Urinary Tract Infection (UTI) in Children

DEFINITIONS

**Bacteriuria:** bacteria in urine uncontaminated by urethral flora, can lead to renal scarring → hypertension & rarely CRF if bilateral scarring is present. May be covert (asymptomatic). Symptomatic bacteriuria → UTI (check for loin & suprapubic tenderness, ?fever, dysuria)

**Chronic Pyelonephritis:** histological/radiological diagnosis (juxtaposition of & dilated calyx) → hypertension & can → renal failure (if kidneys are congenitally dysplastic), may get reflux during micturition seen on micturating cystogram: vesico-ureteric reflux (VUR).

EPIDEMIOLOGY

- Common problem. Incidence: boys → 1 %, girls → 3 % <11 yrs
- Recurrence is 50% in those > 2yrs

AETIOLOGY

Usually due to bowel flora entering urinary tract via the urethra. Commonest organism is e.coli, then proteus & pseudomonas. Proteus is more common in boys & predisposes to phosphate stones formation. Pseudomonas indicates a structural abnormality in the urinary tract affecting drainage.

CLINICAL PRESENTATION – depends on age

- Often child non-specifically ill
- **Infants:** Fever, D &V, poor feeding, failure to thrive, collapse/septicaemia, neonatal jaundice, febrile convulsion (> 6 months) rarely any urine symptoms <2y/o
- **Childhood:** Lower urinary tract symptoms: Dysuria, frequency, wetting, haematuria, lower abdo pain
- **Upper urinary tract symptoms:** loin pain, fever, rigors, malaise
- Urinary tract is usually normal, but 35% have vesico-ureteric reflux (VUR), 14% have renal scars (most having reflux too), 5% have stones, 3% develop hypertension

INVESTIGATIONS

- Urine collection: **Careful cleaning & collection necessary as contamination with white cells & bacteria can occur. Suprapubic aspiration** (inserting needle 2 & ½ cm above symphasis pubis) definitive but invasive. Method of choice in severely ill infants < 1 yr. Alternative to wash genitals gently with water & tap repeatedly (in cycles of 1min) with 2 fingers just above the pubis, 1hr after a feed & wait for a clean catch avoiding first part of stream into sterile pot. MSU in older children.. **Other techniques:** culture pads (Microstix), urine bags → false +ves, sanitary towels with syringe collection cheaper option. PROMPT microscopy & culture. >10^5 organisms/L of a pure growth → UTI. Usually shows pyuria

All children should be investigated following 1st confirmed UTI – aim to identify serious structural abnormalities & urinary obstruction, renal scars & VUR

- **Ultrasound:** cheap non invasive, identifies serious structural abnormalities & bladder dysfunction. May however miss reflux & scarring. If USS normal but child presents with fever, vomiting, PMH of recurrent UTIs →
- **99 Tc Technetium renography – static for scarring (99Tc DMSA scan) –** checks for obstructive uropathy +/- Isotope cystograhy. (NB – NOT IVU as radiation-rich & unreliable)
- **Micturating cystourethrography (MCU) & MAG 3 scan:** Picks up obstruction, useful to look for reflux. (INVASIVE – not needed if initial tests normal)
- **Plain abdo Xray:** If haematuria present to look for stones
MANAGEMENT

- **Antibiotics:** Trimethoprim PO for 7 days, nitrofurantoin or cephalaxin. Resistant organisms → co-amoxiclav for 5/10 days. Vomiting/sick child needs initial IV ABx e.g. cefotaxime or ampicillin & an aminglycoside e.g. gentamycin, monitoring its serum levels!
- Paracetamol. Avoid constipation, ↑ fluids, Encourage full regular voiding, good hygiene, Repeat MSU
- **Recurrent UTIs, renal scarring or reflux** Long term Mx: urine culture, long term low dose ABx prophylaxis with trimethoprim (2mg/kg at night) is 1st line although nitrofurantoin & nalidixic acid may be given. Surgical reimplantation of ureters if ABx fail. BP check twice a year. Regular assessment of renal growth & function if there’s bilateral scarring due to risk of chronic renal failure. Surgical correction of moderate reflux is unlikely to be beneficial & in minor reflux is likely to be more harmful. Consider screening siblings for reflux.
- If there’s renal scarring USS is repeated after 2 years to check renal growth. Once reflux has resolved & child has been asymptomatic for a yr, ABx prophylaxis can be stopped.

Please Note
These notes were compiled by Mona Zaky as a medical student in 2007. They are presented in good faith and every effort has been taken to ensure their accuracy. Nevertheless, medical practice changes over time and it is always important to check the information with your clinical teachers and with other reliable sources. Disclaimer: no responsibility can be taken by either the author or publisher for any loss, damage or injury occasioned to any person acting or refraining from action as a result of this information.

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