PTS 2a Mock SBA Series 2020

Paper 4- [Answers]- Version 3

Marking Instructions:

- Award **1 mark for each question** on the paper
- Multiple 'correct' answers may exist, a mark is awarded for the **single *best* answer**
- There are **100 marks** in total.
- There is **no identified 'pass mark'.**

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Please **do not share** this document on **google drives** or **directly** to **future 2a students,** this takes away from their opportunity to complete the mock SBA in the run up to their exams when it has maximal impact as a revision resource. **This mock paper will be repeated for future years.** Thank you.

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Paper 4- Topics Assessed

Respiratory	Liver and Friends	Cardiovascular
1. *COPD spirometry results* 2. *Signs of asthma* 3. *Management of asthma* 4. *Different types of lung cancer* 5. *Metastasis of lung cancer* 6. *Diagnosis of PE* 7. *Pneumonia causes* 8. *Pneumonia assessment* 9. *Side effects of TB medication* 10. *Genetics of CF*	41. *Diagnosis of gallstone disease* 42. *Alcoholic liver disease* 43. *Diagnosis of hepatitis* 44. *Inguinal hernia Mx* 45. *Hepatitis serology* 46. *Causes of ascites* 47. *Gall stones risk factors* 48. *Liver disease signs* 49. *Diagnosis of peritonitis* 50. *Gallstone investigations*	81. *WPW ECG* 82. *WPW pathophysiology* 83. *ECG normal intervals* 84. *Risk scores* 85. *Heart Failure CXR* 86. *Heart Failure Medication* 87. *Diuretics pharmacology* 88. *ECG territories* 89. *Post-MI complications* 90. *Anti-platelet pharmacology*
Public Health	**Haematology**	**Gastrointestinal**
11. *Adherence and concordance* 12. *Infection control* 13. *Genital ulcers and STIs* 14. *Occupational diseases* 15. *Obesity* 16. *Chemoprophylaxis* 17. *Occupational diseases* 18. *Medical statistics terms* 19. *Prevention* 20. *Screening programmes*	51. *White cell counts* 52. *Haematological CA* 53. *Pernicious anaemia* 54. *Macrocytic anaemia* 55. *Presentation ALL* 56. *Iron deficiency anaemia* 57. *Haemophilia* 58. *Platelet disorders* 59. *Sickle cell crisis* 60. *Myeloma*	91. *Oesophageal CA* 92. *Coeliac disease* 93. *UC extraintestinal* 94. *H.pylori Ix* 95. *GORD Mx* 96. *Colorectal CA Ix* 97. *Acute UC Mx* 98. *Coeliac disease diagnosis* 99. *IBD Mx* 100. *GI vitamin absorption*
Neurology	**Genitourinary**	
21. *Presentation of stroke* 22. *Management of stroke* 23. *Parkinson's disease* 24. *Risk factors for cancer* 25. *Myasthenia Gravis* 26. *Temporal Arteritis* 27. *Nerve roots* 28. *Epilepsy* 29. *Types of seizures* 30. *Neurology emergency*	61. *Kidney stones Ix* 62. *CKD diagnosis* 63. *Alpha blockers* 64. *Renal Cell Carcinoma* 65. *GnRH agonists* 66. *Pulmonary oedema mx* 67. *Erectile dysfunction* 68. *Kidney functions* 69. *Complicated UTIs* 70. *ADPKD*	
Musculoskeletal	**Endocrinology**	
31. *OA X-ray findings* 32. *Gout investigation findings* 33. *NSAID pharmacology* 34. *Spondyloarthropathies* 35. *RA hand signs* 36. *Osteoporosis* 37. *Reactive arthritis* 38. *Osteomyelitis microbiology* 39. *Osteoporosis risk tool* 40. *Gout treatment*	71. *Management of hypothyroid* 72. *Graves' disease investigations* 73. *Graves' disease symptoms* 74. *Investigating acromegaly* 75. *Anterior pituitary* 76. *Hyperparathyroidism* 77. *Managing acute severe hypercalcaemia* 78. *Hyperthyroid crisis* 79. *Addison's disease* 80. *Long term steroid therapy*	

Respiratory

Question 1- Answer B- FEV<80% predicted, FEV1/FVC<0.7

COPD is an obstructive disease, which causes a decrease in the FEV of an individual, also the FEV1 falls disproportionately greater than the FVC causing a decreased FEV1/FVC. FEV1/FVC < 0.7= obstructive disease.

Question 2- Answer B- Dullness to percussion

Hyper-resonant sounds are heard when percussing lungs hyper-inflated with air which may occur when an individual is having an acute asthma attack. Dullness to percussion occurs when fluid replaces air containing lung tissues such as with pleural effusions. Exam technique tip here is to notice there are 2 opposite percussion signs given- both hyperresonance and dullness.

Question 3- Answer B- *SABA →Low ICS →LTRA →LABA →MART →Mod ICS →High ICS*

Note that asthma guidance changes frequently and that it is important to check the latest guidance and update your own notes accordingly, the following information has been taken from Nice Guidance last updated Oct 2020. A summary of the stepwise asthma in adults management provided below. https://cks.nice.org.uk/topics/asthma/management/newly-diagnosed-asthma/

Short acting beta 2 agonist (salbutamol) 1st line. If uncontrolled add inhaled corticosteroid (beclomethasone). If uncontrolled add leukotriene receptor antagonist (monteleukast). If uncontrolled add long acting beta agonist (salmeterol). If uncontrolled change ICS and LABA therapy to a maintenance and reliever therapy (MART) regimen which contains both ICS and fast-acting LABA. If uncontrolled consider seeking specialist advice and increase to moderate or high dose inhaled corticosteroid.

SABA →Low ICS →LTRA →LABA →MART →Mod ICS →High ICS

Patients with asthma on a SABA should start taking ICS if: use inhaled SABA >2 times a week +/- asthma symptoms >2 times a week +/- woken at night by asthma sx once weekly or more.

Question 4- Answer A- Adenocarcinoma

Adenocarcinomas (A) are the most common type of lung cancer in non-smokers and are associated with asbestos exposure. Squamous cell carcinomas (E) are strongly associated with cigarette smoking.

Question 5- Answer D- Breast

The breast is not a common site for lung cancer to metastasise to, however the lungs are a common site for breast cancer to metastasise to. Adrenal glands, bone, brain and liver and common sites for lung cancer to metastasise, note that lymph nodes are also a common site for lung cancer to spread to.

Question 6- Answer C- CT pulmonary angiogram

Based on the history of symptoms that sound like a DVT, as well as risk factors like his smoking and suggested long haul flights; it is most likely that he has had a PE.

