CASE REPORT

Fluorescent Treponemal Antibody Absorption Test Reaction in Systemic Lupus Erythematosus

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ABSTRACT

Background: **The longitudinal courses of autoantibodies as well as beading phenomenon and its disappearance in the fluorescent treponemal antibody absorption (FTA-ABS) test based on treatment have not yet been reported. We present a patient with systemic lupus erythematosus (SLE) and beading phenomenon in the FTA-ABS test and further report that this phenomenon was useful in the test.**

Case Presentation: **A 26-year-old woman was referred to our hospital for further treatment of SLE. She had general malaise, and the major clinical findings were anti-ds-DNA antibody level of 400 IU/mL and antinuclear antibody level of 1: 640. She was positive for the rapid plasma reagin (RPR) test for syphilis at 1: 4 and negative for *Treponema pallidum* hemagglutination test. Strong fluorescence reaction was observed in the FTA-ABS test. To prevent false-positive reaction, the testing sample with patient's serum-to-0.1 M dithiothreitol solution ratio of 1: 9 was incubated at room temperature for 30 min. Subsequently, the beading phenomenon disappeared, demonstrating negative results. Through chronic steroid administration, symptomatic improvement was observed. Furthermore, with disappearance of the autoantibodies, the beading phenomenon also disappeared, and the RPR test became negative.**

Conclusion: **Whenever identifying the beading phenomenon is difficult, serum specimen preprocessing method could prove useful in the FTA-ABS test.**

KEY WORDS

systemic lupus erythematosus, serological reaction of syphilis, fluorescent treponemal antibody absorption test, beading phenomenon, 0.1M dithiothreitol

CASE REPORT

Background

Fluorescent treponemal antibody absorption (FTA-ABS) test is a useful laboratory procedure to examine the serological reaction of syphilis. However, a beaded pattern of immunofluorescence infrequently occurs in routine FTA-ABS test[1,2)], which has already been reportedly observed in patients with systemic lupus erythematosus (SLE) as a false-positive reaction[3,4)]. However, longitudinal courses of autoantibodies and beading phenomenon using FTA-ABS test according to the treatment have not yet been reported. Furthermore, the disappearance method in the beading phenomenon of the FTA-ABS test also remains unknown. We report a patient with SLE whose autoantibody was considered as the beading phenomenon in the FTA-ABS test and a novel technique used for its management.

Case Presentation

A 26-year-old woman was referred to our hospital for further treatment of SLE with general malaise. Laboratory tests revealed a platelet count of 96/nL (reference: 120-350), a leukocyte count of 3.8/nL (reference: 4.5-8.5), an anti-ds-DNA antibody level of 110 IU/mL (reference: ≤ 12), and an antinuclear antibody level of 1: 640 (reference: < 1: 40). Her heart and lung examination findings were within the normal range.

She tested positive for syphilis at 1: 4 in the RPR serological test; however, the TPHA test was negative. The strong fluorescence reaction was observed in the FTA-ABS test (Fig. 1(A) and (B)). Although per-

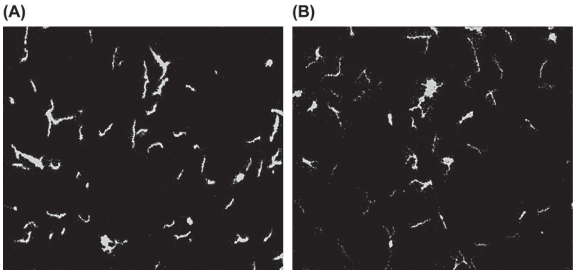

Figure 1: Reaction pattern in the treponemal FTA-ABS test under the fluorescent microscope
(A) Positive reaction in the treponemal FTA-ABS test
(B) Nonspecific reaction (beading phenomenon) in the treponemal FTA-ABS test

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forming this test was difficult, a strong fluorescence reaction was observed in two kinds of FITC-labeled antihuman IgM (μ chain) antibody and the FITC-labeled antihuman IgG (γ chain) antibody, and the beading phenomenon was observed. To prevent a false-positive reaction, the testing sample of the patient's serum at 0.1M DTT solution of 1:9 was incubated at room temperature for 30 min.

After performing the FTA-ABS test using the processing specimen, the beading phenomenon was dissolved, which showed negative results. For comparison, 1/15 M PBS (pH 7.3) was used as a substitute for 0.1 M dithiothreitol (DTT) solution. Therefore, this case was confirmed to have the false-positive reaction pattern of the FTA-ABS test. In addition, the RPR test results were considered to be a biological false-positive reaction. She was diagnosed with SLE and administered an oral prednisolone course without hospitalization.

Through steroid administration, symptomatic improvement occurred. Both the anti-ds-DNA antibody value and antinuclear antibody titer rapidly decreased with symptom improvement 3 weeks post-diagnosis. Furthermore, with disappearance of these autoantibodies, the beading phenomenon in the FTA-ABS test also disappeared, the result of the RPR test became negative.

The serological test for syphilis method theoretically has more false-positive reactions (biological false-positive reaction) not the inspection specific for syphilis. A false-positive reaction is detected in systemic autoimmune disease, such as SLE or rheumatoid arthritis[5,6], and in viral infectious diseases, such as hepatitis virus or human immunodeficiency virus[7,8]. Conversely, the false-positive reaction by the *Treponema pallidum* antibody detection law is known conventionally.

When a false-positive reaction is assumed in the TPHA test, the FTA-ABS test is considered as a confirmatory assay. However, antinuclear antibody in the blood of patients with SLE may rarely produce a false-positive reaction peculiar to the FTA-ABS test; this process is called the beading phenomenon. The beading phenomenon in the FTA-ABS test was observed in our patient with strongly positive antinuclear antibody and anti-ds-DNA antibody levels. The RPR test results showed the biological false-positive reaction. With the pathologic improvement of this patient under steroid therapy, these false-positive reactions disappeared due to decreased autoantibodies.

The origin of the beading phenomenon by the FTA-ABS test was believed to be caused by the autoantibody and FITC-labeled antibody sequentially reacting to the treponemal pallidum Nichols strain on the test kit into a sandwich form. Therefore, the beading phenomenon should be examined to identify the nonspecific absorption pattern in the FTA-ABS test for syphilis through careful microscopic examination. However, the disappearance of the beading phenomenon has not been confirmed as a false-positive reaction yet. We tried the cancellation method for the patient with SLE with the beading phenomenon for the first time.

We used the 0.1 M DTT solution that acted as a disulfide-reducing agent and as a cutting ss-binding of the component of IgM-like antibody causing nonspecific reaction[9,10]. When determining the beading phenomenon was difficult, using this method was thought to be useful in the FTA-ABS test. The nonspecific material derived from the autoantibody that caused the beading phenomenon disappeared by placing a specimen with 0.1 M DTT solution beforehand.

CONCLUSION

Our findings show that serum specimen processing method using 0.1M DTT solution is useful when a strong fluorescence intensity is absorbed in the FTA-ABS test and distinguishing the beading phenomenon is difficult.

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