



CHAPTER 7 NEPHROLOGICAL/UROLOGICAL DISORDERS

Note:

- May convert oliguric to non-oliguric RF.
- Can be used at 1–4 mg/hour.
- No mortality advantage in clinical trials.
- An increased incidence of seizures has been reported.

5. Avoid nephrotoxic agents or those agents that may become nephrotoxic when GFR is reduced

Withdraw nephrotoxic drugs, e.g. aminoglycosides, NSAID's and ACE-inhibitors, especially when volume depletion is present.

6. Modify doses of drugs, if applicable

Check all drugs for possible dose adjustment.

7. Treat sepsis, if present

URAEMIC EMERGENCIES

1. Fluid overload/pulmonary oedema

- furosemide, preferably IV, 250 mg 6 hourly for 24 hours administered over at least 20 minutes
Maximum dose: 1 g/24 hours.
Refer immediately if no improvement.

2. Acidosis

If pH < 7.25 or CO₂ < 15 and the patient is stable and not dehydrated:

- Shohl's solution, oral, 10–30 mL three times daily after meals.
Adjust dose according to response.

citric acid	140 g
sodium citrate	98 g
water to	1 L
1 mL = 1 mmol of alkali	

If not overhydrated or if severe acidosis or ill:

- sodium bicarbonate 4.2%, IV, 50 mL in 1 L dextrose 5%.
Maximum dose: 300 mL sodium bicarbonate per L dextrose 5%.
Up to 3–4 L/24 hours depending on requirements i.e. clinical condition or CVP measurement.

CAUTION

Avoid fluid overload.

3. Bleeding

Urgent dialysis is required if patient is bleeding, e.g. from gums or GIT. If not on dialysis, refer immediately for dialysis or start if available.

Dialysis may not stop 'uraemic bleeding' immediately.

Blood transfusion is indicated but only for blood loss or low Hb.



CHAPTER 7 NEPHROLOGICAL/UROLOGICAL DISORDERS

For uraemic gastritis, proton pump inhibitor, e.g.:

- omeprazole
 - GFR 10–50: decrease dose by 50%
 - GFR < 10: decrease dose by 75%

Note:

For haemodialysis: suggest give dose after dialysis.

For chronic ambulatory peritoneal dialysis: no adjustment is required.

4. Hyperkalaemia

Serum K^+ > 7mmol/L or K^+ 5.5–7 with ECG changes.

Emergency measures are normally a prelude to rather than a substitute for dialysis.

- calcium gluconate 10%, slow IV bolus, 10 mL
Maximum dose: 40 mL.
- dextrose 50%, IV infusion, 100 mL with insulin, soluble 10 units over 10–20 minutes
Repeat 2 hourly as necessary.
Monitor HGTs every 30 minutes.
OR
dextrose 50%, continuous IV infusion, 100 mL with insulin, soluble 10 units at 5–10 L/hour
Monitor HGTs hourly.

For longterm or chronic, nonurgent need for potassium removal:

- sodium polystyrene sulfonate, oral, 15 g with 15 mL lactulose, 6 hourly
Do not administer aluminium hydroxide and sodium polystyrene sulfonate simultaneously.

OR

sodium polystyrene sulfonate, rectal, 30–60 g as an enema
After 8 hours, wash out with phosphate enema.

Note:

Rectal administration is less effective.

Treat acidosis to prevent cardiac instability.

Furosemide may also be of benefit.

Monitor ECG and measure serum K^+ frequently.

If the above treatment fails after 24 hours, urgent dialysis is required.

5. Hypertension

Treat if present and especially if evidence clinically of hypertensive end organ damage.

See Section 3.5: Hypertension.

6. Hyperphosphataemia

To decrease absorption of phosphate in acute renal failure

- aluminium hydroxide 300 mg/5 mL, oral, 15–30 mL 8 hourly

ACUTE DIALYSIS

Ideally, all cases should be discussed with a specialist.

Indications

- unsuccessful primary therapy:
 - oliguria or anuria
 - metabolic imbalance, e.g. acidosis: pH < 7.1 and/or TCO₂ or HCO₃ < 12 mmol/L
 - hyperkalaemia > 7 mmol/L
 - fluid overload, especially pulmonary oedema
 - severe dysnatraemia Na > 160 or < 115 mmol/L
- uraemic complications, e.g. pericarditis, encephalopathy and bleeding
- drug overdose, dialysable toxin only

Good and effective removal by haemodialysis can occur with only a few agents. A decision to be made by a specialist based on clinical scenario.

