

NHS England only commissions the high cost phosphate binders sevelamer, lanthanum and sucroferric oxyhydroxide for dialysis patients and so these agents are not usually prescribed in pre-dialysis patients

Sodium bicarbonate for the management of metabolic acidosis

Patients with a GFR less than 30mL/min and serum bicarbonate <20mmol/L should be offered sodium bicarbonate to correct metabolic acidosis associated with CKD. Sodium bicarbonate is usually stopped as soon as renal replacement therapy starts. Higher doses can exacerbate oedema because of sodium content.

Symptom Control in CKD

Oedema

A loss of functioning nephrons can lead to a fall in urine output. In addition to restricting fluid and salt intake, diuretics can be prescribed to manage symptoms. Patients may require high doses, e.g. furosemide 250mg od or bd. If additional diuresis is required, metolazone may be added for its synergistic effect with loop diuretics. Metolazone is not licensed in the UK and so some clinicians may prefer high dose bendroflumethiazide.

Uraemia can cause Itching, muscle cramps and restless legs

Emollients, menthol in aqueous cream and antihistamines are frequently prescribed to relieve itching. Gabapentin, ranitidine and UVB light are alternative treatments for itching. Quinine is often prescribed to relieve cramps and patients find clonazepam 500 micrograms, pramipexole 180 micrograms or co-beneldopa 62.5mg at night useful for restless legs.

Further reading:

- *Etelcalcetide for treating secondary hyperparathyroidism*
Published by NICE 2017
- *Anaemia of chronic kidney disease*
Published by Renal Association 2017
- *CKD-mineral and bone disorders*
Published by Renal Association 2015
- *Chronic kidney disease: managing anaemia*
Published by NICE 2015
- *Chronic Kidney disease in adults: assessment and management*
Published by NICE 2014
- *Chronic kidney disease (stage 4-5): management of hyperphosphataemia*
Published by NICE March 2013
- *Cinacalcet for the treatment of secondary hyperparathyroidism in patients with end stage renal disease on maintenance dialysis therapy*
Published by NICE 2007

International resources:

- *Kidney disease improving global outcomes* www.kdigo.org
- *National Kidney Foundation KDOQI* www.kidney.org
- *Caring for Australasians with renal impairment* www.cari.or.au

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Chronic Kidney Disease (CKD)



The kidneys have an important role in maintaining health. When the person is healthy, the kidneys maintain the body's internal equilibrium of water and minerals (sodium, potassium, chloride, calcium, phosphorus, magnesium and sulphate). The acidic metabolism end-products that the body cannot get rid of via respiration are also excreted through the kidneys. The kidneys also function as a part of the endocrine system, producing erythropoietin, calcitriol and renin. Erythropoietin is involved in the production of red blood cells and calcitriol plays a role in bone formation.

www.renalpharmacy.org.uk

Chronic Kidney Disease Top Tips for Pharmacists

Background

This leaflet aims to provide an overview of CKD and pre-dialysis for pharmacists. There is no pharmacological cure for CKD, so the key aims of CKD management are:-

- Prevent or delay the progression of CKD
- Prevent and manage complications
- Reduce risk of cardiovascular disease

Identify those at risk of CKD progression

Risk factors for CKD progression

- Cardiovascular disease
- Proteinuria
- AKI
- Hypertension
- Diabetes
- Smoking
- Chronic NSAID use
- African, African-Caribbean, Asian family history
- Untreated urinary outflow obstruction

Regularly monitor those on drugs with a high risk of nephrotoxicity.

Those on prescribed drugs known to be nephrotoxic, such as calcineurin inhibitors, lithium and non-steroidal anti-inflammatory drugs (NSAIDs) should have an annual eGFR check.

Prevention or delay progression of CKD

Offer lifestyle advice to those with or at risk of CKD

- Regular exercise
- Maintain healthy weight
- Stop smoking

Control blood pressure

In all stages of CKD and low proteinuria aim for BP below 140/90mmHg.

Tighter targets are recommended in those with Polycystic Kidney Disease or an albumin/creatinine ratio (ACR) $\geq 70\text{mg}/\text{mmol}$. In this population aim to keep BP below 130/80mmHg.

Renin angiotensin system antagonists should be offered to diabetic patients with ACR $\geq 3\text{mg}/\text{mmol}$, those with hypertension and an ACR $\geq 30\text{mg}/\text{mmol}$ and anyone with an ACR $> 70\text{mg}/\text{mmol}$, as they can lessen proteinuria.

Reduce cardiovascular risk

Adults with chronic kidney disease should be offered a statin. Atorvastatin 20mg od is the preferred agent.

Managing complications of CKD

Anaemia

Patients should be monitored for renal anaemia when eGFR falls below 45ml/min. Once other causes of anaemia have been excluded iron stores should be replenished. Most patients will require IV iron to achieve sufficient iron stores. Erythropoietin stimulating agents (ESAs) e.g. Eprex®, Neorecormon®, Aranesp®, Mircera®,

are offered once iron stores are corrected to achieve a haemoglobin of 100-120g/L. Hypoxia-Inducible Factor Prolyl Hydroxylase Inhibitors may provide oral alternative to ESA's in the future.

Bone disease and osteoporosis

Calcium, phosphate and iPTH should be checked when eGFR falls below 30ml/min. A rising Alkaline Phosphatase along with elevated iPTH and falling calcium indicate renal bone disease (now referred to as chronic kidney disease mineral bone disorder or CKD-MBD). Renal Association guidelines provide target levels for iPTH, calcium and phosphate.

Vitamin D analogues such as alfacalcidol or calcitriol are prescribed to maintain normocalcaemia and protect bones. If secondary hyperparathyroidism develops patients may be offered a parathyroidectomy. Calcimimetics such as cinacalcet or etelcalcetide are prescribed in line with NICE guidance if surgery is contra-indicated to manage secondary hyperparathyroidism.

Dietary advice and phosphate binders are prescribed to achieve target phosphate levels. After diet restrictions calcium acetate is recommended first line in England. Since the introduction of generic sevelamer carbonate, this is generally offered second line. Lanthanum is prescribed as an alternative to sevelamer and comes in a range of strengths reducing tablet burden. Iron and magnesium based binders are reserved for third line use. Phosphate binders must be taken with meals to be effective and care must be taken to avoid interactions with other medication, eg. iron supplements / ciprofloxacin. Calcium levels should be monitored in those prescribed calcium based binders.