

MCQs

Revise Nephrology

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Glomerulonephritis 1

IgA nephropathy most commonly presents with:

- A. Rash
- B. Diarrhoea
- C. Haematuria
- D. Headache
- E. Flank pain

IgA nephropathy

- C
- Wide clinical presentation
 - Incidental microscopic haematuria and mild proteinuria
 - Synpharyngitic macroscopic haematuria with flank pain
 - Nephrotic syndrome or rapidly progressive glomerulonephritis
 - Henoch Schonlein purpura or IgA vasculitis
 - Palpable purpura, arthritis, abdominal pain, renal disease
- IgA deposits may be seen in biopsies of patients with no evidence of kidney disease, multiple components in the pathogenesis of disease

Glomerulonephritis 2

In nephrotic syndrome the presence of antibodies to Phospholipase A2 (PLA2) is specific for the following glomerular pathology?

- A. Fibrillary
- B. Primary FSGS
- C. Mesangioproliferative
- D. Lupus nephritis
- E. Primary membranous

PLAR2

- E
- Primary membranous nephropathy (80% of MN cases)
 - PLAR2 antibodies
 - Thrombospondin type 1 domain containing 7A antibody (THSD7A)
- Strongly correlate with disease activity
 - Low and decreasing levels predict spontaneous remission – therefore manage conservatively
 - High and increasing levels associate with nephrotic syndrome and encourage prompt initiation of immunosuppressive therapy
 - Predicts relapse and recurrent disease

Glomerulonephritis 3

A 35-year-old man with nephrotic syndrome is diagnosed with IgA nephropathy, and has a blood pressure of 145/70 mm Hg. He is commenced on 4mg Perindopril daily. He has no peripheral oedema and his chest is clear. He returns for routine follow up in clinic 6 months later and his blood pressure is 135/80 mm Hg with Protein Creatinine Ratio of 60 mg/mmol. Which is the most appropriate treatment?

- A. Increase perindopril
- B. Add calcium channel blocker
- C. Salt restriction
- D. Observation
- E. Thiazide diuretic

Management approach in IgA nephropathy

- Non-immunosuppressive treatment
 - RAS blockade
 - Fish oil
 - Statins
- Immunosuppressive treatment (Prednisone)
 - Proteinuria persisting despite RAS blockade
 - Rising creatinine
 - Severe histologic findings
 - Endocapillary proliferation
 - Crescents
- Answer:
 - Increase perindopril?
 - Observation?

Glomerulonephritis 4

A young boy has nephritic syndrome. A renal biopsy was unremarkable on immunofluorescence and electron microscopy. Which of the following findings would be most consistent with a diagnosis of Alport Syndrome?

- A. Hamartomas
- B. Polydactyly
- C. High arched palate
- D. Sensorineural deafness
- E. Cerebral aneurysms

Alport syndrome

- D
- Diagnosis made on electron microscopy – basket weave GBM
- X-linked inheritance and may be recessive or dominant, but typically an affected male (XY) with mother who only has microscopic haematuria (XX). Defect usually in the gene encoding $\alpha 5$ chain of type 4 collagen
- Haematuria + CKD + lenticonus (bulging of lens capsule and underlying cortex) + sensorineural deafness because this is where this chain of type 4 collagen is located
- Type 4 collagen also what anti-GBM antibody is against although $\alpha 3$ chain

Glomerulonephritis 5

Which of the following is the most common clinical presentation of AA amyloidosis?

- A. Gastroparesis
- B. Macroglossia
- C. Peripheral neuropathy
- D. Restrictive cardiomyopathy
- E. Nephrotic syndrome

AA amyloidosis

- E
- 90% affects the kidney
- Amyloid (which could be lots of different proteins including amyloid A, beta 2 macroglobulin in dialysis associated amyloidosis, transthyretin, monoclonal light or heavy chains) can deposit in the glomerulus (mesangium or the capillary loops), vessels or tubules
- Biopsy abdominal fat pad for diagnosis but in the case of proteinuria I would always biopsy the kidney as there is a wide differential diagnosis of MGRS

Glomerulonephritis 6

- Hepatitis C positive patient presents with rash, purpura, Raynaud's syndrome. Biopsy shows a MPGN pattern. IF negative for IgG and IgA. Positive for IgM and complement. What is the likely diagnosis?
- A. Hepatitis C associated cryoglobulinaemic GN
- B. Idiopathic MPGN
- C. Post-streptococcus GN
- D. Membranous GN

