
<250	14 (35.0%)	6 (15.0%)
>333	3 (7.5%)	17 (42.5%)

Coincidence Rate 77.5%

TABLE II RELATION BETWEEN ADNase-B AND ASK (40 CASES)

ASK \ ADNase-B	ADNase-B	
	<170	>240
<1280	10 (25.0%)	12 (30.0%)
>2560	2 (5.0%)	16 (40.0%)

Coincidence Rate 65.0%

ASK \ ADNase-B	ADNase-B	
	<240	>340
<1280	15 (37.5%)	7 (17.5%)
>2560	2 (5.0%)	16 (40.0%)

Coincidence Rate 77.5%

DISCUSSION

In patients with infection by hemolytic streptococcus, simultaneous serological tests such as ASO, ASK and ADNase-B do not always give a high value in each. The following explanations have been offered: 1) variable production of exotoxin in different strains, 2) variable intervals required for the normalization of serum titer in different reactions and 3) longer time required for normalization as the titers of the reaction are higher.

According to Stollerman et al³, ASO was positive in 78% of patients with rheumatic fever. Positive reaction was obtained in 90% by the use of ASO and ASH, and in 95% by the use of ASO, ASK and ASH. Ayoub et al⁴ reported the rise of ADNase-B and longer duration of the elevated value of this reaction than other reaction in chorea. According to the report of Hugh et al⁵, rise

of ASO was seen in 51% and that of ADNase-B in 91% of 101 patients with nephritis which occurred following skin infection by streptococcus hemolyticus. High titers of ADNase-B were sustained longer than ASO according to these workers.

The normal value of ADNase-B was below 60 times in young children, 170 times in school children and 85 times in adults according to the results of Klein et al⁶. In Japan, they are under investigation but appear somewhat higher, so that titers above 240 and 340 times were tentatively considered to be abnormal. The determination of normal range of serum reaction maintained at a high level for a long period is quite difficult as to the selection of "normal" material leaving a room for further study.

In this report, ADNase-B was frequently positive and other serum reactions were negative in patients with discordant results. Disagreement between these results on simultaneous determination in the acute stage was experienced in tonsillitis, acute glomerulonephritis and anaphylactoid purpura. Such disagreement was also seen in patients with rheumatic fever after the course of several months to one year. In valvular heart disease, ADNase may stay positive at certain stage even if ASO and ASK were already negative. Such result indicates the history of rheumatic fever in a retrospective way, presenting an important method for the elucidation of the etiology and control of the disease.

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