CTPA's are the gold standard for diagnosing pulmonary embolisms. D-Dimers are useful as a negative result would exclude a PE, but a positive result would not be useful for a diagnosis.

Question 7- Answer D- Mycoplasma pneumonia

Bacteria causing atypical pneumonia include mycoplasma pneumonia (A), Chlamydophila pneumonia and legionella pneumonia. These atypical organisms are not detectable on Gram stain and cannot be cultured using standard methods. Strep pneumonia (C) being the commonest community acquired cause, staph aureus (E) being the commonest hospital acquired cause, haemophilus influenzae (B) commonest cause of pneumonia in COPD patients, klebsiella pneumonia (A) whilst less common is still a 'typical' pneumonia.

Question 8- Answer D- 5

1.Margaret is confused. 2. Urea > 7mmol/L. 3. Rasp rate>30. 4. BP systolic<90. 5. 65+.
This gives Margaret a CURB65 score of 5 and mortality of 15-40%.

Question 9- Answer D- Optic neuritis

The four medications used for treating TB are RIPE (Rifampicin, Isoniazid, Pyrazinamide, Ethambutol). Their side effects are: Rifampicin= red/orange urine ("R-R"), Isoniazid= neuropathy, Pyrazinamide= arthralgia, Ethambutol= optic neuritis ("e-eyes"). Not that nausea is a common side effect of most medications therefore is unlikely to be the single best answer in a side effects question.

Question 10- Answer B- Chromosome 7

Chromosome 6 is affected in hereditary haemochromatosis.
Chromosome 7 is affected in Cystic fibrosis in coding for the CFTR protein causing defective Cl- secretion and Na+ absorption.
Chromosome 13 is affected in Wilson's disease.
Chromosome 14- gene for Alpha 1 antitrypsin located on chromosome 14.
Chromosome 21 (trisomy) causes Down syndrome.

Public Health

Question 11- Answer E- Patient Preference

Apart from patient preference, all other answers are unintentional reasons why someone may not take a medication. A person who has a preference regarding a medication may intend not to take a medication. All other reasons may result in someone avoiding a medication for reasons beyond their control. This question was taken from the drug adherence and concordance lecture.

Question 12- Answer D- Before body fluid exposure

It is not necessary to wash your hands specifically before body fluid exposure, provided you have washed your hands at the other Moments for Hand Hygiene. This question was taken from an Infection Control lecture and from the WHO's 5 Moments for Hand Hygiene.

Question 13- Answer B- Benzathine penicillin

In this case benzathine penicillin is the most appropriate choice for primary syphilis. Azithromycin (A) is the second line treatment. Pregnancy does not affect the drug choice given (Benzathine penicillin is given) but it does affect the dosages. If the patient is penicillin allergic, then azithromycin or doxycycline would be the appropriate choice.

Question 14- Answer C- Hand arm vibration syndrome

Mr Y's symptoms here have been caused by his job. It is apparent that he has Raynaud's syndrome (colour change in fingers white, blue, red) which has a secondary underlying cause. Carpel tunnel syndrome is associated with weakness and tingling, but this is in the median nerve distribution and not "throughout all fingers". Dupuytren's contracture (B) can be occupation related but does not present like this; usually one or more digits become permanently flexed. Repetitive strain injury (D) is more likely linked to office work, rather than using power tools and can cause some tingling, weakness and aching but it would not be associated with Raynaud's. SLE (E) is associated with Raynaud's but it does not typically present for the first time in this demographic of patient, and certainly the patient's use of power tools makes it far more likely here that the underlying diagnosis is Hand arm vibration syndrome (C).

Question 15- Answer B- Hashimoto's disease

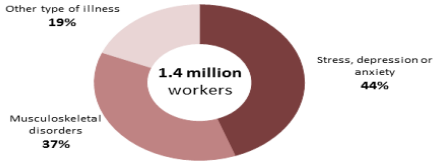
GORD (A), Obstructive sleep apnoea (C), osteoarthritis (D) and pancreatitis (E) are conditions in which those who are more obese have an increased risk of developing. Hashimoto's disease (B) or thyroiditis can cause people to gain weight by reducing the levels of T3/4 circulating in the blood but is caused by an autoimmune process and is not considered a complication of obesity.

Question 16- Answer D- Ciprofloxacin

When a patient presents with suspected meningococcal meningitis, you must contact trace appropriately (although most of this will be done by public health). Ciprofloxacin and rifampicin are the drugs of choice to give for chemoprophylaxis. Amoxicillin (A) is usually given to immunosuppressed or very young/old patients to cover for organisms such as Listeria. Benzylpenicillin (B) is given in primary care if meningitis is suspected. Ceftriaxone (C) is given as the first line treatment for meningococcal meningitis. Clarithromycin (E) is not used usually to treat meningitis.

Question 17- Answer E- Stress, anxiety and depression

2018/19 government statistics (image right). Note that cancer, lung conditions and noise-induced sensorineural hearing loss contribute to the 'other types of disease'.



Question 18- Answer A- proportion of patients who have disease and test positive

The proportion of patients who have the disease and test positive (A)= sensitivity
The proportion of patients who don't have the disease and test negative (B)= specificity.
The proportion of patients who test positive who have the condition (C)= positive predicted value
The proportion of patients who test negative who don't have condition(D)= negative predicted value

Question 19- Answer B- Long term anti-platelet therapy following MI

NHS health check (C), statin use (D) and immunisation programmes (E)are primary prevention as they are there to reduce the initial occurrence of disease. Diabetic eye screening (A) is tertiary prevention as they have the aim to reduce the impact of an ongoing problem and improve quality of life. Antiplatelet therapy after an MI (B) is a secondary prevention intervention used to treat the disease as soon as possible to halt the disease progress and to try and prevent long term problems.

Question 20- Answer E- Prostate screening programme

Prostate screening is a controversial issue, at present the PSA blood test is not considered good enough to be used to accurately determine whether men are at risk of prostate cancer and thus cause men to be investigated unnecessarily. AAA (A), breast (B) and cervical (C) screening programmes and the newborn and infant physical examination are all standard screening programmes in the UK.

Neurology

Question 21- Answer A- Cerebellar Stroke

A stroke involving the cerebellum (A) will present with cardinal symptoms of ataxia, headache, vertigo and vomiting.

CNVII palsy (B) presents with complete paralysis of all the facial muscles on the ipsilateral side. The patient presenting with mouth droop, flattening of nasolabial fold, inability to close eye, and smoothing of the brow on the damaged side.