Membranoproliferative GN = Mesangiocapillary GN

- A
 - Diagnostic approach based on the IF findings
 - Ig + C3
 - Immune complex mediated MPGN due to infection, rheumatological diseases, monoclonal gammopathy...
 - C3
 - C3 or C4 glomerulopathy
 - No Ig or C3
- Cryoglobulins
 - I – Monoclonal IgG or IgM
 - II – Mixed, monoclonal Ig with rheumatoid factor activity (usually IgM) and polyclonal Ig
 - III – Mixed, polyclonal IgG and polyclonal IgM
- Post-infectious GN can cause a MPGN pattern but there would usually be IgG and the history doesn't fit

Glomerulonephritis 7

A patient presents with abdominal pain, hypertension, rash, renal failure. Renal biopsy shows crescentic GN. What is the most appropriate initial treatment?

- A. Prednisone and cyclophosphamide
- B. ACE inhibitor
- C. Prednisone and mycophenolate
- D. IV benzylpenicillin
- E. Prednisone

Crescentic GN

- A
- Nephritic syndrome
 - Hypertension, renal failure
- Rapidly progressive glomerulonephritis (clinical diagnosis)
- Crescentic glomerulonephritis (histological diagnosis)
- Both terms are not diagnostic, just descriptive
- Potential diagnoses include:
 - ANCA vasculitis
 - Anti-GBM disease
 - Post-streptococcal GN
 - IgA nephropathy
- Treatment for all conditions is usually pulse methylprednisone (4mg methylpred = 5mg prednisone) and cyclophosphamide to start with while the diagnosis is being clarified

Glomerulonephritis 8

A 28-year-old patient presents with haematuria 36 hours following URTI. His renal function is normal, and a CT KUB has ruled out stones. Patient says that he has had similar episodes in the past. Most likely diagnosis is:

- A. Thin basement membrane disease
- B. Membranous GN
- C. MPGN
- D. Post-infectious GN
- E. IgA nephropathy

IgA nephropathy (IgAN)

Answer is **E** - IgAN

- Peak incidence in 2nd and 3rd decades
- Episodic macroscopic hematuria in **40-50%** (often within 24-48 hours of URTI)
- Microscopic hematuria in **30- 40%** (usually sub nephrotic proteinuria)
- Nephrotic syndrome in 5%
- Rapidly progressive GN in 5%
- Rarely as AKI or malignant hypertension

Glomerulonephritis 9

A 75 year old woman presents with peripheral oedema and ascites increasing over the last 4 months. She is found to have 9g/day proteinuria, hypercholesterolaemia, hypoalbuminaemia (9g/L) and Cr = 60. What is the most likely diagnosis?

- A. Diabetic nephropathy
- B. Membranous nephropathy
- C. Minimal change disease
- D. AL amyloid
- E. IgA nephropathy

Nephrotic syndrome

- B
- Nephrotic syndrome vs nephrotic range proteinuria
 - Syndrome tends to be due to primary glomerular disorders
 - Nephrotic range proteinuria without the syndrome is more likely to be due to damage to the glomeruli due to other diseases such as diabetes or obesity
- In older people most common cause of nephrotic syndrome
 - Membranous
 - Amyloid/minimal change
- Minimal change disease is most common in children
- IgA nephropathy usually causes nephritic syndrome but may have nephrotic range proteinuria and sometimes nephrotic syndrome

Dialysis 1

What is the best marker of dialysis adequacy?

