Self-assessment/CPD answers

Below, you can find the answers to the self-assessment questions published in this chapter.

Answers

Primary glomerular disease

Question 1

Correct answer: D. is best: it is always best to take specialist advice and most nephrologists prefer to be consulted at an early stage. They are likely to suggest further blood tests for assessment and then urgent referral to a hospital clinic. While (A) could be justified, it would be rare for a primary care physician to take such a step and other baseline investigations such as measurement of excretory renal function, plasma albumin etc would be prudent before embarking on any therapy. Furthermore, monitoring of such therapy, at least initially, usually requires specialist hospital assessment. (B) is inappropriate because this a potentially life-threatening condition. (C) is unnecessary initially, malignancy is rare in this age group and usually only considered if there is an initial failure to respond to therapy. (E) is inappropriate: there is no suggestion from the case history that this could be an explanation

Question 2

Correct answer E. is best: this is a classical presentation of infection-related glomerular nephritis. (A) is not an adequate explanation for ++ protein, as specifically stated in the article, and is unlikely anyway in the absence of symptoms. Certainly it should not be assumed to be the explanation before other more sinister causes have been excluded. (B) does not explain the findings. (C) is possible but there are no clinical features (heart murmurs, splinter haemorrhages etc) to support it. There are no features to suggest (D) and the history too long.

Question 3

Correct answer A. is best: stick to simple first principles, take a history and examine the patient before deciding on next steps. (B) makes sense but is not an immediate response. (C) is indicated if sepsis is suspected but there is not enough information available yet, hence the need for (A). (D) is likely to be recommended but is not an immediate response. (E) is inappropriate.

Tubulo-interstitial disorders

Question 1

Correct answer: C. The commencement of omeprazole is temporally related to the development of acute kidney injury. Antineutrophil cytoplasmic antibody (ANCA)-associated vasculitis (A) is unlikely in the context of a negative proteinase 3 and myeloperoxidase antibodies. In addition there are no systemic features to suggest a vasculitic process. Tubulo-interstitial nephritis with uveitis (B) is not associated with conjunctival inflammation. Paracetamol would not be expected to cause an acute tubule-interstitial nephritis (D). Systemic lupus erythematosus is incorrect (E). Although the antinuclear antibody (ANA) is positive, this is of a low titre with a speckled pattern and essentially normal double-stranded DNA antibody titre and complement levels. In this context the positive ANA is a non-specific finding. In addition there are no systemic features to suggest a diagnosis of systemic lupus erythematosus.

Question 2

Correct answer: E. The abdominal pain, weight loss, bilateral hydronephrosis and retroperitoneal mass are typical of immunoglobulin (Ig)G4-related disease. There has been a partial response to corticosteroids that further supports the diagnosis. IgG4-related disease can be associated with constitutional symptoms as exemplified in this case. There can be widespread and varied involvement such as sialadenitis, inflammatory masses and retroperitoneal fibrosis that may lead to bilateral hydronephrosis. The interstitial infiltrate in IgG4-related disease is predominantly comprised of plasma cells that stain positive for IgG4 on immunostaining. There is typically a rapid response to high-dose corticosteroids as seen in this case. Hypocomplementaemic interstitial nephritis (A) is associated with systemic hypocomplementaemia and massive interstitial deposits comprised of lymphoid or plasma cells. Low complement levels may also be seen in IgG4-related disease and there is a degree of overlap between the two conditions. In this case, the presence of an inflammatory mass and bilateral hydronephrosis supports IgG4-related disease as the most likely diagnosis rather than hypocomplementaemic interstitial nephritis. Undiagnosed gastrointestinal malignancy (B) with local metastasis is incorrect as there is no evidence to support this on the CT colon findings. There is no temporal association between the commencement of omeprazole (D) and the manifestation of renal impairment to support this as a likely diagnosis. In addition, omeprazole induced interstitial nephritis would not explain the rest of the symptomatology. Although the patient is originally from Peru where Mesoamerican nephropathy (D) is prevalent, he has lived in the UK for the majority of his life and therefore would not have been exposed to the environmental conditions associated with Mesoamerican nephropathy.

Question 3

Correct answer: A. Although granulomas can be seen in the context of drug-induced acute interstitial nephritis, they are unlikely to be present with tetracycline-related acute interstitial nephritis (B). The hypercalcaemia, breathlessness and cough, granulomas and tubulo-interstitial nephritis on biopsy support a diagnosis of sarcoidosis. There are no glomerular

histological findings to support a diagnosis of IgA nephropathy (A). In addition, the immunostaining revealed background staining only for IgA, indicating that there is no significant deposition of IgA present. Lung malignancy (D) is excluded as detailed in the CT findings. This is an important exclusion to make in this case. IgG4-related disease (E) is associated with a plasma-rich interstitial infiltrate that stains positive for IgG4 on immunostaining. It is not typically associated with granuloma formation or hypercalcaemia.

