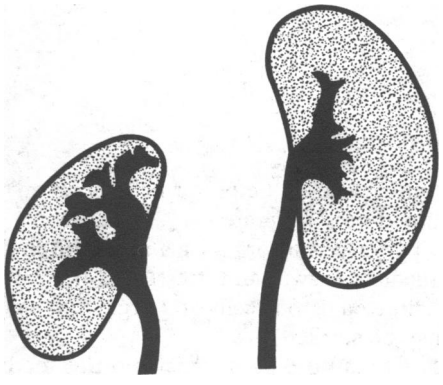
ABC of 1 to 7

H B VALMAN

URINARY TRACT INFECTION



Urinary tract infection may affect about 5% of girls and 3% of boys and may be followed by hypertension or renal failure in adult life. If severe renal scarring is present, which is rare, it has usually occurred by the age of 5 years. Therefore early diagnosis and effective treatment are especially important in this age group, but the symptoms may be insidious and the interpretation of routine specimens of urine difficult.

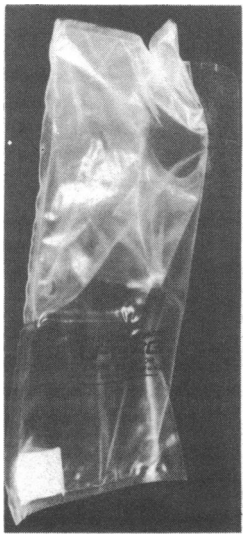
Clinical features

Dysuria	Fever
Frequency	Vomiting
Abdominal pain	Lethargy
Enuresis	Slow gain in weight

There may be lethargy, vomiting, slow weight gain, fever, dysuria, frequency, abdominal pain, or bed wetting but sometimes only fever. In girls dysuria is not always due to urinary tract infection but it may be caused by partly separated labial adhesions.

Frequency of micturition may be due to a behaviour problem rather than a urinary tract infection. As the symptoms are not specific every ill child without a diagnosis as well as those with the features above must have a properly collected urine specimen examined for the presence of bacteria. This specimen must be taken before any antibiotics are given, and if the child is not dangerously ill it is preferable to withhold antibiotics until a specimen can be examined in the laboratory. The urine should be routinely tested for glucose, but the presence of protein does not confirm a urinary tract infection or its absence exclude it.

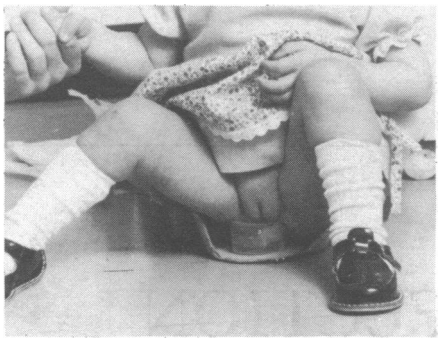
Collection of urine



In infants a disposable adhesive plastic urinary bag is applied to the skin round the external genitalia after preliminary washing with water. The bag is removed as soon as a small amount of urine has been passed. A fresh mid-stream clean-catch specimen can often be obtained after gentle suprapubic stimulation, especially in boys. If the bag urine specimen contains more than 10×10^6 pus cells per litre or bacteria are seen in a fresh specimen or there is a growth of more than 100×10^6 organisms per litre a further bag urine specimen should be taken, preferably after a bath, if the infant is not severely ill.

If the infant is ill or the second bag specimen is abnormal a further urine specimen may be obtained by suprapubic bladder puncture. Bacteria cultured from this specimen confirm a urinary tract infection.

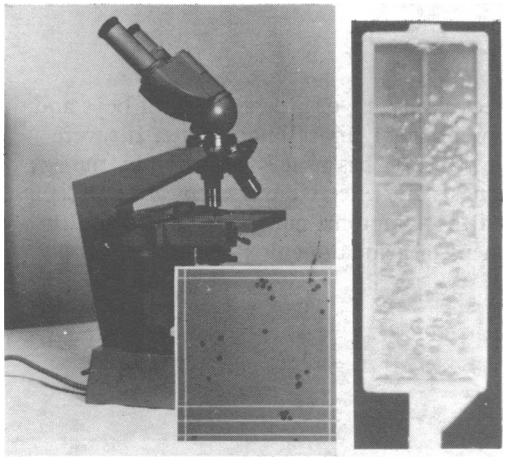
A child who will sit on a potty or the lavatory seat can have a mid-stream specimen of urine collected, preferably after a bath. The growth of at least 100×10^6 bacteria per litre and the presence of the same organism with the same antibiotic sensitivities in three specimens of urine confirm the diagnosis.