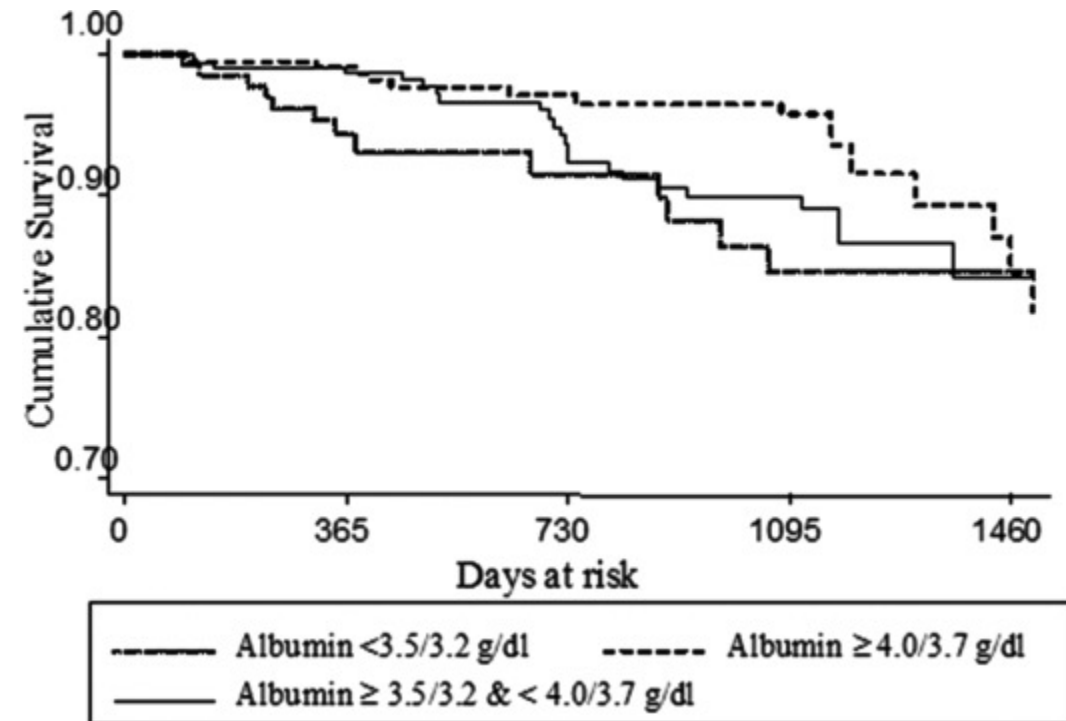
- A. Albumin
- B. Beta 2 macroglobulin
- C. Phosphate
- D. Creatinine
- E. Urea

Serum albumin is a strong predictor of death in chronic dialysis patients

- <https://pubmed.ncbi.nlm.nih.gov/8355451/>
- We examined the predictive value of various clinical variables in assessing survival in chronic hemodialysis patients (N = 1,243, 524 females, 719 males) who were under treatment with hemodialysis as of January 1991 in Okinawa, Japan and who were followed up until April 1992.
- The standardized coefficient was
 - -0.380 (P = 0.0001) at **age** of entry
 - 0.316 (P = 0.0001) for serum albumin
 - 0.280 (P = 0.0001) for serum creatinine
 - 0.138 (P = 0.043) for body mass index (BMI)
 - -0.139 (P = 0.016) for male sex
 - The prescribed dialysis dose was significantly correlated with serum creatinine (r = 0.48, P = 0.0001), serum albumin (r = 0.135, P = 0.0001) and BMI (r = 0.275, P = 0.0001).

Serum Albumin Level and Risk for Mortality and Hospitalization in Adolescents on Hemodialysis

- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2386701/>
- [Clin J Am Soc Nephrol.](#) 2008 May; 3(3): 759–767.



Dialysis 2

In a patient with chronic kidney disease and declining eGFR, on which factor would you base your decision to start elective haemodialysis?

