10 Renal

URINE DIPSTICK

Leuk - < 10 normal
Nitrates - ***coagulase splitting bacteria*** (ie GNB eg ***e coli***)
- needs stasis = poorly sens for upper tract
- ***60% overall sensitivity*** (95% PPV, 70%NPV)

Red Cells - does not differentiate intact/Hb/Mb
Cell Count - ***Infection if > 10 ^{5}/ml***
- For bag urine NPV good, ***PPV = SPC***

Protein - Looks at albumin only
Glucose
Specific gravity - > 1.02 pre-renal failure
- 1.01-1.02 renal failure

DDx Microscopic Haematuria

- Pre-renal: exercise, bleeding problems incl drugs
- Renal: infection, glomerular, interstitial, tumour, trauma
- Post-renal: stone, infection, neoplasia, trauma
- False +ve - hypertonic/hypotonic urine
- specimen: ***old, dilute, acidified***

DDx Proteinuria

- ↑Plasma protein: haem cancer, high protein diet
- ↑Tubular secretion
- ↑Filtered protein eg acute febrile illness
- Other: NSAIDs, CCF, exercise

URINARY TRACT INFECTION

Complex UTI Risk Factors

- abnormal anatomy
- obstruction eg stone, cancer
- Instrumentation ie cystoscopy
- immunosuppression incl DM
- prosthesis eg IDC, SPC
- renal failure
- systemic signs
- incomplete emptying

Mx

Urinary Tract Infection

Mild: ***ADF, cephalexin*** 500BD, ***Tri, nitro*** 100BD
Severe: ***Gent & Amp*** or ***Ceftriaxone***
Pregnant: ***ADF or cephalexin (NOT Tri)***
Kids: ***Bactrim*** 4/20mg/kg or ***Tri*** 4mg/kg

Pyelonephritis & Prostatitis

Prostatitis: same as UTI except ***nitro***
Pylo adults: same as UTI except ***nitro***
Kids: ***Cipro*** 12.5mg BD
Pseudo: ***Cipro*** 500BD

ACUTE RENAL FAILURE

GFR (Cockcroft-Gault)

Crea clearance = (140-age) x IBW ÷ crea
For female x 0.85

Urea: Crea

NB Crea is normally recorded in umol/L so ÷ 1000

> 100:1 pre-renal (also high SG, low Na)
40-100:1 normal or post renal
<40:1 renal (intrinsic)

Causes

Pre-renal

- Arterial block: emboli, dissect, thrombus, trauma
- Shock, hypotension, volume depletion

Renal

- ATN: due to hypoperfusion or toxins
- GN
- Pigments: Hb, Mb, CK
- Toxins: ***Gent, NSAIDS, contrast, alcohols***
- Severe HTN
- Obstruction
- Tubular, venous: thrombus (renal or IVC)
- Interstitial Nephritis: proteinuria, allergy esp NSAIDs

Post-renal

- Stones
- Papilla
- Tumours
- Fibrosis
- Iatrogenic ureteral ligation
- Prostatic hypertrophy
- Constipation
- Haematoma/Haematuria

Dialysis Indications

Absolute

ROPED
- **R**efractory K > 6.5
- **R**efractory pH < 7.2
- **R**efractory HTN
- **O**liguria < 5ml/day
- **O**verload of fluid
- **P**ericarditis
- **E**ncephalopathy
- **D**ialysable toxins

Relative

- Cr > 1000
- Urea > 30

Rhabdomyolysis

Causes

- Metabolic: ***thyroid storm, pheo, DKA, HHS***
- Trauma: crush, burns, electrical
- Excess physical activity
- Infection: ***esp flu***, persistent high fevers, sepsis
- Autoimmune
- Electrolytes: Low K or PO_4
- Extremes of temp incl ***MH, NMS, environmental***
- Ischaemic: compartment, prolonged immobile, tourniquet, clamp

Snakebite
- Seizures

Complications

- Early: ↑ K, ↓Ca (from high PO_4)
- Late: ***AKI*** (CK > 5K = 50%AKI), shock (3rd spacing)
- Rare: DIC, Shock

Mx

- Fluids
- Urinary Alkalisation aiming pH 6.5-7.0
- ***Frusemide or mannitol***
- ***RRT***
- Underlying cause
- Complications - ↑K, ↓Ca
- 3rd space: ***ARDS, SIRS, Compartment***

GLOMERULONEPHRITIS

Nephritic

- ***Haematuria - hallmark***
- HTN
- Oedema
- Oliguria
- Not as much proteinuria

Types

- Post strep: - supportive, self-limiting
- IgA (***Berger's disease***) - Most common GN
  - idiopathic, ½ preceded by URTI
  - ½ only have single event
- Rapidly progressive GN
  - Mx salt & H_2O restrict
  - Good prognosis
  - incl ***Goodpasture's***
    - Anti-GBM antibodies
    - Pulmonary haemorrhage early feat
    - Mx: ***pred, plasmapheresis***

Nephrotic

"has an o, like protein"
- ***heavy proteinuria*** (appears frothy)
- serum alb < 3g/L
- ***Oedema***, ↑lipids, hypercoagulable

Types

- GN: ***membranous*** (adults), ***minimal change*** (kids)
  - Mem: ass with renal vein thrombus, give ***steroids***
  - Min Δ : URTI precipitated, good prognosis
  - Focal glomerular sclerosis: end stage 5-10y
  - Membranoproliferative: idiopathic
- Drugs: ***gold, probenecid, ACE-I***
- Infection: HIV, SBE, Hep B
- DM
- Amyloid
- Carcinoma
- Haem malignancy
- Collagen disease