SCREENING TECHNIQUES IN THE DIAGNOSIS OF URINARY TRACT INFECTION IN CHILDREN

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Urinary tract infections are quite common in paediatric practice and are responsible for significant morbidity. If untreated, they often lead to irreversible kidney damage. It is important to appreciate that the presence of symptoms in infants is a poor guide to infection since many infections are asymptomatic. It becomes imperative, therefore, to diagnose and treat them early. Urinary tract infections are usually diagnosed on the basis of positive urine cultures (colony counts above 100,000 per ml. of urine), which is a time consuming procedure and requires a well equipped laboratory.

Attempts to simplify the diagnosis of urinary tract infections, specially for the busy practitioner and laboratories, have led to the introduction of various screening procedures, viz. triphenyl tetrazolium chloride (TTC) test; nitrate test, microscopic examination of urine for pus cells and smears stained by Gram’s method. Chemical tests have been proved to be unreliable (Eliot and Pryles 1964, Kinclaid-Smith et al. 1967). In this study an attempt has been made to correlate stained smears and microscopic examination of urine for pus cells with bacterial colony counts and to evaluate these tests as reliable screening procedures.

**Material and Methods**

A total of 150 children were investigated. Out of these, 50 represented the control group, while the remaining 100 cases were those patients who had any one or a combination of the following criteria: (i) Clinical manifestations suggestive of urinary tract infection, (ii) pyuria, (iii) pyrexia of obscure origin, (iv) suspicion of congenital abnormalities of the urinary tract.

Collection of the urine in most of the cases was by the clean catch midstream technique in a sterile tube. In all the cases the genitalia were cleaned with soap and water before collecting the urine specimen. All the samples were examined within one hour of collection. When the examination was delayed the specimens were stored at 4°C in a refrigerator. The following investigations were carried out:

1. Routine urine examination, which included specific gravity, reaction and chemical examination.
2. Microscopic examination of the urine which comprised (i) pus cell count/
H.P.F. of the centrifuged specimen at
the rate of 1000 R.P.M. for 10 minutes.
The deposit was examined microsco-
pically and at least 10 to 15 high
power fields were examined. (ii) Gram's staining of freshly passed
uncentrifuged specimen of urine.

3. Quantitative urine culture: The
number of bacteria per ml. of urine
were determined by the technique of
Schneierson (1962).

Observations
Fifty-five out of 150 cases turned out
to have definite urinary tract infection
(bacterial colony count above 100,000/ml.

In 20 cases, the bacterial count was below
100,000/ml. while 75 cultures were sterile.

Samples with a bacterial colony count
above 100,000/ml. showed more than 5
pus cells in 51 out of 55 cases (92.7%), 33
(60.6%) revealed more than 10 pus cells
(Table 1). All the cultures showed signifi-
cant bacteriuria where the pus cell count/
H.P.F. was more than 6, whereas only
44.4% were positive when the pus cells
were less than 5/H.P.F.

Slides of uncentrifuged urine revealed
organisms in 51 out of 55 (92.7%) cases with
colony counts above 100,000/ml. of urine.
No child with a urinary colony count below
100,000 showed any organism (Table 2).

Table 1. Correlation of bacterial counts with pus cells.

<table>
<thead>
<tr>
<th>No. of cases</th>
<th>Bacterial count (number/ml.)</th>
<th>Pus cells/H.P.F.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1-5</td>
</tr>
<tr>
<td>8</td>
<td>Below 10,000</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>10,000 to 100,000</td>
<td>5</td>
</tr>
<tr>
<td>55</td>
<td>Above 100,000</td>
<td>4</td>
</tr>
</tbody>
</table>

Table 2. Correlation of bacterial counts with Gram's stained smear.

<table>
<thead>
<tr>
<th>Bacterial count/ml.</th>
<th>No. of cases</th>
<th>Bacteria in Gram's stained smear</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Present</td>
</tr>
<tr>
<td>10,000</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>10,000 to 100,000</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>above 100,000</td>
<td>55</td>
<td>51</td>
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