- A. Uraemic symptoms
- B. Albumin
- C. Haemoglobin
- D. Urea
- E. Creatinine

Dialysis 3

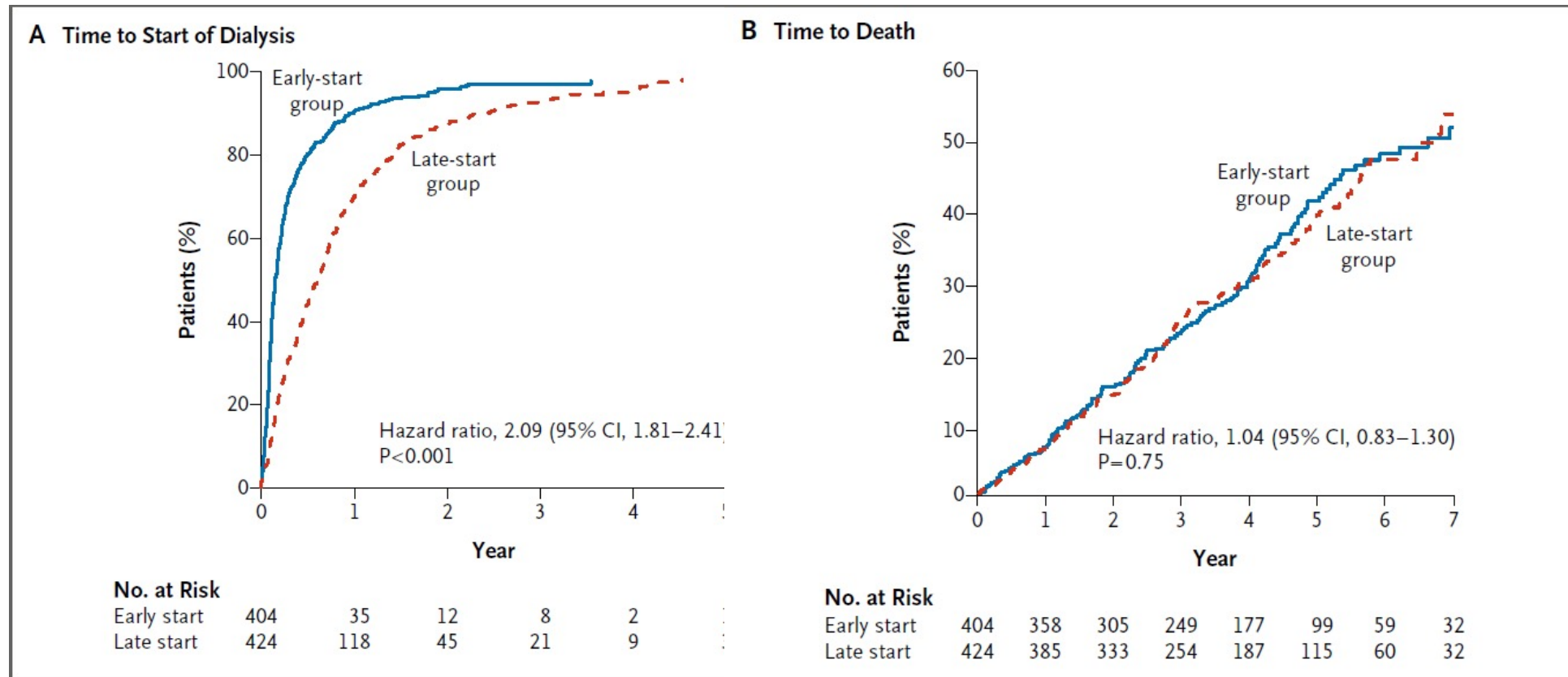
In chronic kidney disease, which of the following is the strongest indication for commencing elective haemodialysis?

- A. Potassium of 5.7
- B. Pericardial rub
- C. Creatinine of 500 $\mu\text{mol/L}$
- D. Urea of 36 mmol/L
- E. Anaemia

The IDEAL study

A Randomized, Controlled Trial of Early versus Late Initiation of Dialysis

No difference in mortality whether the patient started at (late) 5 – 7 ml/min or (early) 10 – 14 ml/min; approximately 5 months difference and people in the late start group often had to start dialysis at eGFR > 7 ml/min



- Answers
- Q2 A Uraemic symptoms
- Q3 B Pericardial rub

Dialysis 4

The presence of which of the following factors would make continuous renal replacement therapy a superior choice compared to intermittent haemodialysis

- A. Hyperkalaemia
- B. Hyperuricaemia
- C. Hypotension
- D. Pericarditis
- E. Acidosis
- F. Active bleeding
- G. Coagulopathy

HD vs CRRT

Intermittent haemodialysis

- Blood flow rate 250 – 350 ml/min
- Dialysate flow rate 500 ml/min
- Anticoagulation not necessary
- Ultrafiltration rate 500 – 1000 ml/hour

Continuous renal replacement therapy

- Blood flow rate 100 – 180 ml/min
- Dialysate flow rate 1 – 2 L/hour
- Continuous anticoagulation required
- Ultrafiltration dictated by needs over 24 hours (just give less replacement fluid)

Dialysis 4 - Answer

- The presence of which of the following factors would make continuous renal replacement therapy a superior choice compared to intermittent haemodialysis
 - A. Hyperkalaemia – Intermittent haemodialysis will reduce K faster
 - B. Hyperuricaemia – Rarely would dialyse just for this reason, but could potentially in the case of tumour lysis syndrome
 - C. Hypotension – CRRT is the best choice
 - D. Pericarditis – Intermittent haemodialysis would clear uraemic toxins faster and anticoagulation is contraindicated
 - E. Acidosis – Intermittent haemodialysis corrects this faster
 - F. Active bleeding – Anticoagulation not required for IHD
 - G. Coagulopathy – As above

Dialysis 5

In Australia, what is the most commonly isolated pathogen amongst patients with PD peritonitis?