In postural hypotension (C), patients feel dizzy, lightheaded and may even faint when they got up from a sitting position. These symptoms usually last for a less than a few minutes.

SAH (D) would be indicated If the patient had presented with a sudden onset headache which they described as 10/10 in severity and like a thunderclap. Neck stiffness is another presentation of SAH that is commonly mentioned by patients.

If the symptoms would have resolved within an hour it would suggest a TIA (E) rather than a stroke.

Question 22- Answer B- Order a CT to be done within 1 hr

You first need to determine whether if this is an ischaemic or haemorrhagic stroke. A CT scan would tell you this as you can see presence of blood on a CT scan (white colour).

A) ABCD2 is a risk assessment tool to determine the likelihood of someone having a stroke following from a TIA. The components are Age (>60 years old), BP (>140/90), Clinical features (Unilateral weakness; No weakness with speech disturbances), Diabetes, Duration (more than or less than 60 minutes).

D) Once haemorrhagic stroke is excluded, Pt is started on aspirin 300mg for 2 weeks. After these 2 weeks the patient is started on long-term treatment such as clopidogrel.

E) Alteplase is only given if an ischaemic stroke is confirmed and the patient is still within the 4.5hr time window

Question 23- Answer E- Parkinson's disease

The cardinal triad of symptoms for Parkinson's disease are resting tremor, cogwheel rigidity and bradykinesia. Note that depression is also a symptom of Parkinson that patients don't always mention but is worth remembering.

Question 24- Answer D- Secondary Brain Tumour

Given the time that he has been smoking and that there is a strong family history of cancer, it is safe to say that it's something to do with cancer and his lungs. Most common mets of cancers to the brain are cancers of lung, breast, skin, kidney and bowel.

Question 25- Answer E- Myasthenia Gravis

Fatiguability is a key symptom that patients complain of in myasthenia gravis. Usually the disease process is sped up following an infection. Having an AI condition also increases one's risk of developing other AI conditions. Charcot-Marie-Tooth *disease (B) is a group of inherited conditions that damage the peripheral nerves, it is also known as hereditary motor and sensory neuropathy (HMSN). The most common initial presentation of CMT is distal weakness and atrophy, which manifest with foot drop and pes cavus (high arched feet)*

Question 26- Answer D- Temporal Arteritis

Temporal or Giant Cell arteritis is usually brought upon by change in temperature, shaving, combing hair or eating. Patient usually presents with a sudden onset and treatment tends to be steroids. Temporal biopsy is done within 14 days of starting steroids to confirm a diagnosis alongside bloods that show ESR, CRP, platelets, and ALP to be increased.

A) Cluster headaches usually occur in cyclical patterns called cluster periods. Possible symptoms include severe pain in or around one eye or on one side of your head. There may be tearing, nasal stuffiness and a runny nostril on the affected side of the head.

C) Migraines can cause severe throbbing pain or a pulsing sensation, usually on one side of the head. It is often accompanied by nausea, vomiting, and extreme sensitivity to light and sound.

E) Tension headaches usually present with dull, aching head pain. Sensation of tightness or pressure across your forehead or on the sides and back of your head. Tenderness on your scalp, neck and shoulder muscles.

Question 27- Answer B- C5-T1

The nerve responsible for carpal tunnel syndrome is the median nerve. The median nerve originates from the lateral and medial cords of the brachial plexus, and has contributions from ventral roots of C5-C7 (lateral cord) and C8 and T1 (medial cord).

Question 28- Answer C- 12 months

Patients must be seizure free for 12 months to have license to drive reinstated.

Question 29- Answer B- Generalised tonic-clonic seizure

This is a typical presentation for generalised tonic-clonic seizure. The patient cannot recall anything and has rigid and jerky movements. Eyes are always open and postictal symptoms such as sore tongue (from tongue biting) and confusion are present.

A) Focal seizure frontal lobe presentation usually involves motor features such as posturing or peddling movements of the legs. Jacksonian march maybe seen. Motor arrest as well as subtle behavioural changes are also observed.

C) Myoclonic seizure presentation involves Ptx showing sudden jerk of limb, face, or trunk. The patient maybe suddenly thrown to the ground or have a violently disobedient limb.

D) Secondary generalised seizures start suddenly and the movements can be strong or forceful. This seizure type can also begin with a focal onset impaired awareness seizure. The seizure may begin with an aura or focal onset aware seizure. Usually begins with a tonic then a clonic phase. A person may lose control of their bladder or bowel as the body relaxes.

E) Tonic seizure presentation is usually a sudden stiffness of the limbs.

Question 30- Answer B- Spinal cord compression

Spinal cord compression is a neurological emergency that requires immediate treatment otherwise patients run risk of getting paralysed. Sensory loss is always bilateral. Spinal cord compression can be due to a variety of causes such as disc herniation or congenital stenosis.

Musculoskeletal

Question 31- Answer A- Bone erosions

From the history the patient likely has osteoarthritis (stiffness<1hr) compared to rheumatoid arthritis stiffness >1hr. Features of rheumatoid arthritis on XR are 'LESS'- loss of joint space, erosions (A), soft tissue swelling, soft bones (osteopenia)

The other options represent features of osteoarthritis on XR are 'LOSS'- loss of joint space (B), osteophyte formation (C), subchondral sclerosis (E), subchondral cysts(D).

Question 32- Answer A- Needle-shaped crystals, negative birefringence under polarised light

Gout findings are (A) needle-shaped crystals, negative birefringence under polarised light. "N+N". Pseudogout findings are (C) rhomboid-shaped crystals, positive birefringence under polarised light.

Question 33- Answer C- Non-selective inhibitor of COX 1 and COX 2 enzymes

(C)Non-selective inhibitors of COX 1 and COX 2 enzymes is the mode of action for NSAIDS.

(B)Bisphosphonates e.g. alendronate inhibit osteoclast-mediated bone resorption.

(A) Methotrexate inhibits dihydrofolate reductase enzyme (this enzyme normally converts folic acid to FH4 which is required for DNA and protein synthesis).

Question 34- Answer E- Septic arthritis

Septic arthritis is caused by infection, it is not associated with HLA-B27. IBD (A), JIA (B), Psoriatic (C) and Reactive (D) are all types of seronegative spondyloarthropathies associated with HLA-B27.

Question 35- Answer A- Bouchard nodes

The vignette points towards a diagnosis of RA- more common in females, patient is relatively young, joint stiffness >1hr, pain eases with use.

