Chronic kidney disease (CKD)

- A reduction in kidney function and/or structural damage present for > 3/12.

- Be aware: if AKI, high risk of CKD later on in life.
- So monitor UEs for life.

Disclaimer:
Read the disclaimer at medimaps.co.uk/disclaimer

References:
1. NICE CKS
2. YPNA lecture, Dudley, June 2018
3. Renal consultant lecture Birmingham, April 2019
4. Renal consultant NAPP sponsored webinar July 2020
5. Dr Fernando MediConf, Feb 2025
6. YPNA webinar, Mar 2026

Symptoms

- Usually assymptomatic.
- Unexplained anaemia.
- HTN.
- Proteinuria.
- Haematuria.
- Nephritic/nephrotic syndrome.
- Uraemic emergencies.

Investigations

- Incidental eGFR < 60.

repeat in 2/52

- This is to ensure it's not AKI, or further rapid deterioration is occurring.
- You can skip this 2/52 repeat if the eGFR has been stable as there is no risk of AKI.
- Simply repeat eGFR and urinary ACR within 3/12.

- UEs.
- Urinary ACR.
- Urine dip for blood.

- Avoid meat 12 hr before UEs.

- If normal eGFR and slightly raised creatinine, not important as Cr is a variable based on age, ethnicity and sex.

- Low urea is a marker of malnutrition, or alcohol.

- Apply caution to interpreting eGFR and Cr in:
- Poor nutrition.
- Extremes of muscle mass.
- Protein supplements.
- Asian/Chinese ethnicity.
- Oedema.
- Obesity.
- Very elderly.
- Pregnant.
- Amputation.

- Urinary ACR can transiently ↑ with following:
- Menstruation.
- UTI.
- Strenuous exercise.
- Upright posture ('orthostatic proteinuria').

- Note: Ideally should be first urine of morning.
- But as per specialist = 'any wee will do'.
- Can store in plan white top bottle overnight in fridge.

- Without ACR you cannot categorise the pt correctly.
- If only eGFR then only one dimensional view of their kidney function,
- You MUST do ACR.

- Exclude UTI by sending MSU.
- If 2/3 urine dips show blood 1+ with no ↓ eGFR and no proteinuria, consider if needs referral to urology (a renal referal would only be needed if they also had ↓ eGFR or proteinuria with a view to biopsy).

- eGFR > 60 AND Urinary ACR < 3mg/mmol
  - No action needed.
  - Use clinical judgement to decide about the need to retest in the future.
- eGFR < 60 AND / OR - Urinary ACR > 3mg/mmol
  - Might be CKD.
- eGFR < 60 - ACR > 70mg/mmol
  - Refer to renal.

- So the question now is, do they actually have CKD?
- An incorrect diagnosis has insurance implications.
- Two ways to diagnose:

↓ renal function → Must have two readings of eGFR<60 over ≥ 3/12 period.

renal damage →
- Urinary ACR > 3mg/mmol over ≥ 3/12 period.
- Electrolyte abnormalities due to tubular disorders.
- Abnormalities detected by histology.
- Structural abnormalities detected by imaging.
- Kidney transplantation.
- Urine sediment abnormalities. → RBC. WBC. Cellular, fatty, or granular casts. Renal tubular epithelial cells.

- Basically need a 3/12 period in which there is ↓ renal function or renal damage.
- So arrange some tests at around that time period.
- Have a think if there is any obvious cause other than just putting it down to age.

- HTN.
- DM.
- Hx of AKI
- IHD, heart failure, PVD, stroke.
- Obesity with metabolic syndrome.
- Renal stone.
- BPH.
- Neurogenic bladder.
- Structural renal tract disease.
- SLE.
- ACEi, ARB, NSAIDs, diuretics, bisphosphanate, aminoglycoside, lithium.
- FHx CKD 5, autosomal dominant polycystic kidney disease, Alport's syndrome, familial glomerulonephritis.
- Acute glomerulonephritis.
- Urinary diversion surgery.
- SLE.
- Vasculitis.
- Myeloma.

- BP.
- BMI.
- UEs, eGFR.
- HbA1c.
- Lipids.
- Urine dip (blood).
- Urine ACR.
- Renal imaging i.e. USS

- Accelerated progression of CKD.
- Visible or persistent invisible haematuria.
- Symptoms of urinary tract obstruction.
- FHx of polycystic kidney disease and >20y.
- eGFR of <30.

- ↓ eGFR ≥25% AND change in GFR category.
- ↓ eGFR ≥25% AND sustained ↓ eGFR ≥15 within 1yr

test if eGFR < 30
- FBC.
- Ca2+.
- Phosphate.
- Vitamin D.
- PTH.

test if concerns about 2o cause
- HbA1c.
- HIV, HCV, HBV.
- Immunology.= lupus, ANCA ANA.
- Myeloma screen.

At eGFR < 60 80% of the kidney mass is lost forever.
At ACR just over 3, only 20% is lost.

Hence, ACR is the key to keep renal function as much as possible.