The HIV and Hepatitis B and C status of all patients receiving intermittent haemodialysis must be available within 24 hours. If haemodialysis is required acutely, the machine is chemically disinfected and isolated from further use until the Hepatitis B status is known.

Note:

HIV is not known to be transmitted through dialysis if machine is cleaned according to standard protocol after use. All known cases of transmission have occurred when standard disinfection procedures have been breached.

Types of dialysis/renal replacement therapy (RRT)

This depends only on the type of resources available:

- peritoneal dialysis

Specifically indicated in the following conditions:

 - primary malignant hypertension with ARF
 - acute on chronic RF
 - head injury
- haemodialysis, intermittent
- continuous veno-venous haemodialysis and haemofiltration (ICU only) or, sustained low-efficiency dialysis (SLED)

Acute renal failure may complicate chronic renal failure.

A small percentage of patients do not recover kidney function and should be treated as CKD.

REFERRAL

- severe fluid overload
- suspected glomerular disease or cause of ARF is unknown
- determination of cause
- failure to recover kidney function after 3 weeks on dialysis or after suspected cause has been treated or withdrawn

7.1.6 END STAGE RENAL DISEASE (ESRD) - CKD STAGE 5

N18.0

DESCRIPTION

A permanent and usually irreversible stage of kidney failure caused by a variety of diseases (see CKD), which requires dialysis or transplantation for the patient to survive.

Note:

These patients are best managed at a specialist centre and by specialists.

NON-DRUG TREATMENT

Appropriate dietary control of metabolic needs, electrolyte, fluid status and serum phosphate and calcium.

Restrict protein, salt, phosphate and potassium.

DRUG TREATMENT

Avoid magnesium and aluminium containing substances.

Manage fluid balance on an individual basis.

Adjust all drug doses for the level of renal function, most will be GFR < 10.

HYPERTENSION

See Section 3.5: Hypertension

Note:

Mortality increases when SBP < 100 mmHg and > 150 mmHg in dialysis patients. Slightly higher BPs are acceptable in patients on dialysis.

Indications and uses of furosemide – See Section 7.1.1: Chronic Kidney Disease (CKD) (Fluid overload and oedema).

FLUID OVERLOAD OR OEDEMA

Fluid restriction or greater fluid removal via ultrafiltration on dialysis.

See Section 7.1.1: Chronic Kidney Disease (CKD).

HYPOCALCAEMIA, HYPERPHOSPHATAEMIA AND HYPERPARATHYROIDISM

See Section 7.1.1: Chronic Kidney Disease (CKD).

ANAEMIA ASSOCIATED WITH CKD OR ESRD

See anaemia associated with CKD.

ACIDOSIS AND HYPERKALAEMIA

This is usually controlled by dialysis.

In cases of acute derangement, see Section 7.1.5: Acute Renal Failure.

OTHER

There are other unique problems associated with CKD 5 (ESRD) and dialysis which require specialist care e.g. pruritus, vascular access.

REFERRAL

- all ESRD patients should be referred to a specialist facility with the resources and expertise to manage ESRD patients
- all ESRD patients who qualify for long term dialysis programs

7.1.7 NATIONAL GUIDELINES FOR CHRONIC DIALYSIS

Public sector dialysis facilities in South Africa are limited because of the expense and shortages of resources. Transplantation is cost effective with good rehabilitation prospects for the patient and thus the major principle for acceptance for renal replacement therapy is the suitability for renal transplantation.

PATIENT SELECTION

The final decision for selection of patients for renal replacement therapy should be made at the tertiary level hospital or by a nephrologist.

The ideal patient for renal replacement therapy is a patient with uncomplicated CKD stage 5 (ESRD), who is a suitable candidate for renal transplantation.

Referral may be most useful in identifying the conditions outlined earlier.