Hand signs in RA include Boutonniere deformity of the thumb (B), swan neck deformity (C), symmetrical swollen joints (D), ulnar deviation (E).

Hand signs in OA include- Bouchard nodes (C), Heberden nodes, squaring of wrist

Question 36- Answer E- T ≤ -2.5

Normal(B) =-1<T. Osteopenia (C) = T score between -1 and -2.5. Osteoporosis (E) = T score ≤2.5

Question 37- Answer D- Reactive Arthritis

The history gives a triad of symptoms which are classical of reactive arthritis (D) (conjunctivitis, urethritis, arthritis- often remembered as "can't see, can't pee, can't climb a tree")

Septic arthritis (E) is an important differential you would want to exclude but the single best answer is reactive arthritis

Question 38- Answer D- Staphylococcus aureus

The organism is purple therefore positive on gram stain. This eliminates E.coli (A), haemophilus influenzae (B), and Salmonella (C) which are all gram-negative, leaving staph aureus (D) or strep pneumoniae (E). Both are circular (cocci), so this does not help us distinguish. However, staph aureus is catalase positive whereas strep pneumonia is catalase negative therefore the answer is staph aureus (D)

A) Escherichia coli- Gram -ve bacilli, aerobic, simple growth requirements, MacConkey pink (lactose fermenter)
B) Haemophilus influenzae- Gram -ve bacilli, aerobic, fastidious growth requirements
C) Salmonella- Gram -ve bacilli, aerobic, simple growth requirements, MacConkey pale (non-lactose fermenter)
D) Staphylococcus aureus- Gram +ve cocci, catalase +ve, coagulase +ve
E) Streptococcus pneumoniae- Gram +ve cocci, catalase -ve, alpha haemolytic

Question 39- Answer B- FRAX

A) $ABCD_2$=risk of stroke following TIA
B) FRAX= risk of fracture
C) Glasgow-Blatchford score= Upper GI bleeding tool
D) QRisk3 score= CV event risk
E) Well's score – risk of DVT/PE (note there are different Well's scores for each)

Question 40- Answer A- Allopurinol

Colchicine (B) is used to manage acute attacks of gout, allopurinol (A) (xanthine-oxidase inhibitor) is used longer term for prophylaxis against gout. Diclofenac (C) and ibuprofen (E) are NSAIDs which may be used for pain relief. Hydroxychloroquine (D) is a DMARD not used in the treatment of gout.

Liver and Friends

Question 41- Answer D- Gallstones

A clinical picture of dark urine and pale stool together with her markedly raised ALP suggests an obstructive cause of jaundice. Her ALT and AST are only mildly raised in comparison. You would expect her ALT and AST to be markedly raised in Alcoholic hepatitis (A), AI hepatitis (B) and Viral Hepatitis (E) due to hepatocellular damage. The absence of weight loss makes pancreatic cancer (C) less likely.

Question 42- Answer E- Raised Mean Cell Volume

Chronic alcoholism/chronic liver disease causes macrocytosis which is show through a raised MCV (E). Other causes of macrocytosis are vitamin B12 and folic acid deficiency and hypothyroidism. MCH is a measure of the haemoglobin present in RBCs, in iron deficiency anaemia/thalassaemia MCH is low, in vit B12/folate deficiency MCH is high.

Question 43- Answer A- Hepatitis A

Hepatitis A is the most common cause of hepatitis in travellers. It is spread mainly through the faecal-oral route. The incubation period is 14-28 days. Unlike hepatitis B and C, it does not cause chronic liver disease. Treatment is usually supportive.

Question 44- Answer E- Urgent referral to secondary care

Men with an inguinal hernia which is symptomatic and irreducible or partially irreducible should be referred urgently to secondary care as it has an increased risk of strangulation. If there are signs of strangulation (pain out of proportion to clinical features, tender, irreducible hernia, erythematous overlying skin, may be accompanied with signs of sepsis), the patient should be referred immediately to secondary care. If the hernia is reducible and the patient is symptomatic, routine referral to secondary care is warranted.

Question 45- Answer A- acute hepatitis B infection

Surface antigens (HBsAg)- indicate active infection or just been vaccinated
E antigen (HBeAg)- marker of viral replication, implies high infectivity
Core antibody (HBcAb)- implies past or current infection
Surface antibody (HBsAb)- implies vaccination or past or current infection
Vaccinations= involve injection surface antigens into people. Therefore, someone who has been vaccinated will have positive surface antibodies (developed against the surface antigen they have been exposed to in the vaccine)
Infections= infections expose patients to both the surface and the core antigens of the hep B virus. Therefore, if the patient has core antibodies they either currently have an infection or they have had an infection previously.
Patient has positive surface antigen meaning they currently have an infection (this rules out C- immunity following previous infection, D-immunity following previous vaccination and E- no infection). Both acute and chronic infection would have positive surface antigen, positive e antigen and positive core antibody. Hepatitis is defined as acute if <6 months or chronic if >6 months therefore this patient's case is acute infection (A).

Question 46- Answer D- Malignancy

Acute pancreatitis (A), heart failure (B), hypoalbuminaemia (C), malignancy (D) and meigs' syndrome (E) are all causes of ascites- described in this case as abdominal distension, shifting dullness, fluid thrill. The history of weight loss, anaemia and an elevated CA 19-9 make malignancy (pancreatic cancer) most likely. Meigs' syndrome (E) is a triad of benign ovarian tumour + ascites + pleural effusion.

Question 47- Answer B- Alcohol

This lady most likely has acute cholecystitis due to gallstones. The typical gallstones patient is the 4Fs- 4Fs- fat (D), female (C), forty (A), fertile. COCP (E) is also a risk factor for gallstone formation. Alcohol (B) is not. Remember not to confuse these with the risk factors for acute pancreatitis (GETSMASHED)

Question 48- Answer C- Dupuytren contracture

The man has Dupuytren contracture, which is a fibroproliferative disorder affecting the palmar fascia mainly of the 4th and 5th fingers. Risk factors include alcohol abuse and liver cirrhosis. This man probably has alcoholic liver disease.
Asterixis (A) is the flapping movement of the hand seen when the arms are placed in an outstretched position with the wrists extended. Clubbing is a sign seen in the fingernails in a number of diseases including IPF, CA, Crohn's. Palmar erythema (D) is the flushed appearance of the skin and can be a sign of liver disease. Xanthelasmas (E) are localised accumulation of lipid deposits on the eyelids.