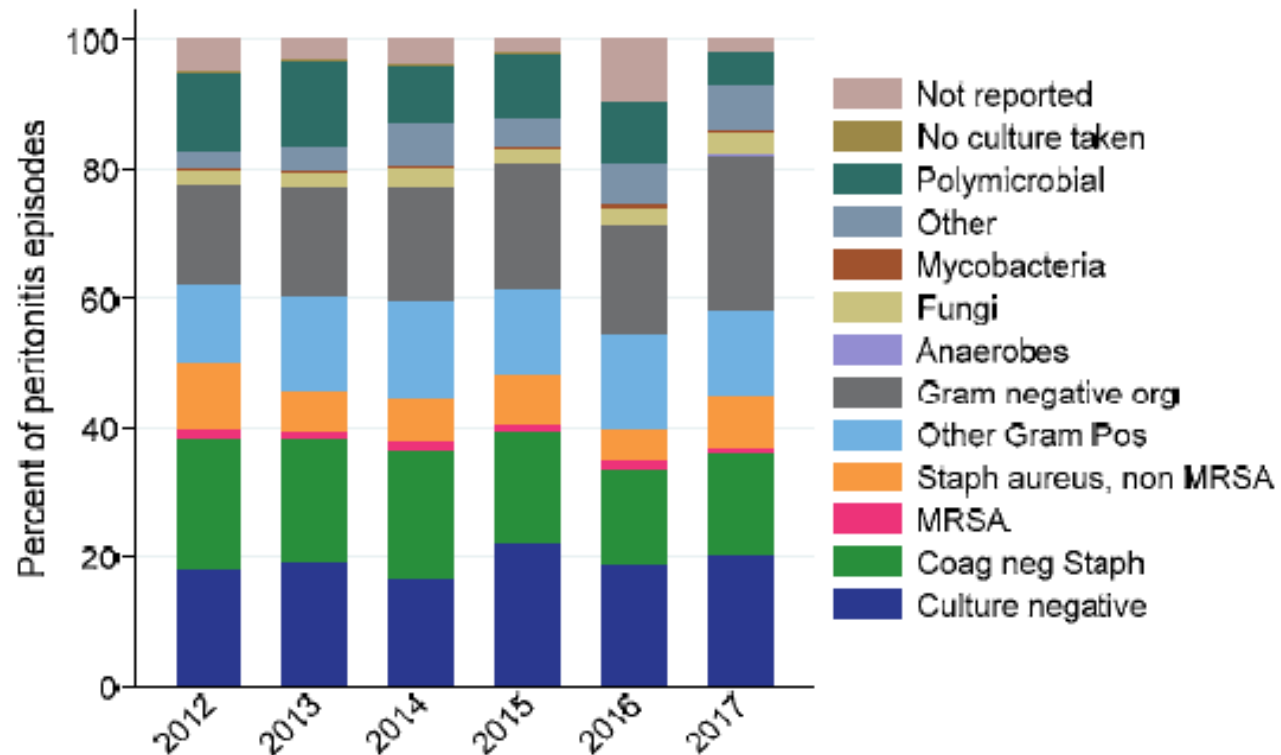
- A. Coagulase negative staph
- B. E.coli
- C. Acinebacter
- D. Strep pyogenes
- E. S. aureus

Dialysis 5 - Answer

A

- Touch contamination is the most common cause of PD peritonitis

Figure 5.28 - Distribution of Organisms Causing Peritonitis - Australia 2008-2017



Dialysis 6

Elderly lady presents with ESKD. She needs to commence renal replacement therapy soon. Which is the strongest contra-indication to peritoneal dialysis?

- A. Previous perforated diverticulum
- B. CCF NYHA Class IV
- C. Osteoarthritis of the hands
- D. COPD

When to choose PD?