Identification and management of diabetic nephropathy

Question 1

Correct answer: C: This is the earliest change on renal histology. B, D and E are later changes associated with diabetic nephropathy, which from the investigations the patient does not have

Question 2

Correct answer: D. High protein intake has been associated with faster renal progression, high salt leads to worse blood pressure control and reduced efficacy of angiotensin-converting enzyme (ACE) inhibitors, at this level of estimated glomerular filtration rate (eGFR) hyperkalaemia due to diet is very unlikely. There is no evidence that a low-carbohydrate, high-fat diet alters prognosis for diabetic nephropathy.

Question 3

Correct answer: A. Recent trial data demonstrate significant morbidity and mortality reduction in patients with heart failure and diabetes. B: Dual blockage with ACE + ARB has not been shown to be effective. C and D may help with diabetic control, but do not lead to cardioprotection. Spironolactone (E) is useful for heart failure but not diabetes.

Thrombotic microangiopathies and the kidney

Question 1

Correct answer: D. Atypical haemolytic–uraemic syndrome (aHUS) is the likeliest diagnosis. The family history of premature unexplained family death is not unusual (quite possibly from undiagnosed aHUS). The normal serum complement levels *do not* exclude the diagnosis. The serum creatinine is >200 micromol/litre, and the platelet count $>30 \times 10^9$/litre, so thrombotic thrombocytopenic purpura (TTP) (A) is much less likely. This could feasibly be Shiga toxin-mediated HUS (B), but an absence of a diarrhoeal prodrome is an unusual presentation (although this does not completely exclude it). The normal renal size and patient's age suggest it is not atherosclerotic renovascular disease (E). Chronic pyelonephritis (C) should be considered – it is the most common cause of severe hypertension in children and young adults, and can run in families, but the normal renal sizes with absence of scarring militates against this diagnosis.

Question 2

Correct answer: B. While the presentation initially sounds like meningococcal septicaemia, the pentad of microangiopathic haemolytic anaemia (red cell fragments), thrombocytopenia ($<30\times 10^9$/litre), acute kidney injury (but with a creatinine <200 micromol/litre), neurological involvement and fever is characteristic of TTP. The appropriate first treatment is plasma exchange. Platelet infusions are contraindicated. The normal C-reactive protein value, lack of coagulopathy and normal blood pressure militates against a diagnosis of meningococcal sepsis (A) – and a lumbar puncture with such a low platelet count would certainly be risky. Antibiotics could be considered if there were any diagnostic doubt.

Eculizumab (C) is not routinely indicated in TTP, and neither haemodialysis, nor aggressive treatment of hypertension (E) are appropriate. Some patients with renal thrombotic microangiopathies may present with extremely severe hypertension – seen especially in those with aHUS.

Question 3

Correct answer: C. This is a classical presentation of Shiga toxin-mediated haemolytic–uraemic syndrome (STEC HUS). The diagnostic triad for HUS is present (microangiopathic haemolytic anaemia, thrombocytopenia, and acute kidney injury) as well as a history of a diarrhoeal prodrome. The treatment is essentially supportive – and the first priority is urgent treatment of the severe hyperkalaemia, fluid challenge given the hypotension and consideration of dialysis if the patient remains anuric. If he starts to pass urine, sodium bicarbonate 1.26% solution could be considered, which would also treat the hyperkalaemia. Drugs to reduce gut motility (B) can paradoxically worsen the condition. Unless the patient is found to be septicaemic, antibiotics (A) are also contraindicated. Eculizumab (D) and plasma exchange (E) are not first-line therapies for this condition, but their subsequent use has been reported in patients who decline despite standard supportive treatment.

Paraprotein-related renal disease

Question 1

Correct answer A: The most likely diagnosis here is AL amyloidosis/monoclonal gammopathy of renal significance. A bone marrow biopsy and renal biopsy are required to establish the underlying diagnosis. The key is to correlate the specific monoclonal immunoglobulin found in the kidney with the circulating paraprotein to ensure a direct link between the monoclonal gammopathy and renal lesion is established. The other diagnosis are unlikely as her blood pressure, HbA_{1C} are not raised. There is no laboratory evidence to support HUS/TTP.