Question 49- Answer E- Spontaneous bacterial peritonitis

The patient has likely developed ascites secondary to liver cirrhosis, however given the patient has a fever the most likely diagnosis is spontaneous bacterial peritonitis. SBP usually presents with severe abdominal pain, worsening ascites, fever, vomiting and rigors. The most common causative organisms are E.coli, Klebsiella and Streptococcus pneumoniae. A perforated appendix (D) can also lead to ascites, but you would expect some clues in the history which suggest appendicitis initially such as abdominal pain migrating to the right iliac fossa pain. Not that the patient is pyrexial and therefore the likely diagnosis is SBP

Question 50- Answer E- US of gallbladder

This lady has biliary colic due to gallstones- intermittent RUQ pain radiating to back. According to NICE, people with suspected gallstone disease should be offered liver function tests and ultrasound. MRCP is considered if the ultrasound has not detected common bile duct stones but the bile duct is dilated and/or liver function test results are abnormal.

Haematology

Question 51- Answer A- AIDS infection

Neutrophilia is a high neutrophil count. This often occurs in response to infection, inflammation or trauma. In contrast, neutropenia is a low neutrophil count and is often a result of immunosuppression by particular drugs and cancers. Despite AIDS (A) being an infection, it targets the immune system and can cause life-threatening neutropenia. In contrast, despite CML (C) being a cancer, it causes proliferation of neutrophils (as well as other cells such as basophils and eosinophils) and so is a cause of neutrophilia. Appendicitis (B), MI (D) and Strep pyogenes (E) infections all increase neutrophil count as the body responds to the acute event.

Question 52- Answer C- Hodgkin's Lymphoma

The Reed Sternberg cell is an abnormal lymphocyte which is classic of Hodgkin's lymphoma. Other buzz words for haematological malignancies include the Philadelphia chromosome in CML and the Bence Jones Protein in Myeloma.

Question 53- Answer E- Vitamin B12 injections

Pauline is likely suffering from Pernicious Anaemia, an autoimmune condition that prevent the uptake of vitamin B12/folate in the bowel. It is most commonly diagnosed in women around the age of 60. As well as 'classic' anaemia symptoms, pernicious anaemia can also cause peripheral neuropathy (hence the pins and needles), lemon tinged skin (due to a mix of mild jaundice and pallor), mouth ulcers, depression and dementia. Vitamin B12 injections can replace that which the body cannot absorb.

Blood transfusions (A) and chemotherapy (B) are more commonly used in sickle cell anaemia, whilst ferrous sulphate (C) is used in iron deficiency anaemia. Venesection is not a treatment for anaemia but for polycythaemia (D).

Question 54- Answer D- Iron deficiency

Iron deficiency anaemia is a hypochromic, microcytic anaemia. The other options: B12/folate deficiency (A), bone marrow failure (B), hypothyroidism (C) and liver disease (E) all cause macrocytic anaemia.

Question 55- Answer A- Acute Lymphoblastic Leukaemia (ALL)

ALL is more commonly found in children and is associated with Down's syndrome (note the facies listed in the question- small chin, slanted eyes). It usually presents with anaemia, bleeding and infection alongside hepatosplenomegaly and peripheral lymphadenopathy. Lucy is suffering from two additional complications: CNS involvement causing facial nerve palsy (drooping), and Superior Vena Cava obstruction causing red face and dilated chest veins. These complications are rare but point towards a diagnosis of ALL.

Question 56- Answer D- Refer urgently for colonoscopy

Mary is displaying red flag symptoms for bowel cancer, a concerning cause of iron deficiency anaemia in post-menopausal women and all men. An urgent (2 week wait) colonoscopy (D)is needed to rule out malignancy.

Ferrous sulphate (A) and dietary advice (B) is appropriate management for pre-menopausal women with iron deficiency anaemia and no red flags. A referral to gynaecology€ is appropriate for women with anaemia and unresponsive menorrhagia or post-menopausal bleeding.

Question 57- Answer D- Factor 9

Haemophilia B is an inherited condition in which Factor 9 is deficient, causing easy bruising and bleeding. It is less common that Haemophilia A, in which Factor 8 is deficient (memory trick: A comes before B, and 8 comes before 9, so A=8 and B=9)

Question 58- Answer D- Secondary polycythaemia

Polycythaemia is an increase in RBC production. Primary polycythaemia (rubra vera) (C) is an issue with RBC overproduction, whereas secondary polycythaemia has an underlying cause, commonly chronic hypoxia as a result of lung disease, smoking, or low FiO_2. In this case, we know Bill has a significant smoking history and COPD, making secondary polycythaemia more likely than primary.

DIC (A) is a condition where many small clots form throughout the body, causing bleeding as clotting factors are used up. There is usually a distinct trigger such as sepsis, major surgery or trauma, making this less likely in Bill's situation.

Question 59- Answer E- Parvovirus B19

Parvovirus B19 causes Fifth disease, a usually mild rash illness. However, in people with sickle cell, it can precipitate a painful crisis.

Anti-malarial medications (A) containing quinine and green beans (B) are known to precipitate crises in people with G6PD.

Both the Hepatitis B (C) and influencza vaccine (D) are recommended by NICE for people with sickle cell disease due to an increased risk of complications from infections and the increased likelihood of receiving a blood transfusion in their lifetime.

Question 60- Answer B- Calcium gluconate

Robert has multiple myeloma causing back pain, anaemia, AKI and hypercalcaemia of malignancy. The presentation of myeloma can be remembered using CRAB – calcium, renal impairment, anaemia, bone lesions. Calcium gluconate (B) is the treatment for hypocalcaemia and so is unlikely to be prescribed in this context. Myeloma is incurable but often managed with a combination of chemotherapy, steroids (C) and thalidomide (E). Supplementary treatments include bisphosphonates(A) and radiotherapy (D) to address bony pain.

Genitourinary

Question 61- Answer C- Non-Contrast CT KUB

Severe intermittent abdominal pain which is present on the side and in testicles (Loin to groin) is indicative of kidney stones. The diagnostic investigation for this is a non-contrast CT KUB (kidney ureter bladder)- note that stones <5mm are likely to pass by themselves and therefore do not need further management other than analgesia.

Amylase (A) is a marker which is raised in pancreatic damage e.g. pancreatitis or pancreatic cancer. Pancreas pains are generally epigastric and 'bore' through to the back.

Flexible cystoscopy (B) would be used if you suspected bladder cancer- a transitional cell carcinoma. This presents with painless haematuria and is strongly associated with smoking and exposure to dyes.

Nucleic acid amplification test (D) is used to test the urine for STIs e.g. chlamydia or gonorrhoea- this investigation would be warranted if the history indicated discharge, fever, testicular pain +/- swelling and likely give a hint at a sexual history e.g. change of partner.

