Present day practice

An assessment of a latex agglutination slide test for toxoplasma antibody

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The dye test of Sabin and Feldman (1948) is the most commonly used test for the examination of sera for antibodies to *Toxoplasma gondii* and it is used to standardize the international standard serum. This test, however, has several disadvantages, the main one being that it is necessary to use a live antigen. A rapid diagnostic test using latex particles and a killed antigen has considerable appeal and several workers have devised techniques on these lines. Siim and Lind (1960) developed a flocculation test using deep frozen toxoplasma extract and plastic particles. Bozděch and Jira (1961) produced a latex test in test tubes, but had doubts about its sensitivity. Roussel (1964) used bentonite and kaolin particles which gave specific and reproducible results. Lunde and Jacobs (1967) developed a latex agglutination test but the presence of heterophile antibodies gave false positive results. Giannini and Tosti (1968) compared the latex agglutination test with the dye tests and found a good correlation when dye test titres were 1:128 or more. Denis (1967) compared an agglutination test using acryl plastic particles with the haemagglutination and complement-fixation test. Recently a new latex agglutination slide test was marketed by Ital Diagnostics (available in this country from Diamed Diagnostics, 38 Queensland Street, Liverpool L7 3JG) and it was decided that the three laboratories in the Public Health Laboratory Service engaged in the serological diagnosis of toxoplasmosis should assess the value of this test.

We could not substantiate the makers' initial claim that the latex test is positive only in acute disease. Sera from five patients who had recovered from Toxoplasma infection and from whom *T. gondii* had been isolated from between one and six years previously were found to be positive with the latex slide test.

Unlike the latex test described by Lunde and Jacobs (1967) this test was found to be specific for toxoplasma antibody and did not crossreact with Paul Bunnell-positive sera or sera found to contain Epstein-Barr virus antibody. We found some sera, however, that showed a result which can best be described as 'streaking'. This is a partial agglutination with streaks of agglutinated particles. We were able to show that this effect is the result of testing sera contaminated with bacteria, and the test must be considered void if there is any sign of streaking. Such sera may still be examined for toxoplasma antibody with the dye test, although the examination of grossly contaminated sera is not to be recommended.

This paper was largely prompted by inquiries from pathologists about the value of the latex slide test. Its main value in a routine laboratory appears to be for the screening of sera which are likely to have a dye test titre greater than 1/64, such as suspected glandular toxoplasmosis or suspected congenital toxoplasmosis. Although a positive latex slide test does not necessarily indicate recent or active infection, it should be useful for screening sera from patients with a glandular fever-like illness when the Paul Bunnell test is negative. A positive latex slide test with neat serum obviously cannot differentiate between past and recent infection but the result of a titration of the serum may be of value, a high titre suggesting recent infection. It is of limited value in ophthalmic cases because low dye test antibody titres may be significant and antibody at this level is not detected by the latex slide test.

We appeal to pathologists throughout the country to arrange for sera with a positive latex test to be sent to one of the three laboratories for confirmation. In this way detailed epidemiological information may be built up and the reliability of the test further evaluated.

Materials and Methods

Ital-Diagnostics issue their reagents in kit form. Each kit contains 2 ml of antigen and approximately 1 ml each of a positive and a negative control serum, which are supplied in bottles fitted with dropping pipettes. There is also a glass slide in a tray and wooden sticks for mixing the reagents on the slide.

Received for publication 4 October 1971.

Sera from suspected cases of toxoplasmosis were examined by means of the dye test and divided into groups according to their titre. Each group was then qualitatively tested with the latex slide test. The test was performed simply by adding one drop of the antigen to one drop of neat serum on the slide provided, mixing with a stick and leaving for five minutes before reading. Positive sera produces agglutination of the latex particles which can be seen by the naked eye. Some of the positive sera were titrated, using drops of a special diluent available from Ital-Diagnostics, to determine whether the titre of the latex slide test correlated with the dye test.

Results

Table I shows that the latex slide test gives almost entirely negative results with sera that are negative with the dye test and mainly negative results when the dye test titre is below 1/64. The test is positive with most sera with a dye test titre of 1/128 or greater. Table II shows that the strength of the reactions correlated with the dye test but at a much lower level and it can be concluded that the test correctly detects toxoplasma antibody, but is much less sensitive.

Dye Test Titre	*Latex Slide Test*		*Total*
	+	–	
2048+	45	0	45
512/1024	112	7	119
128/256	59	32	91
32/64	35	51	86
4/16	11	30	41
Negative	2	69	71
Total	264	189	453

Table I *Results compared with dye test titres*

Serum No.	*Dye Test Titre*	*Latex Slide Test Titre*
1	4096	64
2		16
3		16
4		16
5		8
6	2048	16
7		8
8		8
9		8
10		4
11	1024	8
12		8
13	512	16
14		8
15	256	4
16		2
17	128	8
18		2
19	64	2
20		2
21	16	2
22		2

Table II *Comparison of titres by dye tests and latex slide tests*

Comment

Microscopical examination of the latex antigen stained by Giemsa or Leishman stains shows numerous toxoplasma organisms. When the latex antigen is stained, using fluorescein-linked toxoplasma antibody, the toxoplasmas fluoresce but the latex particles do not. Thus the agglutination would appear to involve whole organisms as well as soluble components of *T. gondii*.

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