The following co-morbid conditions should be considered as **contra-indications for transplantation** in the South African public sector:

- age > 60 years
- diabetics with significant non-renal complications or diabetic > 50 years
- malignancy
- severe cardiac failure or inoperable coronary artery disease
- HIV positive unless stable on HAART
- severe COPD or bronchiectasis
- chronic, persistent or active hepatitis due to hepatitis B or C
- patients with cirrhosis diagnosed by liver biopsy
- persistent non-compliance
- any serious underlying disorder in which transplantation is contra-indicated
- BMI > 35 kg/m²
- serious psychiatric conditions or substance abuse
- unwillingness to undergo transplantation

The following factors are relative contraindications for transplantation but not absolute exclusion criteria:

- patients with positive Hepatitis B surface antigen
- distance from the transplant centre and unavailability of transport
- BMI ≥ 30–35

7.1.8 URINARY TRACT INFECTION (UTI)

N39.0

DESCRIPTION

Infection of the urinary tract, which, because of the anatomical continuity of the system, involve part or all of the urinary tract. More rarely, perinephric tissues may be involved. Upper UTI is a more serious condition and requires longer and sometimes intravenous treatment.

Features of upper UTI include:

- flank pain/tenderness
- temperature 38°C or higher
- other features of sepsis, i.e. tachypnoea, tachycardia, confusion and hypotension
- vomiting

In complicated, recurrent or upper UTIs, urine should be sent for microscopy, culture and sensitivity.

NON-DRUG TREATMENT

It is advised that to avoid recurrence of UTI consider the following:

- treat constipation if associated with UTI
- double/triple voiding with vesico-ureteric reflux
- void after intercourse and before retiring at night
- do not postpone voiding when urge to micturate occurs
- change from use of diaphragm or spermicides to an alternative type of contraception

DRUG TREATMENT

Empirical treatment is indicated only if:

- positive leucocytes and nitrites on urine test strips, or
- leucocytes or nitrites with symptoms of UTI, or
- systemic signs and symptoms.

Alkalinising agents are not advised as many antibiotics require a lower urinary pH.

UNCOMPLICATED CYSTITIS

- ciprofloxacin, oral, 500 mg as single dose

For pregnant women:

- amoxicillin/clavulanic acid, oral, 375 mg 8 hourly for 7 days

COMPLICATED CYSTITIS

- ciprofloxacin, oral, 500 mg 12 hourly for 7 days

ACUTE PYELONEPHRITIS

Admit all patients with severe acute infections, defined as vomiting or sepsis or diabetes or HIV.



CHAPTER 7 NEPHROLOGICAL/UROLOGICAL DISORDERS

Ensure adequate hydration with intravenous fluids.

Ideally, all hospitalised patients should have an ultrasound, and especially in high risk patients e.g. diabetics.

Duration of antibiotic therapy:

fluoroquinolones: 7 days

other antibiotics: 14 days.

Longer courses of therapy, 2–3 weeks, should be given for complicated pyelonephritis.

If normal renal function:

- gentamicin, IV, 5 mg/kg/day

Switch to oral therapy as soon as patient is able to take oral fluids:

- ciprofloxacin, oral, 500 mg 12 hourly for 7 days

If impaired renal function:

- ceftriaxone, IV, 1 g daily

Switch to oral therapy as soon as patient is able to take oral fluids:

- ciprofloxacin, oral, 500 mg 12 hourly for 7 days
CrCl: 10–50 mL/minute 75% of normal dose
CrCl: < 10 mL/minute 50–75% of normal dose

Refer to a urologist if there is failure to resolve.

7.1.9 RECURRENT UTI

DESCRIPTION

Recurrence of a UTI more than 3 times within a one-year period.

Two types occur:

Relapse

Recurrence of bacteruria with the same organism within 3 weeks of completing treatment may be due to:

- antibiotic resistance
- inadequate duration of therapy, e.g. prostatitis
- underlying structural abnormality, e.g. benign prostatic hyperplasia with bladder outflow obstruction, renal cysts and pyogenic abscess

Reinfection

Eradication of bacteruria by appropriate treatment, followed by infection with a different organism.

Constitutes 80% of recurrent infections.

Send urine for microscopy, culture and sensitivity as treatment is dictated by the results.



CHAPTER 7 **NEPHROLOGICAL/UROLOGICAL DISORDERS**

NON-DRUG TREATMENT

General measures.

Women should void soon after intercourse.

Identify and treat hormone-deficient atrophic vulvo-vaginitis in the elderly.

Patients with impaired bladder emptying require careful urological examination to establish whether surgical treatment is required.

Patients with ileal conduits or long term indwelling catheters should not receive antibiotics unless there is invasive upper UTI. In this setting, treatment with a short, intensive course is appropriate.

DRUG TREATMENT

PROPHYLAXIS

> 3 infections/year to reduce risk of recurrence requires continuous prophylaxis for 6–12 months or even 2 years:

- nitrofurantoin, oral, 100 mg at night
Beware of pulmonary fibrosis.
Limit for 6 months only.