PSA (E) is a marker for the prostate. It is raised in BPH / prostate CA / prostatitis but is not diagnostic of a condition in itself as it can be raised by a number of different conditions and can even be raised following prostate irritation following a rectal examination.

Question 62- Answer D- eGFR <60mls/min/1.73m^2 >3 months

eGFR is used as a measure of kidney function. Normal kidney function should be >90 (E).
Diagnosis of CKD is made when you have 2 measurements >3 months apart with an eGFR <60 (D).
Note that (A) eGFR <15 indicates end stage renal failure, these patients require dialysis and should await renal transplant.

Question 63- Answer E- Postural hypotension

Alpha 1 adrenoceptors are found in blood vessels and the urinary tract (bladder neck and prostate). As a result Tamsulosin, an alpha blocker, is indicated in BPH to relax the muscles around the bladder neck/prostate to allow better urinary flow and in resistant hypertension as it causes vasodilation. Therefore the appropriate side effect to make patients aware of is the risk of postural hypotension- a risk of blood pressure falling when going from sitting to standing. Many drugs can cause the other side effects but to give an example of each:
Agranulocytosis (A) is a potential SE of carbimazole. Dry cough (B) is a potential side effect of ACE inhibitors. Hypoglycaemia (C) is a potential SE of diabetes medications e.g. metformin/insulin. Ototoxicity (D) (toxicity to the bones of ear, ear=oto)- can be a potential side effect of the antibiotic gentamicin.

Question 64- Answer A- Clear Cell

Clear cell (A) and papillary (C) are both types of renal cell carcinoma. Clear cell is the commonest, accounting for ~75% of cases with papillary (C) accounting for 10-15%.

Large cell (B) carcinomas account for 10-15% of lung cancers.

Smudge cells (D) are associated with chronic lymphocytic leukaemia.

Squamous cell (E) carcinoma is the second most common type of skin cancer.

Question 65- Answer B- GnRH agonist

A) 5-alpha reductase inhibitor e.g. Finasteride, 2nd line tx for BPH
B) GnRH= Goserelin- used in the treatment of prostate cancer.
C) Alpha blocker e.g. Tamsulosin, 1st line tx for BPH
D) Anticholinergic e.g. Oxybutinin, 1st line tx for overactive bladder
E) Aromatase inhibitor e.g. Anastrozole, tx of breast CA post-menopausal women / gynaecomastia in men

Question 66- Answer D- IV furosemide

Management of acute pulmonary oedema includes high flow oxygen, IV furosemide (D), IV morphine / GTN notifying your senior and an urgent CXR. You should consider escalating for CPAP (A) depending on response to the above management. Salbutamol nebs (E) are relevant for opening the airways and are used in the treatment of acute asthma attacks.

Question 67- Answer C- Occupational exposure to asbestos

Whilst exposure to asbestos is a significant risk factor for mesothelioma (cancer of the pleura), it is not associated with erectile dysfunction. There are a number of risk factors for erectile dysfunction. Psychological causes include stress, depression and poor relationship with partner (E). Physical causes include cardiovascular disease (B), diabetes, trauma. Lifestyle causes include smoking (A), alcohol, obesity. Radical prostatectomy (D) is a common cause.

Question 68- Answer D- Low RBC secretion of erythropoietin

The kidney has a multitude of functions including clearing metabolic waste, maintaining salt/water balance, maintaining pH, converting vit D into its active form and producing Epo (D). Secretion of insulin (A) is a role of the pancreas. Secretion of parathyroid hormone (B) is a role of the parathyroid gland. Secretion of ADH (C) is a role of the posterior pituitary gland. Detoxification (E) is a role of the liver.

Question 69- Answer B- Bed 2 Emily, 73-year-old female with psychosis

A UTI is deemed complicated in- a man (A-Jim, C-John), a pregnant lady (E-Allison), a child (D- Lucy), someone immunocompromised (likely D-lucy due to CF), recurrent UTIs (C-Johnathan), structural abnormality (A-Jim). By contrast, Bed 2 Emily does not hit any of this criteria and whilst her psychosis and delirium may present challenges in treating her- noting that lots of anti-psychotics have drug interactions and that these patients can often be non-compliant with treatment- her UTI is uncomplicated.

Question 70- Answer B- Autosomal Dominant Polycystic Kidney Disease

ADPKD is associated with formation of berry aneurysms- the most significant consequence of this is that they rupture and cause a sub-arachnoid haemorrhage. This presents with sudden onset severe "thunderclap" headache, star sign on CT head, requires neurosurgical clipping.

Endocrinology

Question 71- Answer C- Levothyroxine

(C)Levothyroxine is the first line treatment for primary hypothyroidism. This is a typical presentation of thyroid disease; a middle-aged woman with lethargy, cold intolerance, menorrhagia, depressive symptoms (poor eye contact, mental slowness). Others include dry hair & skin, bradycardia and slow relaxing reflexes. Levothyroxine synthetic thyroid hormone that is taken daily (lifetime therapy.
(A) Beta-blockers (bisoprolol, propranolol etc.) reduce the rate and force of contraction of the heart via the beta-1 muscarinic receptors found in the myocardium. Beta-2 receptors are in the smooth muscle of blood vessels and airways (hence the contraindication in asthma patients as they can cause restriction of the airways). These are used for symptomatic relief in hyperthyroidism.
(B) Carbimazole is a treatment for hyperthyroidism (most commonly Graves' disease). It blocks thyroid hormone synthesis.
(D) Prednisolone is a corticosteroid and is not used in hyper/hypothyroidism.
(E) Thyroidectomy is a third line treatment after radioiodine ablation and carbimazole for hyperthyroidism.

Question 72- Answer C- Low TSH, raised T3 & T4

Graves' disease is primary hyperthyroidism. The thyroid gland overproduces thyroid hormones without stimulation from the pituitary therefore elevated levels of T3&T4 causing negative feedback to the hypothalamus and pituitary inhibiting the production of TRH and TSH respectively.
Raised TSH and low T3&T4 would be found in primary hypothyroidism.

Question 73- Answer C- Increased weight

All of the above are features of Graves' disease apart from increased weight. Weight commonly decreases in hyperthyroidism despite increased appetite.