A

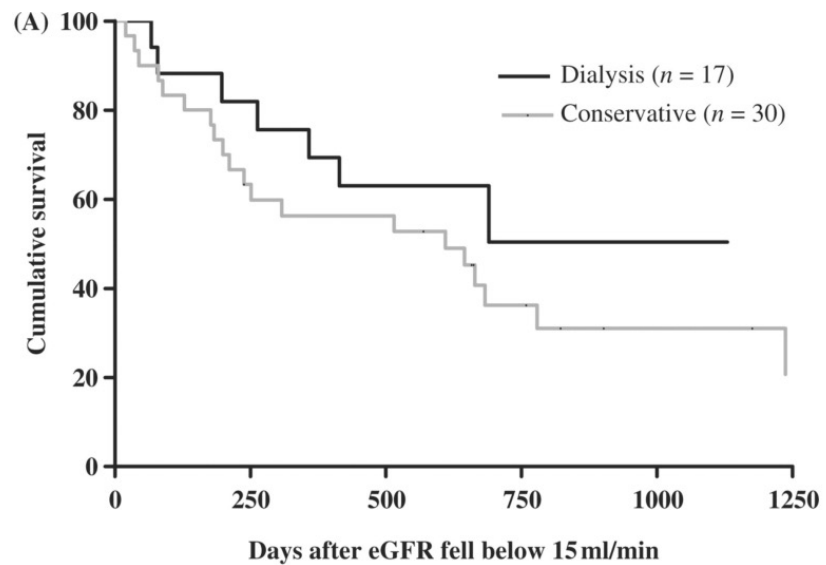
- Preference for PD
 - Everyone! – ‘PD first’
 - Congestive cardiac failure
- Absolute
 - Documented loss of peritoneal function or extensive abdominal adhesions that limit dialysate flow
 - Absence of suitable assistant if patient incapable of performing PD (cognitive deficit, blindness)
 - Uncorrectable mechanical defects (Eg: Unreparable hernia, stomas)
- Relative
 - Inflammatory bowel disease, frequent episodes of diverticulitis
 - Severe COPD
 - Severe malnutrition

In reality, an elderly patient with CCF/COPD should be offered conservative care!

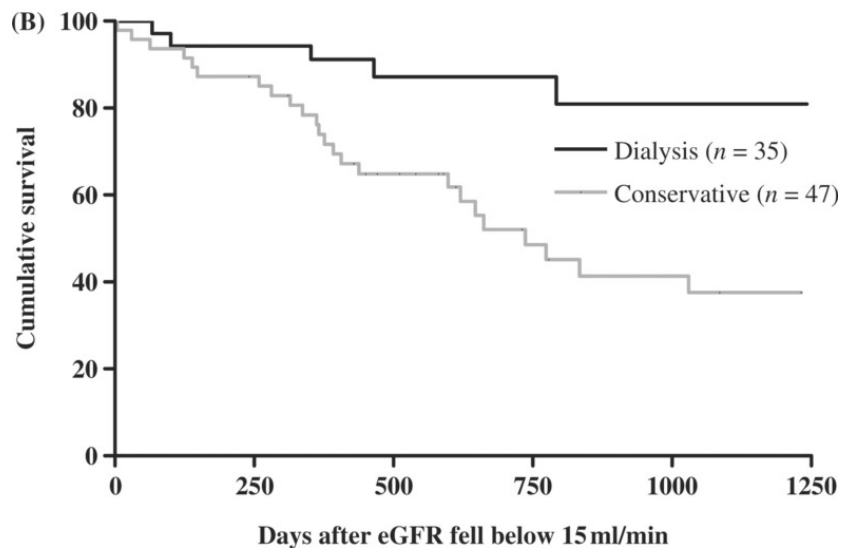
Dialysis or conservative care?

- Patients > 70 years of age who chose RRT or maximum conservative care (MCM)
- eGFR ~ 10 ml/min
- Median survival for RRT = 37.8 months versus MCM = 13.9 months (2 years difference)
- Hemodialysis-only patients spent 47.5% of the days they survived at or in the hospital (173 d per patient per year) versus MCM patients, who spent 4.3% of the days they survived at or in the hospital (16 d per patient per year).

Clin J Am Soc Nephrol 4: 1611–1619, 2009. doi: 10.2215/CJN.00510109



Ischaemic heart disease $p = 0.27$



No ischaemic heart disease $p < 0.0001$

Fig. 4. (A) Kaplan-Meier survival curves for those with ischaemic heart disease, comparing the dialysis and conservative groups (log rank statistic 1.46, df 1, $P = 0.27$). (B) Kaplan-Meier survival curves for those without ischaemic heart disease, comparing the dialysis and conservative groups (log rank statistic 12.78, df 1, $P < 0.0001$).