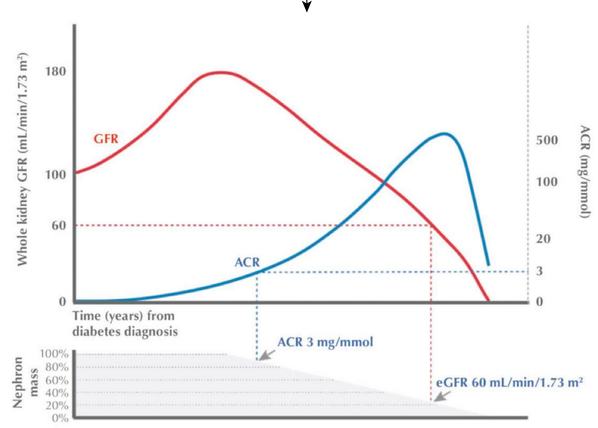

Figure 2. ACR testing can detect early signs of diabetic kidney disease (DKD) before significant nephron loss has occurred. Why wait? (Tonneijck et al, 2017)

Management

Refer to renal.

Include following info:
- Why referring (see right).
- Latest bloods.
- Rate of progression (serial eGFR and Cr).
- Risk of progresion (kidneyfailurerisk.com)

- GFR <30.
- ↓ eGFR ≥25% AND change in GFR category.
- ↓ eGFR ≥25% AND sustained ↓ eGFR ≥15 within 1yr.
- ACR ≥ 70 (unless 2o diabetes).
- ACR ≥ 30 and haematuria.
- Uncontrolled HTN on 4 medications.
- Suspected renal artery stenosis. → Refractory HTN. Recurrent pulmonary oedema with normal LVF. ↑ Cr by ≥ 25% when started ACEi.
- Known or suspected rare or genetic cause. → Polycystic kidney disease.

Lifestyle
- Avoid NSAIDs. Aspirin 75mg is safe to use.
- Low sodium intake
- CVD management.

Monitoring
- Number of times per year to test UEs.

GFR categories (ml/min/1.73 m²), description and range	ACR categories (mg/mmol), description and range		
	A1 <3 Normal to mildly increased	A2 3–30 Moderately increased	A3 >30 Severely increased
G1 ≥90 Normal and high	≤1	1	≥1
G2 60–89 Mild reduction related to normal range for a young adult	≤1	1	≥1
G3a 45–59 Mild–moderate reduction	1	1	2
G3b 30–44 Moderate–severe reduction	≤2	2	≥2
G4 15–29 Severe reduction	2	2	3
G5 <15 Kidney failure	4	≥4	≥4

BP
- Control of BP more important than which agent you use.
- If can't tolerate ACEi/ARB, use nitrate or hydralazine.
- <140/85 if ACR <30 and not diabetic (<150/90 if >80y)
- 120-129/<80 if diabetes or ACR>30

ARB instead of ACEi
- One in five get cough with ACEi.
- So just go straight to losartan 50mg, then to 100mg.
- Two steps and you are done.
- This is advice from renal consultant.
- Note: If frail, then start at 25mg.

- Check UEs after initiating and after ↑ dose.
- Have to check UEs at EVERY dose ↑ as may only get a haemodynamic compromise at a certain dosage.
- They ↓ intra-glomerular pressure, hence the drop in eGFR.
- If <25% ↑ Cr, continue and monitor.
- If > 25% ↑ Cr, stop ACEi and evaluate for renal artery stenosis.
- You can give ACEi even if eGFR 32. But monitor.
- As for stopping ACE/ARB if a drop in eGFR, there is no guidelines. Continue unless very low.

Lipids
- CVD is a major killer in CKD, not damaging your kidneys so much that you die.
- Some advice atorvastatin 20mg to all patients.
- Some think you should not push down lipids.
- e.g. If older and lipids = 6, let it be. But if 40y on dialysis with lipids of 10 need to do something.
- Use statin or with ezetimibe >50y with ckd 3-5.
- Can fire and forget if older.

Diuretics
- Loop diuretics do not cause kidney damage.
- The lower the eGFR the higher the dose needed to work.

Proteinuria
- If proteinuria = diuretic (furosemide 20mg) + ACEi / ARB.

HyperK
- Reduce K in diet.
- Stop nsaids.
- K+ lowering diuretics e.g. furosemide.
- Stop K sparring diuretics e.g. spironoloactone (but don't stop if heart failure).
- Avoid salt substitutes.
- Stop or reduce ACEi/ARB.

Dialysis
- Study has shown only a 6/12 extended life in elderly undergoing dialysis (much of which is spent travelling to and from dialysis clinics).
- They start dialysis at an eGFR of 7-8 if assymptomatic.
- Assess life expectancy and if pt wishes for dialysis/transplant.
- Take age into consideration for thinking about referral.
- e.g. 40y with low eGFR should refer, but in 80y no need as little life expectancy.
- Use online calculator kidneyfailurerisk.com

???If refuses dialysis can monitor with ??? Bicarb.???

Anaemia
eGFR < 20 causes normochromic normocystic anaemia.
TSAT and ferritin check.
ESA = erythropoetic stimulating agent.
EPO not required until ckd 4/5
Start EPO if Hb < 10???

Bone disease
Limit phosphorus in diet. Refer to renal dietician.

CKD 4 = cant utilise adcal etc. Need alphacalcidol. We can Rx.
PTH levels 2-9 x upper limit of normal. is target to adjust the alfacalcidol.

May need phosphate binder e.g. Fosec.
DEXA doesn't predict # risk in CKD 3 - 5.
No bisphosphanates for eGFR < 30.

Metabolic acidosis.
- More severe in high protein intake.
- Na Bicarbonate = may delay dialysis by 6 months. 1g QDS max.
- Start if eGFR < 30

Malnutrition
- Supplements if malnutrition.
- Use MUST scoring.
- Refer to dietician if needed.