Question 74- Answer B- Oral glucose tolerance test

This patient has acromegaly. She has amenorrhoea, decreased libido and acral enlargement (ring doesn't fit) and excessive sweating. Acromegaly is caused by increased secretion of growth hormone (GH) from the pituitary gland due to a pituitary tumour or hyperplasia. The diagnostic test for acromegaly is a glucose tolerance test (A). In normal physiology glucose suppresses GH, but it remains elevated in patients with acromegaly.
(A) MRI brain may show a pituitary tumour / hyperplasia but is not diagnostic of acromegaly as it does not demonstrate raised growth hormone levels. (you can get pituitary tumours that do not secrete GH i.e.. Prolactinoma) This would identify underlying pathology but is not the initial investigation.
(C)Random blood glucose will be raised but is not diagnostic.
(D)Serum cortisol is used in the diagnosis of adrenal abnormalities such as Cushing's and Addison's.
(E) TFTs may be abnormal as the pituitary gland is affected but they are not implicated in acromegaly. Note that the presentation is similar to hypothyroidism however a key distinction here is the hand enlargement and excessive sweating. Sweating is a feature of hyperthyroidism not hypothyroidism so this would not fit.

Question 75- Answer A- Corticotropin releasing hormone (CRH)

The hypothalamus secretes hormones that trigger the anterior pituitary gland to secrete hormones into the blood stream, initiating response at a desired tissue.
CRH (A) is released by the hypothalamus to simulate adrenocorticotropic (ACTH) release which acts on the adrenal glands to increase production of adrenocorticoids (cortisol, aldosterone and testosterone).
FSH (B) and GH (C) are secreted following stimulation by GnRH (gonadotrophin releasing hormone), prolactin (D) is secreted following stimulation by prolactin releasing hormone and TSH (E) after TRH.

Question 76- Answer D- Raised serum PTH, hypocalcamia, hypophosphataemia

This is secondary hyperparathyroidism. This patient has the classical symptoms 'bones, stones, groans, moans, thrones' bone pain, renal stones, abdo pain, polyuria and depression. However, they have compensatory hypertrophy of the parathyroid in response to CKD and low vitamin D. Secondary hyperparathyroidism has raised PTH but low calcium and phosphate on investigation. It is treated by correcting the hypocalcaemia.
Primary hyperparathyroidism (parathyroid adenoma) would show raised PTH, raised Ca and low phosphate (C). This is treated by surgical removal of the adenoma
Tertiary hyperparathyroidism (autonomous hyperplasia) would show raised PTH, raised Ca and raised phosphate (E) and require parathyroidectomy.

Question 77- Answer D- Parathyroidectomy

Severe hypercalcaemia can present with dehydration, confusion and poses a risk of cardiac arrest and death. The immediate management is IV fluids (rehydration), bisphosphonates (inhibit osteoclasts - prevent bone resorption therefore reduce Ca in blood as bone not broken down), measurement of U&E/Ca, and prednisolone. Parathyroidectomy is not immediate management. It may make up subsequent management once the patient is stable.

Question 78- Answer C- Hyperthyroid crisis

This is a presentation of hyperthyroid crisis (C). The key clue is the withdrawal from carbimazole, the treatment for hyperthyroidism (Graves' disease). Cocaine intoxication (A) presents in a very similar way, but the history is suggestive of previous hyperthyroid diagnosis.
Conn's syndrome (B) is primary hyperaldosteronism due to an adrenal adenoma. It presents with hypertension, hyperkalaemia and metabolic acidosis. Aldosterone antagonists are used to treat the patient until definitive surgery. !hyperkalaemia can cause arrhythmia and death and must be monitored and corrected.
Myxoedema coma (E) is a hypothyroid emergency. It can present with hypothyroid symptoms relating to any body system but commonly affects mental state and patients are hypothermic, hypotensive and bradycardic. Immediate thyroid hormone replacement is needed.

Question 79- Answer C- Hypertension

All of these apart from hypertension are symptoms of Addison's disease, it causes hypotension.
Addison's: adrenal insufficiency = low levels of cortisol and aldosterone, treated with hydrocortisone and fludrocortisone replacement / treat cause).
'tanned, tired, tearful, thin, throwing up'

Question 80- Answer E- Thickened skin

Long term steroid use causes skin thinning and easy bruising therefore (E) thickened skin is incorrect. Diabetes Mellitus (A), immunosuppression (B), osteoporosis (C) and proximal muscle weakness (D) are all potential complications of long-term steroid use.

Cardiovascular

Question 81- Answer A- Wide QRS, short PR, delta wave

Wolf-Parkinson-white syndrome is a type of supraventricular tachycardia (SVT) caused when by an accessory pathway causing a re-entrant loop. The ECG findings are a wide QRS, short PR and a classical delta wave (slurred upstroke to the QRS).

Question 82- Answer A- Atrioventricular re-entry tachycardia

Supraventricular tachycardias are caused by the electrical signal of depolarisation re-entering the atria from the ventricles. There are 3 main types of SVTs: atrioventricular nodal re-entrant tachycardia (AVNRT), atrioventricular re-entrant tachycardia (AVRT) or atrial tachycardia. AVNRT is when re-entry point is back through atrioventricular node, AVRT is when re-entry point is an accessory pathway (e.g. in WPW) and atrial tachycardia is where electrical signal originates in atria somewhere other than sinoatrial node (not technically caused by re-entering from ventricles but instead abnormally generated electrical activity in atria).

Question 83- Answer D- 0.12-0.20s

The limits of normal for a P-R interval are 0.12-0.20s. PR changes: Prolonged PR interval is found in heart block, shortened PR interval found in WPW, PR depression found in pericarditis. 0.08-0.12s (B) is the normal range for QRS. Wide QRS found in R/L bundle branch block, hyperkalaemia, WPW, ventricular rhythm, tricyclic antidepressant poisoning.
0.40-0.44s (D) is the normal range for QTc.

Question 84-Answer B- HASBLED

(B) HASBLED is used to calculate risk of bleeding for patients on anticoagulants.
(A)CHaDS2VaSc is used to determine likelihood of stroke in patients with AF. ABCD2 (C) is used to calculate the risk of stroke following suspected TIA. Wells (D) is used to calculate risk of DVT or PE- note there are 2 different risk scores depending on which one. QRisk (E) is used to calculate the risk of a cardiovascular event in next 10 years. Useful tip- download MedCalc app for all risk scores.

Question 85- Answer B- Cardiothoracic ratio <0.5

Patients in HF have ABCDE signs on CXR. A-alveolar oedema, B- Kerley B lines, C-cardiomegaly, D-dilated pulmonary vessels- E-pleural effusion. In normal patients the heart should take up <50% of the thoracic width, if it takes up >50% then this is cardiomegaly. Hence the correct answer here is B- in heart failure the cardiothoracic ration would be greater than 0.5 not less than.