Parents can be taught how to collect a mid-stream specimen of urine from a girl while she is sitting on a potty or the lavatory. As several specimens may be needed during the subsequent year time is well spent during the initial tuition. Special devices for collecting the mid-stream specimen have been devised using a removable tray.

Despite scrupulous care in the collection of urine by these methods it may be impossible to interpret the results of specimens obtained from some girls. A fine urinary catheter can be used to obtain a confirmatory specimen as several authorities no longer consider the procedure hazardous.

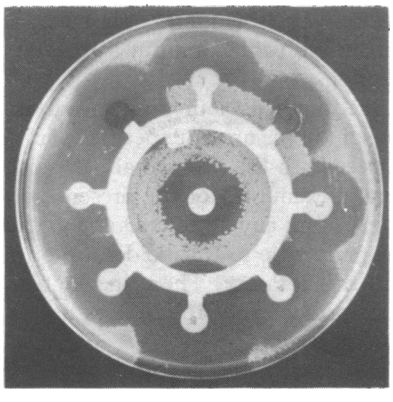
Laboratory examination of urine



Microscopy for pus cells and culture should be performed within an hour of collection or the urine should be refrigerated at 4°C until examination is possible. Microscopy for pus or organisms is helpful in the sick child because it gives an immediate answer and is essential if any antibacterial drug has already been given as pus cells and organisms may be shown although the culture may be sterile.

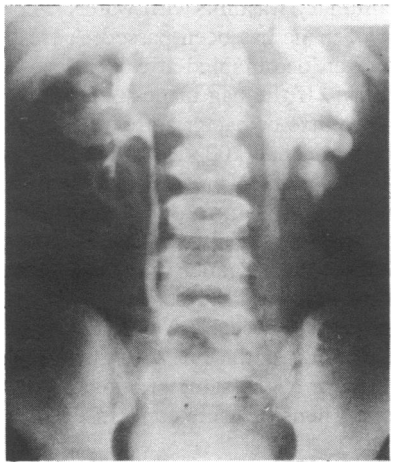
An alternative is to use a dipslide to culture pathogens, and this method is useful in general practice.

Antibacterial treatment

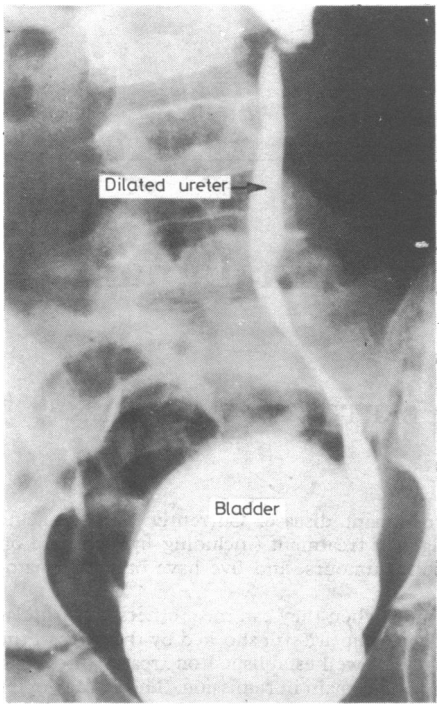


For most children treatment can await the results of bacterial sensitivity tests, but if immediate treatment is necessary co-trimoxazole is the drug of choice. The results of sensitivity tests to cultured pathogens will show whether a different drug is needed. The full therapeutic dose must be continued for 14 days and the urine should be cultured three and 10 days after the start of treatment to check that the infection has been eliminated. The urine should be sterile three days after the start of treatment. A high fluid intake will dilute the urinary bacterial count, stimulate frequent voiding, and ease dysuria.

