False positive reactions occurring with the Captia Syphilis-G EIA, in sera from patients with Lyme disease

The Captia syphilis enzyme immunoassays for detection of immunoglobulins G and M to *Treponema pallidum*, have been shown to offer several advantages over the current serological tests. They are simple and rapid, and they give results that are read objectively.

The overall sensitivity of the Captia Syphilis-G, of over 98% was comparable to the sensitivity of the TPHA (*Treponema pallidum* Haemagglutination Assay) and the FTA-ABS (Fluorescent Treponemal Antibody Absorbed) test, at all stages of the disease except in primary syphilis (82%). At this stage, the Captia Syphilis-G failed to detect antibodies in the sera of patients who had positive results with all the other tests. Serological detection of untreated early infections is very important in the control of the disease. In the light of our results, the use of the Captia Syphilis-G for screening purposes instead of the present combination of the VDRL (Venereal Disease Research Laboratory) test and TPHA, as has been suggested, does not appear to be suitable. On the other hand, its excellent specificity, as reported by Young et al could be ideally suited to confirming the treponemal nature of serum samples preselected on the basis of VDRL test reactivity. False positive reactions occurring with the Captia Syphilis-G, were not associated with an individual sexually transmitted disease.

To study the specificity of the Captia Syphilis-G and to assess the role of other diseases in producing false positive reactions, we examined 835 sera from non syphilitic patients, by the Captia Syphilis-G, according to the manufacturer's instructions (Merck Diagnostics, UK).

Sera (N = 728) giving negative TPHA and VDRL tests were obtained from specimens submitted to the Diagnostic Laboratory for routine testing. Of these 728 sera, three were positive for Captia Syphilis-G (specificity = 99.6%). On repeat testing, they remained negative for TPHA and VDRL tests and positive with Captia Syphilis-G.

Sera (N = 107) from patients with diseases often associated with biologically false positive reactions were also examined by Captia Syphilis-G and Captia Syphilis-M. All the 107 specimens were negative by TPHA, VDRL and Captia Syphilis-M (table). All the rheumatoid factor positive sera were also negative on testing with the Captia Syphilis-G.

As reported previously, rheumatoid factor appears to be not important in producing false positive reactions in the Captia Syphilis system. However, the Captia Syphilis-G was reactive with one specimen in the antinuclear antibody (ANA) serum group and with six specimens from patients with Lyme borreliosis. Reactive ANA serum may be due in part to nucleoprotein on the surface of the *T pallidum* antigen. Antigenic cross-reactivity between *Borrelia burgdorferi* and *T pallidum* has been demonstrated and a variety of procedures has been recommended to differentiate Lyme borreliosis from syphilis. Our results confirm that syphilis can be excluded serologically with the VDRL and TPHA. It has also been suggested to remove cross-reacting antibodies by absorption with *Treponema phagedenis*. Unlike other *T pallidum* antigen tests, such as the TPHA, that comprise an absorption stage to neutralize group treponemal antibody, the Captia Syphilis-G involves no such absorption. The lack of an absorption stage may explain the false positive reactions observed in our study with sera of patients with Lyme borreliosis.

In conclusion, the high overall specificity of the Captia Syphilis-G was confirmed in our study. However, the great number of false positive findings observed with sera from patients with Lyme borreliosis has to be emphasised. As we reported previously, simultaneous utilisation of the two Captia assays should limit the possibility of false negative or false positive results which can be observed when only one test is carried out. Finally the simultaneous measurement of IgG and IgM antibodies for *T pallidum* by the Captia immunoassays appears to be an efficient method for confirming the serodiagnosis of syphilis as well as for supplying the investigator with additional information for serological evaluation of the patient and the disease.

Table Results obtained with specimens from 107 patients with disease other than syphilis

<table>
<thead>
<tr>
<th>Specimen group</th>
<th>No positive in</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>VDRL</td>
</tr>
<tr>
<td>Rheumatoid factor</td>
<td>47</td>
</tr>
<tr>
<td>Antinuclear antibody</td>
<td>40</td>
</tr>
<tr>
<td>Lyme borreliosis</td>
<td>20</td>
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</tbody>
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Accepted for publication 2 December 1991