Urinary Tract Infection (UTI)

Definitions

- **Bacteriuria** = presence of bacteria in the urine.
- **UTI** = symptomatic significant (>10^7-10^8 CFU/L) bacteriuria from kidneys to bladder.
- **Lower UTI** = cystitis
- **Upper UTI** = pyelitis or pyelonephritis.
- **Uncomplicated UTI** = usual pathogen in patient with normal urinary tract/kidney fn.
- **Complicated UTI** = where anatomical, functional, or pharmacological factors predispose the person to persistent infection, recurrent infection, or treatment failure.
- **Recurrent UTI** may be due to relapse/re-infection. Significance depends on age and sex.

Pathogenesis

- Escherichia coli (70-80%)
- Staphylococcus saprophyticus
- Proteus mirabilis
- Strep. faecalis
- Neonates: also Staph. aureus, Klebsiella.
- Immunosupressed/Catheterised/Complicated UTI: *Klebsiella sp., Proteus vulgaris, Candida albicans, Pseudomonas sp.*

Risk factors

Generally factors that predispose to urinary stasis or instrumentation of the urinary tract:

- Obstructive uropathy – prostatism, posterior urethral valves, urethral stenosis
- Calculus
- Catheterisation
- Diabetes
- Pregnancy
- Spinal lesions – neuropathic bladder
- Vesico-ureteric reflux
- Phimosis
- Constipation
- Certain sexual issues: activity, new partner, spermicide, certain practices

Epidemiology

- UTI fairly common in females.
- Uncommon in male except in infancy or elderly.

Presentation

General

- Foul smelling ± cloudy urine
- Haematuria
- Acute confusional state – esp elderly
- Maybe occult in infants or FTT

Favouring cystitis:

- Dysuria
- Urinary frequency or Urgency
- Suprapubic pain
- Urinary incontinence

Favouring pyelonephritis:

- Pyrexia
- Tachycardia
- Loin pain/tenderness
- Rigors
- Nausea & vomiting
- Septic shock

Investigations

N.B.: In children always check BP

Urine:

- Best sample: <6mo: SPA/catheter, 6mo-toilet trained: catheter, >toilet trained-adult: SU.
- U/A: +LE (Sn 77%, Sp 54%), +Nitrites (Sn 81%, Sp 87%), Both + (Sn 94%)
    - In symptomatic adults either leucs>100 &/or nitrite positive is enough to treat on spec in uncomplicated case
    - In young children sterile pyuria common in fever so U/A nitrites & bacteria on microscopy helpful, but always need to culture
- M,C&S:
    - In adults: if ?complicated (anyone except young, healthy, non-preg F with norm urinary tract and no failed Rx)
    - In men: if symptomatic. Do not inv or treat asymptomatic pyuria in elderly men
    - In children: always

Bloods: FBC, UEC, CRP,pregnancy test

Imaging: Renal tract USS (?obstruction, gross anatomy), CT (pyelonephritis)

F/U in children: USS, MCUG(<2y), DMSA (3-6mo post-UTI, ?scarring), DTPA or MAG-3 (fn)

Management

Non-drug: Good hydration, regular voiding, preventing constipation. Cranberry juice.

Drug treatment

- Supportive: Ural, analgesics, antipyretics
- Female uncomplicated cystitis:
    - PO **cephalexin** 500mg bd x 5d, **trimethoprim** 300mg od x 3d, **co-amoxiclav** 500+125mg bd x 5d, or **nitrofurantoin** 50mg qid x 5d
- Male cystitis: 10-14d course of any of above
- Pregnancy cystitis: 10d course of any of above except trimethoprim.
- Resistant UTI/pseudomonas: **ciprofloxacin 500mg bd** x 10d
- Adult pyelonephritis:
    - If not severe then 10-14d course of same first 3 ABx as for cystitis
    - If severe: IV (**ampicillin** 2g q6h plus **gentamicin** 4-6mg/kg od) or **ceftriaxone** 1g od
- Child:
    - If cystitis>6mo: PO **cephalexin** 12.5mg/kg bd x 5d, **cotrimoxazole** 4+20mg/kg bd x 5d, or **co-amoxiclav** 12.5+3.1mg/kg bd x 5d
    - If <6mo or pyelonephritis: IV (**ampicillin** 50mg/kg q6h plus **gentamicin** 7.5mg/kg [6mg/kg if >10y] od) or **cefotaxime** 50mg/kg q8h
- Child prophylaxis: **cotrimoxazole** 2+10mg/kg, **cephalexin** 12.5mg/kg, or **nitrofurantoin** 1-2.5mg/kg od

Complications

- Pyelonephritis or recurrent UTI
- Perinephric and intrarenal abscess
- Hydronephrosis or pyonephrosis
- Renal failure
- Septicaemia
- Prostatitis in men
- In pregnancy: Pyelonephritis, preterm delivery, anaemia, PIH