Question 86- Answer D- B blocker and ACEi

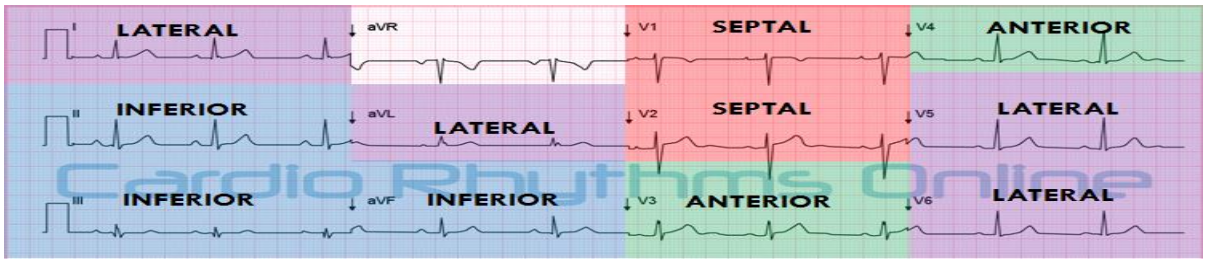
ACE- and B blockers are proven to improve prognosis in heart failure. Diuretics are useful in that they provide symptomatic relief but do not improve survival. Always important to start low, titrate slowly and start the ace and b blocker at different times.

Question 87- Answer A- Ascending loop of Henle

Furosemide is a loop direct that inhibits the Na+/K+/2Cl- cotransporter channel on the ascending limb of the loop of Henle.

Potassium-sparing diuretics e.g. amiloride act on distal convoluted tubule (C) inhibiting ENaC channels. Thiazide-like diuretics e.g. Bendroflumethiazide inhibit Na+Cl- cotransporter channels in the distal convoluted tubule (C).

Question 88- Answer A- Anterolateral



Question 89- Answer D- Pulmonary oedema secondary to mitral regurgitation

Acute mitral regurg following MI occurs when territories suppling the papillary muscle or septum are affected causing them to rupture leading to valve incompetence. The murmur associated with mitral regurg is pansystolic- this is heard at the apex and may radiate to the axilla. Acute and severe mitral regurg can cause acute pulmonary oedema leading to breathlessness.

Other complications of MI are remembered by mnemonic DARTH VADER- Death, Arrhythmias, Rupture (ventricular septum/papillary muscles), Tamponade, Heart failure (acute/chronic), Valve disease, Aneurysm of ventricle, Dressler's syndrome, thromboEmbolism, Recurrence/mitral Regurg.

Question 90- Answer C- P2Y12 inhibitor

Clopidogrel is an antiplatelet that prevents platelet aggregation by binding the P2Y12 receptor. COX inhibitors (A) are NSAIDS. HMG coA reductase inhibitors (B) are statins, Phosphodiesterase 5 inhibitors (D) are sildenafil, Vitamin K antagonists (E) are warfarin.

Gastrointestinal

Question 91- Answer D- Oesophageal Cancer

Barrett's Oesophagus is a prominent risk factor for cancer and would be seen on endoscopy [make sure you know the histology]. The dysphagia history of difficulty swallowing solid-> liquids is a red flag due to extensive tumour growth, compared to achalasia, which is characterised by difficulty swallowing both solids and liquids from the start + regurgitation.

Question 92- Answer E- Villous Atrophy

This lady is suffering from coeliac disease, which is suggested by the diarrhoea, abdo pain and malabsorption. The malabsorption is manifested by the weight loss and macrocytic anaemia due to Folate/B12 deficiency. Two other features of coeliac disease seen on endoscopy will be crypt hyperplasia and lymphocytic infiltration.

A)C)D) Crohn's has NON-caseating transmural inflammation in skip lesions

B) UC has crypt abscesses

Question 93- Answer A- Angular Stomatitis

Angular stomatitis is a sign of iron-deficiency anaemia. The other options are all extraintestinal symptoms of UC.

E) Pyoderma gangrenosum is a rare, inflammatory skin disease where painful pustules or nodules become ulcers that progressively grow.

Question 94- Answer E- Urea Breath Test

The first-line test for Helicobacter pylori is the 13C Urea Breath Test. The other options are all possible investigations for peptic ulcer disease. Another option would be the stool antigen test but it is not included as one of the options. The endoscopy is the most accurate test but it is not first-line as it is invasive.

Question 95- Answer D- Lansoprazole

This lady has symptoms of GORD. She has a chronic cough due to acid reflux and is also suffering from heartburn. A proton pump inhibitor such as Lansoprazole would be prescribed to reduce acid production. Ranitidine is a H2 receptor blocker which is prescribed if symptoms are refractory.

Question 96- Answer B- Colonoscopy

This man has suspected colorectal cancer. The red flags of tenesmus, rectal bleeding and weight loss point towards this as well as his age. The gold standard investigation is a colonoscopy to assess for a tumour.

Question 97- Answer A- Admit to Hospital

Severe UC according to Truelove and Witt's criteria = more than 6 stools passed in day and 1 of : HR>90, Temp>37.5, Hb<10.5, ESR>30mmol/L

Patient is therefore suffering from severe flare up of UC and should be admitted to hospital for IV steroids. The other options are management for mild-moderate UC.

Question 98- Answer B- Crohn's Disease

This lady is suffering from Crohn's Disease. Cobble stoning (broad linear, transverse and longitudinal ulcerations with inflamed mucosa surface) and skip lesions are common features seen on colonoscopy due to the patchy distribution of ulcers and inflammation in the mucosa. Smoking is also a risk factor for CD whereas it is protective in UC.

D) lynch syndrome- a syndrome of genetic predisposition to non-polyposis colorectal cancer.

Question 99- Answer C- Loperamide

This lady is suffering from Irritable Bowel Syndrome, as seen by the change in bowel habit + bloating/discomfort relieved by defecation + normal blood tests. An anti-motility agent like Loperamide would be useful for her ongoing diarrhoea.

Question 100- Answer E- Vitamin B12

Intrinsic factor is a protein secreted by the stomach that joins to vitamin B12 and moves to through the small intestine to the terminal ileum where it is absorbed. Following the surgery, the patient no longer has a terminal ileum to absorb the intrinsic factor-b12 complex. Therefore, they will require Vitamin B12 supplements (A). They are not deficient in intrinsic factor as their stomach is still functioning normally (B).

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I hope you found the Mock useful! Thanks for taking part!

Andrew Maud
PTS Assessment Officer 2020-21