Question 2

Correct answer A: Prompt commencement of disease-specific therapy is the single most important factor in the management of patients with multiple myeloma. Bortezomib-based chemotherapy is first line and should be commenced as soon as possible. The renal response depends on the quality of the haematological response, and rapid suppression of monoclonal immunoglobulin secretion with chemotherapy improves outcomes. Plasma exchange is not effective and there is not sufficient evidence of benefit to support the use of HCO-HD in routine clinical practice.

Question 3

Correct answer A: A kidney biopsy is indicated in the setting of a progressive proteinuric chronic kidney disease or acute kidney injury with non-light chain proteinuria. Also if the involved serum free light chains is <500 mg/litre as the likelihood of myeloma cast nephropathy is less and an alternative diagnosis such as MGRS may be missed. A bone marrow biopsy (B) is indicated to evaluate haematological disorders, stage lymphoproliferative disorders and in assessment of infection in immunocompromised individuals. This patient has a monoclonal gammopathy of undetermined significance (MGUS) and a paraprotein-related kidney disease needs to be excluded.

Lupus nephropathy and vasculitis

Question 1

Correct answer: A. There is no randomized controlled evidence (RCT) evidence to support the use of rituximab in lupus nephritis, although retrospective data suggest rituximab may be useful where other treatments including mycophenylate mofetil (MMF) have failed or are not tolerated. Plasma exchange (C) may also be added where other treatments have failed but is not supported by RCT evidence. Oral prednisone (D) may be used instead of pulsed IV but should be combined with another induction agent since as MMF or cyclophosphamide given the adverse side effect profile of prolonged high-dose glucocorticoids. Hydroxychloroquine (E) is recommended by Kidney Disease: Improving Global Outcomes for lupus nephritis but should be combined with other immunosuppression.

Question 2

Correct answer: A. Methylprednisolone (B) may be appropriate if crescentic disease is confirmed on renal biopsy. At this level of renal function, and without any pulmonary involvement, there is no role for plasma exchange (E). There is no evidence for methotrexate (C) in the treatment of renal limited ANCA vasculitis.

Renal disease in pregnancy

Question 1

Correct answer: C New high blood pressure after 20 weeks gestation is a diagnostic feature of pre-eclampsia. HELLP syndrome (haemolysis, elevated liver enzymes and low platelets) (C) is a severe variant of pre-eclampsia with elevated liver enzymes and low platelets. A headache is consistent with this diagnosis. Pre-eclampsia/HELLP tends to improve after removal of the placenta at delivery, typically within 72 hours, as in this case in which the platelet count has increased towards the normal range. Hypertension due to pre-eclampsia/HELLP can persist post-partum. aHUS (A) and TTP (E) are typically associated with a lower haemoglobin (<80 g/litre) in the absence of another cause, and higher lactate dehydrogenase (LDH) (>1000 U/litre) compared to HELLP syndrome. In addition thrombocytopenia resulting from aHUS or TTP persists post-partum unless treatment with plasma exchange and/or eculizumab are given. Although autoimmune haemolytic anaemia (D) causes thrombocytopenia in conjunction with an elevated LDH, neither autoimmuune haemolytic anaemia nor immune thrombocytopenic purpura (B) cause de novo elevation of blood pressure in late pregnancy.

Question 2

Correct answer: B. Mycophenolate is tetratogenic, and first-trimester exposure is associated with hypoplastic nails, shortened fingers, diaphragmatic hernia, microtia, micrognathia, cleft lip and palate, and congenital heart defects A 6-week washout period is required in advance of pregnancy, although longer is usually required in order to ensure stable graft function on a pregnancy-safe alternative, usually azathioprine (D). Erythropoietin (A), nifedipine (C) and tacrolimus (E) are considered safe in pregnancy.

Question 3

Correct answer: B. All women with chronic kidney disease have an increased risk of developing pre-eclampsia in pregnancy. Low-dose aspirin (75−150 mg daily) is used to reduce this. Folic acid (A) should be taken by all women for 3 months before pregnancy and during the first trimester to reduce the risk of neural tube defects. Ramipril (C) is fetotoxic to the developing kidney and should not be used in pregnancy. Erythropoietin (E) requirements increase in pregnancy, and synthetic erythropoietin may need to be commenced or increased. However, the gestational haemodilution of normal pregnancy reduces the lower limit of the reference range for haemoglobin in pregnancy to 105 g/litre. Hydroxychloroquine (D) is used in the management of lupus nephritis in pregnancy.