The Uriscreen test was not better than standard urinalysis and dipstick tests for detecting urinary tract infection in children


QUESTION: Is the Uriscreen test better than standard urinalysis and dipstick tests for early detection of urinary tract infection (UTI) in children?

Design
Independent comparisons of Uriscreen, urinalysis, and dipstick tests with quantitative urine culture.

Setting
Emergency department of a children’s hospital in Israel.

Participants
A random sample of 121 children (68% girls) who were 1 month to 17 years of age and who presented to the emergency department with symptoms of UTI. Symptoms for infants were fever with no apparent source, vomiting, decreased appetite, and irritability; for toddlers, abdominal pain and frequent voiding with or without fever; and for older children, dysuria, frequency, urgency, and abdominal or flank pain with or without fever. The exclusion criterion was use of antibiotics.

Description of tests and diagnostic standard
A urine sample was obtained from each child by using age appropriate methods. Within 15 minutes of collection, urine samples were tested in 4 ways. The Uriscreen test was a commercial kit (Diathec Diagnostica, Rehovot, Israel; cost US$0.71 per test); the dipstick test was the Multistix 10 SG strip (Bayer, Elkhart, IN, USA; cost US$0.27 per test); and urinalysis was done in the hospital laboratories with an automated urine analyser (Urotron RL9, Boehringer Mannheim; cost US$13 per test). The diagnostic standard was quantitative urine culture, which was done by using the commercial Diaslide method (Diathec Diagnostica, Rehovot, Israel). The Uriscreen test was a new method for rapid diagnosis of UTI that tests for catalase. Catalase is produced by bacteria and cells and is generally absent if there are no leukocytes, erythrocytes, or bacteria in the urine. Studies of Uriscreen in adults have shown mixed results. A previous study in children found the test's sensitivity too low to be useful for screening, whereas the study by Waisman et al found that the test had a high sensitivity but low specificity in asymptomatic children.

Main results
Sensitivity and specificity for detecting UTI.

Main outcome measures
Sensitivity and specificity for detecting UTI.

Test characteristics for early detection of urinary tract infection in children*1

<table>
<thead>
<tr>
<th>Tests</th>
<th>Sensitivity (95% CI)</th>
<th>Specificity (CI)</th>
<th>+LR</th>
<th>–LR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uriscreen</td>
<td>100% (90 to 100)</td>
<td>69% (58 to 78)</td>
<td>3.2</td>
<td></td>
</tr>
<tr>
<td>Dipstick</td>
<td>97% (85 to 100)</td>
<td>83% (73 to 90)</td>
<td>5.6</td>
<td>0.03</td>
</tr>
<tr>
<td>Urinalysis</td>
<td>89% (73 to 97)</td>
<td>88% (80 to 94)</td>
<td>7.6</td>
<td>0.13</td>
</tr>
</tbody>
</table>

*LRs and CI defined in glossary and calculated from data in article.

Conclusion
The Uriscreen test was not better than dipstick or urinalysis tests for the early detection of urinary tract infection in children.

COMMENTARY
The Uriscreen test is a new method for rapid diagnosis of UTI that tests for catalase. Catalase is produced by bacteria and cells and is generally absent if there are no leukocytes, erythrocytes, or bacteria in the urine. Studies of Uriscreen in adults have shown mixed results. A previous study in children found the test's sensitivity too low to be useful for screening, whereas the study by Waisman et al found that the test had a high sensitivity but low specificity in asymptomatic children.

Why have these and other studies differed regarding the accuracy of Uriscreen? One possibility is spectrum bias (ie, differences in sensitivity and specificity of a test that result from differences in how the disease is manifested in a population). Differences in disease features between symptomatic and asymptomatic patients could be expected, and differences in how the cultures are interpreted can explain some differences in test performance. Culture results are affected by the source of the urine, the number of colony forming units that are considered evidence of infection, and the interpretation of cultures that show multiple organisms. What should the practitioner do? Test errors in UTI are asymmetrical: a false negative result that leads to an infected patient not receiving treatment can be more important than a false positive result. Thus, the high sensitivity found in this study suggests it is useful. We need more definitive knowledge of Uriscreen's performance under different conditions and with different populations, however, before physicians can use it with confidence for deciding about treatment.

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urinary tract infection in children

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