DISCIPLINE: NEPHROLOGY

Key points in anatomy and physiology

Size, shape, position of kidneys

- Kidneys lie POSTERIORLY and move DOWN during inspiration.
- Kidneys and ureters are retro-peritoneal.

Anatomy of bladder, prostate, urethra, male genitalia.

- The nephron – glomerulus, proximal tubule, Loop of Henle, distal tubule, collecting duct.
- Ureters and bladder are lined by a transitional cell epithelium.

Glomerular filtration

Tubular reabsorption and secretion

Renal hormones – the renin-angiotensin system, 1:25-OH Vitamin D3, erythropoetin

History Taking

Major presentations of disease

- Renal failure (biochemical diagnosis)
- Pain – from kidneys or ureters (loin pain), bladder or urethra (suprapubic).
  Dysuria = pain on passing urine.
- Disordered micturition (passing urine) – frequency, urgency, nocturia, hesitancy and dribbling, incontinence.
- Altered urine volume – polyuria, oliguria, anuria.
- Abnormalities in urine – haematuria, proteinuria.

History of the present illness

Renal failure

- Have you had problems with your kidneys not working properly?

Pain

- Have you had any pain in your sides or your lower abdomen?
- Is it ever sore when you pass urine?

Disordered micturition

- Do you have difficulty passing urine?
- How many times do you pass urine in the day and the night?
- Do you ever have to rush to the toilet urgently?
- Are you always able to control the need to pass urine?

Altered urine volume

- Is the volume of urine you pass at the moment more or less than normal?

Abnormalities in urine

- Have you noticed a red colour in your urine?
- Has anyone found blood or protein in your urine when it has been tested?

Past Medical History

Ask about :

- Any previous renal disease
- Hypertension, diabetes (may damage kidneys)
- Vascular disease (may affect kidneys)
- Recurrent urinary tract infection
- Renal stones

Ask about:

- Symptoms of kidney failure - tiredness, itch, growth retardation, restless legs.
- Urinary abnormalities.
- Abnormal micturition
- Loin pain

Family history

Ask about:

- Hypertension, diabetes
- Adult polycystic kidney disease

Social history

(medicine) - including living arrangements, occupational history, marital status, number of children, **smoking history, alcohol use, drug abuse,** foreign travel, exposure to environmental pathogens.

Problems during pregnancy - hypertension, urinary infection, proteinuria.

Drug history

- ACE inhibitors (ACEI) and Angiotensin Receptor Blockers (ARB).
- Non-steroidal anti-inflammatory drugs (NSAID).

Allergies

Allergic drug reactions may cause kidney failure.

Physical Examination

General

- Pallor, breathlessness, scratch marks, state of hydration
- Oedema (ankles, sacrum)
- Fluid retention (raised jugular venous pressure, crackles in lungs)
- Blood pressure (high or low)

Abdomen

Look (inspection):

- for distension due to enlarged kidneys or bladder
- scars of previous surgery

Feel (palpation):

- tenderness over kidneys, bladder
- enlarged kidneys or bladder

Percussion

- suprapubic dullness due to full bladder

Listen (auscultation):

- renal artery or other bruits

Differential Diagnosis – common clinical conditions

Chronic Kidney Disease (CKD) – stages 1-5

Acute renal failure (ARF)

Glomerulonephritis – many types

Interstitial nephritis

Vasculitis

Diabetic nephropathy

Hypertensive nephropathy

Renal vascular disease

Adult Polycystic Kidney Disease (APKD)

Vesico-ureteric reflux

Obstructive uropathy

Renal stone disease

Benign Prostatic Hyperplasia

Prostate cancer

Renal adenocarcinoma

Cancer of renal pelvis, ureter, bladder (transitional cell carcinoma)

Investigations

Urinalysis – for blood, protein, glucose

Urine microscopy – for red cells, white cells, casts, bacteria

Urine culture and sensitivities (C&S)

Plasma

- urea
- creatinine
- sodium
- potassium
- bicarbonate
- calcium
- phosphate
- albumin
- haemoglobin

Immunology screen

- including anti-neutrophil cytoplasmic antibodies (ANCA)

Prostate-specific antigen (PSA).

Glomerular filtration rate (GFR) – used to classify stages of CKD. Measured as creatinine clearance (needs 24 hour urine collection)

Imaging

- renal tract ultrasound
- CT scan
- renal angiography (direct, CT or MRI)
- renal isotope scan

Renal biopsy

Cystoscopy

Management of Diseases

Renal replacement therapy (for CKD stage 5)

- Haemodialysis (also used in acute renal failure)
- Peritoneal dialysis
- Renal transplantation

Immunosuppressive drugs

(for some forms of glomerulonephritis, vasculitis, and after transplantation)

- Prednisolone
- Azathioprine
- Cyclophosphamide
- Tacrolimus
- Cyclosporin
- Mycophenolate mofetil (MMF)

Recombinant erythropoietin (EPO) for renal anaemia