A streptococcal antigen detection test had low sensitivity and high specificity for detecting group A β-haemolytic streptococcus

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Question

In patients with sore throat, what is the diagnostic value of a rapid streptococcal antigen detection test for detecting group A β-haemolytic streptococcus (GABHS)?

Design

Independent comparisons of a rapid streptococcal antigen detection test with throat culture and antibody titre tests.

Setting

General practices in the Netherlands.

Patients

558 patients who were 4 to 60 years of age (mean age 27 y) and had sore throat for < 15 days were recruited by 53 general practitioners.

Description of test and diagnostic standards

2 throat samples were taken from the tonsils or tonsillar fossae and the posterior pharyngeal wall. 1 sample was tested with a rapid streptococcal antigen test (Directigen 1,2,3 Strept A; Becton Dickinson). The other throat sample was transported in modified Stuart medium to the laboratory, where it was inoculated with 7% sheep blood agar (Oxoid) and incubated overnight at 37 °C under aerobic and anaerobic conditions. Colonies with heavy growth on the first isolation were reanalysed after 48 hours. Blood samples were analysed for antistreptolysin and antideoxyribonuclease B antibodies in 139 patients (mean age 29 y).

Main outcome measures

Sensitivity and specificity for detecting GABHS. Reference tests were throat culture for all patients and antibody titres for 139 patients. 4 clinical features in patients were recorded: fever ≥ 38 °C, lack of cough, tonsillar exudate, and anterior cervical lymphadenopathy.

Rapid streptococcus antigen detection test characteristics for detecting group A β-haemolytic streptococcus in patients with sore throat

<table>
<thead>
<tr>
<th>Reference test</th>
<th>Sensitivity (95% CI)</th>
<th>Specificity (CI)</th>
<th>+LR</th>
<th>-LR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Throat culture</td>
<td>65% (58 to 72)</td>
<td>96% (93 to 98)</td>
<td>15.2</td>
<td>0.37</td>
</tr>
<tr>
<td>0 to 2 clinical features</td>
<td>48% (35 to 60)</td>
<td>98% (96 to 100)</td>
<td>29.1</td>
<td>0.53</td>
</tr>
<tr>
<td>3 to 4 clinical features</td>
<td>75% (66 to 83)</td>
<td>91% (85 to 95)</td>
<td>8.2</td>
<td>0.28</td>
</tr>
<tr>
<td>Antibody titres (n = 139)</td>
<td>61% (42 to 78)</td>
<td>74% (65 to 82)</td>
<td>2.4</td>
<td>0.52</td>
</tr>
</tbody>
</table>

+LR = likelihood ratio for the presence of disease if the test is positive; -LR = likelihood ratio if the test is negative. LR and CI calculated from data in article.

Commentary

The study by Dagnelie and colleagues provides further evidence that the rapid antigen test for GABHS pharyngitis has low sensitivity, which contributes to a low negative predictive value and inability to rule out GABHS during the initial patient visit. Successfully ruling out GABHS would obviate the need for obtaining a throat culture and perhaps allow a child or adult to return to school or work sooner.

One of the major strengths of this study is the selection of patients. Patients were recruited by general practitioners in the Netherlands, so the study population was appropriate for primary care. The method of recruitment was not described, but general practitioners probably selected those patients whom they judged most likely to have GABHS. Findings from this study, therefore, may differ from studies that focus on patients who present with a chief symptom of sore throat. Although the method of patient selection was not completely described, this study probably addressed test performance in the most clinically relevant patient population—patients who seem to have streptococcal pharyngitis.

This study contributes to the research on rapid strep testing by addressing test performance in subpopulations with differing GABHS prevalence. The findings confirm the previously shown value of the 4 clinical features used to classify patients (1).

Ironically, the rapid test performed best at ruling out GABHS in the high-probability group (47%)—a group that arguably should have received immediate treatment with no further testing—and worst in the low-probability group (22%); the group that could benefit most from rapid strep testing.

A positive test result in the low-probability group increased the probability of having GABHS to 89%, but a negative test result only decreased the probability by 13%. Clinicians would still be compelled to order a throat culture for patients with negative test results. So the search continues for a rapid strep test that performs well in high sensitivity in a population with a low-to-moderate probability of having GABHS.

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Reference