OR

trimethoprim/sulphamethoxazole 80/400 mg, oral, 1 tablet at night

2–3 infections/year:

- ciprofloxacin, oral, 500 mg as single dose for symptomatic infections (self treatment)

UTI in relation to sexual activity:

- ciprofloxacin, oral, 500 mg as single dose

Screen and treat the sexual partner.

TREATMENT

Treat according to microscopy, culture and sensitivity.

REFERRAL

- septicaemia not responding to treatment
- uncertain diagnosis
- recurrent infection where no facilities exist for adequate culture of urine
- further investigation in women with relapses, especially outside pregnancy
- all men with recurrent UTI, i.e. > 3 infections/year

7.1.10 PROSTATITIS

DESCRIPTION

This is an infection of the prostate caused by uropathogens.

Clinical features include:

- pyrexia
- acute pain in the pelvis and perineum
- urinary retention or difficulty
- acutely tender prostate on rectal examination



CHAPTER 7 **NEPHROLOGICAL/UROLOGICAL DISORDERS**

CHRONIC NON-BACTERIAL PROSTATITIS

Is a diagnosis of exclusion (failure to respond to antibiotics), and is associated with perineal, suprapubic, penile and testicular pain.

DRUG TREATMENT

Acute bacterial prostatitis

In men < 35 years:

- ciprofloxacin, oral, 500 mg as single dose

Followed by:

- doxycycline, oral, 100 mg 12 hourly for 7 days

In men > 35 years:

- ciprofloxacin, oral, 500 mg 12 hourly for 14 days

Chronic/relapse/persistent infection

- ciprofloxacin, oral, 500 mg 12 hourly for 28 days

REFERRAL

- to a urologist if no response to treatment

7.2 UROLOGY SECTION

7.2.1 HAEMATURIA

R31

DESCRIPTION

Bleeding from the urinary tract which can be from the kidneys, the collecting system, bladder, prostate and urethra.

Glomerular disease is suggested if proteinuria is present as well as casts on routine microscopy.

Schistosomiasis (bilharzias) is a common cause of haematuria.

NON-DRUG TREATMENT

All patients must have a urine microscopy evaluation to determine the origin of the haematuria.

Isomorphic: suggests urinary tract below the kidney i.e. pelvis to urethra.

Dysmorphic: suggests intra-renal and glomerular origin.

Exclude schistosomiasis.

Note:

The presence of blood on urine test strips does not indicate infection and should be investigated as above.

CHAPTER 7

NEPHROLOGICAL/UROLOGICAL DISORDERS

DRUG TREATMENT

Only if evidence of associated urinary tract infection, i.e. positive leukocytes or nitrites on urine test strips.

See Section 7.1.9: Urinary Tract Infection (UTI).

See Section 7.1.2: Glomerular Disease.

SCHISTOMIASIS

For *S. haematobium* and *S. mansoni*:

- praziquantel, oral, 40 mg/kg as a single dose

Note:

Breastfeeding women should stop breastfeeding on the day of drug administration and for the next 48 hours.

REFERRAL

- all cases of haematuria
- all cases not responding to specific drug treatment
- suspected glomerular disease - to a nephrologist
- gross macroscopic haematuria with no response to primary therapy and with drop in haemoglobin

7.2.2 BENIGN PROSTATIC HYPERPLASIA

N40

DESCRIPTION

Benign prostatic hyperplasia is a noncancerous (benign) growth of the prostate gland. It occurs usually in men over 50 years. Cause is often unknown and believed to be changes in hormone levels associated with aging.

NON-DRUG TREATMENT

Annual follow-up with prostatic specific antigen (PSA) blood serum test and digital rectal examination (DRE).

For patients presenting with urinary retention, insert a urethral catheter as a temporary measure while patient is transferred for referral.

Surgical reduction of the size is the preferred treatment. e.g. minimally invasive transrectal procedures or radical prostatectomy.

Remove drugs that prevent urinary outflow e.g. tricyclics and neuroleptics.

DRUG TREATMENT

When surgery is not feasible or not preferred:

- doxazosin, oral, 2–4 mg daily
Titrate to a maximum dose of 8 mg daily.
The first dose should be taken at night to prevent symptomatic postural hypotension.

OR

prazosin, oral, 1 mg at night, initial dose
Increase to 2 mg twice daily.