

# 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, erythropoietin

## 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.

# NEFROLOGI



## Njurarnas storlek, utformning och position

- Njurarna ligger posteriort och sjunker ner vid inspiration
- Njurarna och uretärer ligger retroperitonealt

## Urinblåsans, prostatans, uretären och manliga genitaliernas anatomi

- Nefron-glomerulus, proximaltubuli, Henles slynga, distala tubuli, samlingsrören
- Uretär och urinblåsa tacks av övergångsepitel

Glomerulär filtration

Tubulär reabsorption och sekretion

Njurens hormoner – reninangiotensin systemet, 1:25 OH vit D3, erythropoietin

- Njursvikt
- Smärta – från njuren och uretär, blåsa eller uretra
- Problem med miktion – frekvens, trängning, nokturi, stopp, läckage, inkontinens
- Förändrad urinvolym – polyuri, oliguri, anuri
- Avvikelser i urinen – hematuri, proteinuri



## 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



- Har du haft problem med dina njurar?

- Har du haft ont i sidorna eller nedre delen av magen?

- Gör det ont när du kissar?

- Är det svårt att kissa?"

- Hur många gånger kissar du på ett dygn?

- Måste du springa till toaletten akut?

- Kan du själv kontrollera vattenkastningen?

- Är urinvolymen likadan som vanligt eller har den ökat eller minskat?

- Har du märkt att urinen varit röd?

- Har man kunnat påvisa blod eller äggviteämnen i urinen när man tagit urinprov?

- Tidigare njursjukdomar

- Högt blodtryck, diabetes

- Kärleksjukdom

- Återkommande urinvägsinfektioner

- Njursten



## Review of Symptoms

### 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

## 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)



- Symtom på njursvikt: trötthet, klåda, tillväxthämning, restless legs
- Urinavvikelser
- Onormal miktion
- flanksmärta

- Högt blodtryck, diabetes
- Adult polycystiskt njursjukdom

- ACE hämmare, Angiotensinreceptor blockare
- NSAID, antiinflammatoriska

Allergiska läkemedelsreaktioner kan orsaka njursvikt

- Blekhet, andnöd, rivmärken, hydreringsgrad
- Ödem (underben, sakrum)
- Vätskeretention (ökat jugularstryck, lungrassel)
- Blodtryck (högt eller lågt)



## 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)



### Inspektion:

- Utspändhet på grund av förstörd njure eller urinblåsa
- Operationsärr

### Palpation:

- Ömhet över njurloger, blåsa
- Förstorad njure eller blåsa

### Perkussion

- Suprapubisk dämpning på grund av full blåsa

### Auskultation:

- Njurartär

- Kronisk njursjukdom grad 1-5
- Akut njursvikt
- Glomerulär nefrit – många typer
- Interstitiell nefrit
- Vaskulit
- Diabetes nefropati
- Hypertensiv nefropati
- Renal vaskulär sjukdom
- Adult polycystisk njursjukdom
- Vesikouretär reflux
- Obstruktiv uropati
- Njurstenssjukdom
- Benign prostata hyperplasi (BPH)
- Prostatacancer
- Renalt adenocarcinom
- Cancer i njurbäckenet, uretär, blåsa



## 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



## Utredningar

Urinalanalys – blod, protein, glukos

Urinmikroskopi – erythrocyter, leukocyter, sediment, bakterier

Urinodling och resistensbestämning

### Plasma:

- Urea
- Kreatinin
- Natrium
- Kalium
- Bikarbonat
- Calcium
- Fosfat
- Albumin
- Hemoglobin

### Immunologi

- Inclusive anti-neutrofila cytoplasmaantikroppar (ANCA)

Prostata-specifikt antigen, PSA

GFR glomerulär filtrationshastighet, bedömer kronisk njursjukdom mäts genom kreatininclearance, kräver 24 timmars urinsamling

### Bildundersökning

- Ultraljud över njurar
- DT
- Renal Angiografi/ angiografi över njurar
- Renal PET scan

Njurbiopsi

Cystoskopi



## 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



## Behandling av sjukdom

- Hemodialys
- Peritoneal dialys
- Njurtransplantation

### Immunhämmande läkemedel

- Prednisolon
- Azatioprin
- Cyklofosfoamid
- Tacrolimus
- Cyklosporin
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Erythropoetin