Urinary tract infection (UTI) is a major cause of morbidity among children. Unexplained fever and failure to thrive are common presenting signs in infants, besides nausea, vomiting and diarrhea. In slightly older children, in addition to the above, increased frequency of micturition and nocturnal enuresis can be the other associated complaints. Sometimes the infection may remain asymptomatic. There are very few studies on urinary tract infection in malnourished children. In a study carried out by Phillips and Wharton(1) on 75 malnourished children, UTI was detected in 8 (10.7%) children. The present study was carried out in children selected from the pediatric wards of the Chigateri General Hospital to assess the prevalence of UTI in 88 severely malnourished children.

Material and Methods

Eighty eight children aged 1-5 years of age weighing less than 60% of the expected weight for age according to LAP classification(2) were selected from the Pediatric wards of the Chigateri General Hospital during April, 1989 to April, 1990. Fifty three children selected from the Outpatient Department between 1-5 years of age and weighing more than 80% of the expected weight for age were selected as controls.

In children below the age of 3 years, urine was collected by suprapubic aspiration(4). In older children, after cleansing...
the external genitalia with carbol soap solution, and then with sterile water, clean catch midstream sample of urine was collected in autoclaved bottles. The urine samples were transferred to the laboratory and subjected to microscopy and urine culture within half an hour of collection. In addition, routine investigations like microscopic examination, albumin and pH were carried out. Urine culture was considered significant if the colony count was 100,000 or more per ml of freshly voided urine. In case of suprapubic aspiration, any growth obtained was considered to be significant.

**Results**

Sixty two children (70.5%) had Grade III PEM and 26 children (29.5%) had Grade IV PEM. Of the 88 severely malnourished children, 7 (8.3%) had evidence of UTI by urine culture. *Table I* gives the clinical details of these 7 children. The urine microscopic examination did not show pyuria except in one case. Bacteria were, however, seen in 4 (57%) cases. In all the 7 cases, there were no symptoms or signs suggestive of UTI. *E. coli* was isolated in 3 children, *Proteus* in 2 and *Enterobacter* and *Klebsiella* were isolated in one child each. None of the 53 controls had a positive urine culture.

The associated infection and/or disease states present in these 88 children are shown in *Table II*.

**Discussion**

Not many studies of urinary tract infection in malnourished children have been carried out. An earlier study by Phillips and Wharton(1) in Uganda detected UTI

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**Table I—Clinical and Laboratory Profile of Patients of PEM with Positive Urine Culture**

<table>
<thead>
<tr>
<th>Age in Years</th>
<th>Sex</th>
<th>Diagnosis</th>
<th>Urine microscopy</th>
<th>Culture</th>
<th>Blood</th>
<th>Abdominal ultrasound</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>M</td>
<td>Abdominal tuberculosis, Grade III PEM, anemia</td>
<td>Motile bacilli</td>
<td><em>Proteus</em></td>
<td>Urea (mg/dl) 20</td>
<td>Normal</td>
</tr>
<tr>
<td>2</td>
<td>M</td>
<td>Chronic diarrhea, Grade IV PEM, anemia</td>
<td>Non-motile bacilli</td>
<td><em>E. coli</em></td>
<td>Creatinine 0.9</td>
<td>Normal</td>
</tr>
<tr>
<td>2½</td>
<td>F</td>
<td>Anemia, Vitamin A deficiency, acute gastroenteritis, Grade III PEM</td>
<td>2-3 pus cells</td>
<td><em>E. coli</em></td>
<td>Urea (mg/dl) 25</td>
<td>Normal</td>
</tr>
<tr>
<td>3</td>
<td>F</td>
<td>Anemia, Vitamin A deficiency, Grade IV PEM</td>
<td>Normal</td>
<td><em>Klebsiella</em></td>
<td>Creatinine 0.9</td>
<td>Normal</td>
</tr>
<tr>
<td>3</td>
<td>F</td>
<td>Vitamin A deficiency, Grade III PEM, anemia</td>
<td>Granular casts, non-motile bacilli</td>
<td><em>Enterobacter</em></td>
<td>Creatinine 0.9</td>
<td>Normal</td>
</tr>
<tr>
<td>2</td>
<td>F</td>
<td>Anemia, Vitamin A deficiency, Grade III PEM, primary complex</td>
<td>Non-motile bacilli</td>
<td><em>Proteus</em></td>
<td>Creatinine 0.9</td>
<td>Normal</td>
</tr>
<tr>
<td>2</td>
<td>M</td>
<td>Anemia, Grade III PEM, primary complex</td>
<td>Normal</td>
<td><em>E. coli</em></td>
<td>Urea (mg/dl) 32</td>
<td>Normal</td>
</tr>
</tbody>
</table>
in 10% of malnourished children. Later studies (5, 6) revealed UTI in 26% and 9.5% of malnourished children, respectively. In the present study, 8% of malnourished children had UTI. It was surprising that all the 88 malnourished children studied were admitted in the hospital for various illnesses other than UTI. The most common associated conditions were respiratory infection (31.8%), diarrhea (27.2%) and anemia (25%). Similar infections have been noted by other workers (7, 8). Of the 26 children admitted for respiratory infection, two had UTI. Of the 24 children with diarrhea and of the 22 children with anemia, 2 had UTI.

An autopsy study carried out by Stirling (9) in 33 severely malnourished children, between 6-18 months of age, revealed renal pathology in 22 (66.7%) and pyelonephritis in 10 (32.2%) infants. He concluded that many children who recover from malnutrition may have residual renal damage. Dayal et al. (5) carried out renal biopsy in 142 malnourished children. Twenty two children had pyelonephritis. Follow up renal biopsy was done in 31 cases. Most of the cases showed regression of glomerular changes and of changes like cloudy swelling of the proximal and distal convoluted tubules. Yet abnormal histopathology did persist in a few cases.

The results obtained from this and earlier studies clearly indicate that UTI is an important occult infection in malnourished children. Urine microscopy as a guide to the presence of UTI is unreliable and significant bacteruria can occur in the absence of pyuria (10). In this study too, urine microscopy by itself was not of much use and culture was necessary to arrive at a diagnosis. It is, therefore, recommended that urine culture should be performed in all significantly malnourished children to diagnose UTI. Further studies are needed to follow up such malnourished children who have associated UTI and also to find out the impact of treatment on the recovery of the malnourished state.

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REFERENCES