Dialysis 7

Which of the following statements regarding haemodialysis (HD) and peritoneal dialysis (PD) is correct?

- A. Patients on PD suffer greater fluctuations in their fluid state than patients on HD
- B. Both HD and PD lose their effectiveness with time
- C. Low serum urea levels are a reliable indicator of effective therapy
- D. Weight gain in the absence of fluid overload commonly occurs in patients on PD
- E. HD has a proven advantage over PD in preservation of residual kidney function.

Urea

- A major determinant of lots of markers of dialysis adequacy
 - Urea reduction ratio
 - Kt/V
- However, also dependent on protein in diet

Dialysis 7 - Answer

Which of the following statements regarding haemodialysis (HD) and peritoneal dialysis (PD) is correct?

- A. Patients on PD suffer greater fluctuations in their fluid state than patients on HD – HD patients have a sawtoothing of their volume over the course of a week and are more likely to die on a Monday/Tuesday in part because of this
- B. Both HD and PD lose their effectiveness with time – PD is dependent on the membrane which becomes less effective with time
- C. Low serum urea levels are a reliable indicator of effective therapy – Often related to diet
- D. Weight gain in the absence of fluid overload commonly occurs in patients on PD – Due to glucose in the PD bags, there's a can of Coke in every bag (30g of sugar)
- E. HD has a proven advantage over PD in preservation of residual kidney function – Haemodynamic fluctuations of HD generally threaten the residual renal function

Dialysis 8

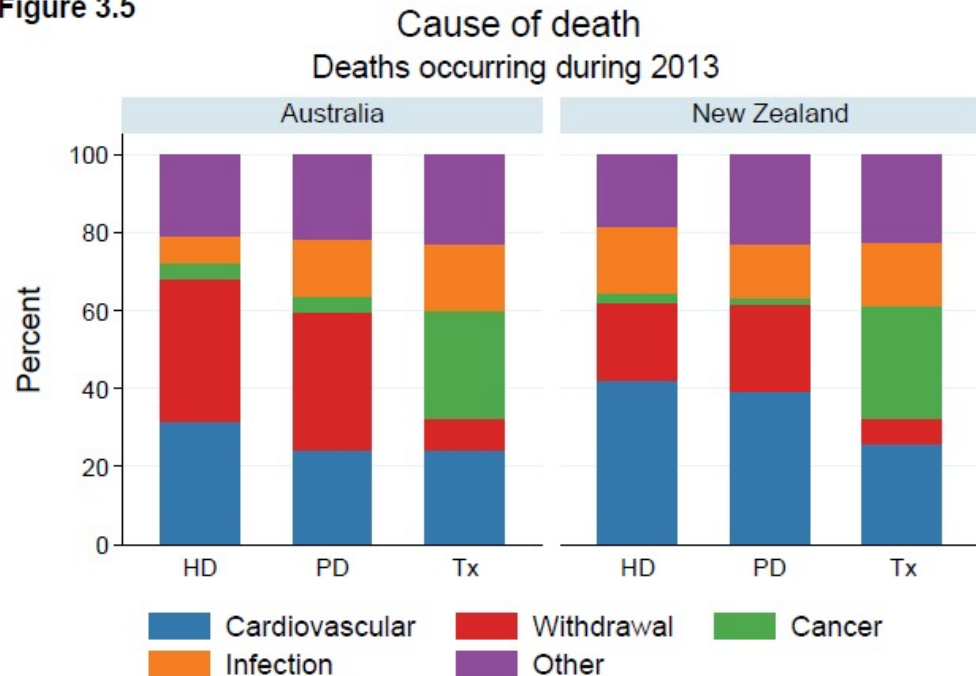
Dialysis patients have a high mortality, with average survival in the order of 40-50% at five years. For a new patient commencing dialysis, the most likely cause of death will be:

- A. Infection
- B. Malignancy
- C. Cardiovascular event
- D. Electrolyte abnormality
- E. Withdrawal from dialysis

Remember this for your long cases!

Cause of death on dialysis

Figure 3.5



- C
- Cardiovascular disease for those on dialysis
- Although withdrawal makes up large component, usually these patients have a combination of comorbidities that make dialysis difficult to tolerate
- Cancer for those with a transplant