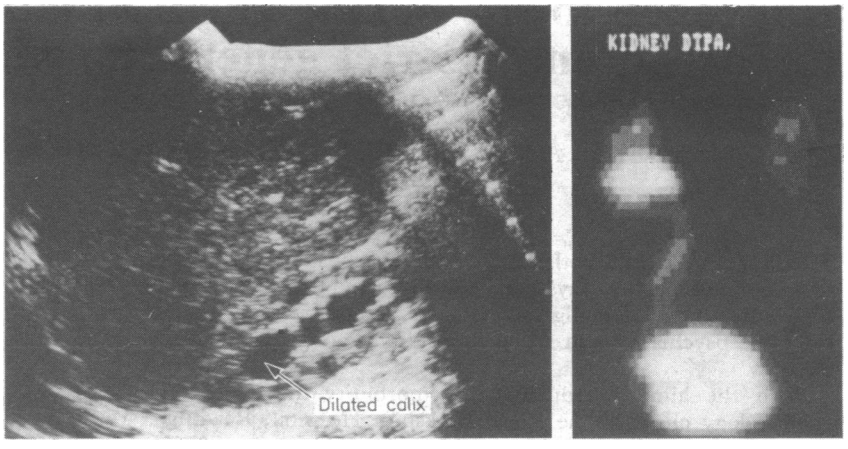
Investigations



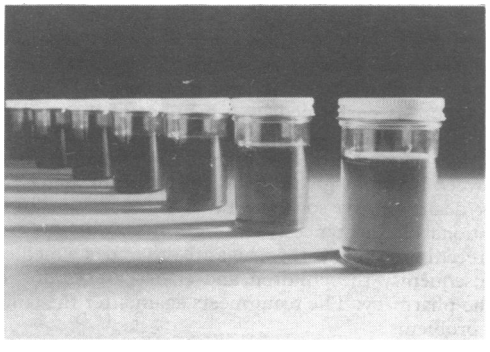
All children who have a confirmed urinary tract infection need an intravenous pyelogram. Micturating cystourethrography is performed after infection has been eradicated in the following groups: (*a*) infants and children under 5; (*b*) children with an abnormality detected on the intravenous pyelogram; (*c*) children aged over 5 years with recurrent infections. Micturating cystourethrography is also advisable in children with a family history of chronic pyelonephritis, renal hypertension, or severe ureteric reflux. The child should be protected by suitable chemotherapy during this investigation.



Ultrasound is useful in detecting or monitoring upper urinary tract dilatation due to obstructive lesions. Radioisotopes may be used to detect vesicoureteric reflux and have the advantage of avoiding the use of a urinary catheter and using less radiation. Both ultrasound and radioisotope investigations can be used to detect gross abnormalities in renal size but may not be accurate enough to determine whether renal growth is normal.



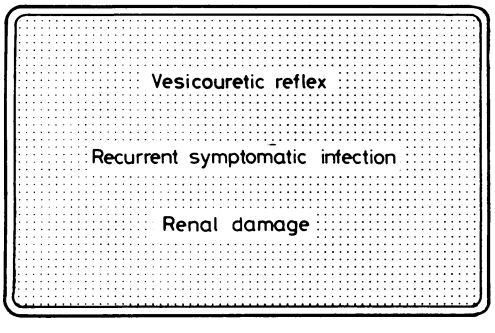
Follow-up



Regular urine cultures are advisable at monthly intervals initially and later at three monthly intervals as well as at times of fever or recurrence of symptoms. The urine should be cultured regularly while vesicoureteric reflux persists and in children with renal damage at least until the kidneys are fully grown. Growth and blood pressure should be measured regularly.

If an anatomical abnormality is detected radiologically or if infections recur the radiological investigations may need to be repeated to determine whether renal growth is normal and whether there is evidence of fresh scarring. The intervals of these investigations vary with the problem, and excessive radiation can be avoided by consulting a paediatrician.

Continuous prophylaxis



The object of prophylaxis is to prevent reinfection of a susceptible urinary tract after bacteriuria has been eliminated. Prophylaxis should be used in children with vesicoureteric reflux, those with recurrent symptomatic infection, and children with renal damage until the kidneys are fully grown. The ideal drug should be absorbed high in the alimentary tract, be excreted in high concentration in the urine, and not cause resistance in the flora of the lower bowel. Co-trimoxazole and nitrofurantoin fulfil these criteria, and a single daily dose of about half the standard 24-hour dose should be given in the evening. Nitrofurantoin has the disadvantage that it often causes nausea and vomiting even at this low dose. These patients are best managed at a special urinary tract infection clinic at the local district hospital.

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The photograph of the antibiotic sensitivity plate was reproduced by permission of Dr R F Williams.