

# PTS 2a Mock SBA Series 2020

## *Paper 2- [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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## Paper 2- Topics Assessed

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<b>Gastrointestinal (I)</b> 11. IBS- diagnosis 12. Mallory Weiss tear- diagnosis 13. GORD- treatment 14. Peptic ulcers- causes 15. Small bowel obstruction- diagnosis 16. Gastritis- management 17. GORD- risk factors 18. Large Bowel Obstruction- investigations 19. GORD- complications 20. Duodenal ulcer	<b>ICS- Pathology</b> 51. Acute inflammation 52. Cell regeneration 53. Hyperplasia 54. Naming neoplasms 55. Acute inflammation cells 56. Acute inflammation outcomes 57. Granuloma definition 58. Atherosclerosis 59. Barret's oesophagus 60. Cancer metastasis	<b>Respiratory</b> 91. COPD infections 92. COPD exacerbations- management 93. Asthma- assessing severity 94. Respiratory Pharmacology 95. Lung Cancer- types 96. Asbestos and lung disease 97. Differentials for chest pain/ SOB 98. Pulmonary Embolism- risk factors 99. CURB65 100. Haemoptysis- causes
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## Cardiovascular

### **Question 1- Answer E- Family History**

The CHADS VASc score is used to calculate the stroke risk and subsequently anticoagulation need in patients with Atrial Fibrillation. CHADS-VASc stands for Congestive Heart Failure // Hypertension // Age (75+=2) // Diabetes Stroke/ TIA/ Thromboembolism Vascular disease // Age (65-74) // Sex category (female=1)

### **Question 2- Answer C- Irregularly Irregular**

- (A) Absent= asystole/death
- (B) Collapsing= aortic regurgitation,
- (C) Irregularly irregular= atrial fibrillation.
- (D) Pulsus paradox= BP drops significantly during inspiration, seen in severe Asthma, COPD, blood loss and cardiac conditions.
- (E) Radio-radial delay= pulse is significantly stronger in one arm than the other and is seen in coarctation of the aorta.

### **Question 3- Answer B- Aortic Stenosis**

- (A) Aortic regurgitation produces an early diastolic decrescendo murmur (and a collapsing pulse)
- (B) Aortic stenosis is the correct answer as it produces an ejection systolic crescendo decrescendo murmur (and a slow rising, narrow pulse pressure), heard loudest on expiration.
- (C) Mitral regurgitation produces an apical pansystolic murmur.
- (D) Mitral stenosis produces an apical mid diastolic rumble.
- (E) Pulmonary stenosis produces an ejection systolic murmur heard loudest on inspiration.

### **Question 4- Answer E- Shortness of breath, fatigue, ankle oedema**

The three cardinal signs of heart failure are shortness of breath, fatigue and ankle oedema. Patients often experience orthopnoea (dyspnoea when lying flat) and also paroxysmal episodic nocturnal breathing (stopping breathing in your sleep). Other signs include cold peripheries, raised JVP, hypotension, cyanosis, oedema and increased weight. On examination patients can have 3<sup>rd</sup> and 4<sup>th</sup> heart sounds, displaced apex beat, murmurs and bibasal crackles.

### **Question 5- Answer A- Amlodipine prescription**

The first line treatment for a patient with hypertension who is over 55 or is of afrocaribbean descent is a calcium channel blocker. Amlodipine is an example of this. If the man was under 55, he should be considered for an ACE inhibitor such as ramipril or an ARB (angiotensin receptor blocker) such as Candesartan.

**Question 6- Answer B- R wave in V1 and Slurred S wave in V6**

*R wave resembles an M // Slurred S wave resembled a W.*

*Use the acronyms MARROW and WILLIAM to help you remember which is which.*

- *MARROW 'RR'= Right bundle branch block. The first letter is M so lead 1 has a complex resembling an M (R wave) and the 6<sup>th</sup> letter is W so lead 6 has a complex resembling a W (Slurred S wave).*
- *WILLIAM 'LL'= Left Bundle Branch Block. The first letter is W so lead 1 has a complex resembling a W (Slurred S wave) and as the 6<sup>th</sup> letter is M lead 6 has a complex resembling an M (R wave). This is the opposite of RBBB.*

*Hence: (A) R wave in V1 and Slurred S wave in V6= RBBB. (B) R wave in V6 and slurred S wave in V1= LBBB. (C) Wide QRS and abnormal pattern= Complete heart block.*

**Question 7- Answer E- Pink**

*The '6 Ps of critical limb ischaemia' are: Pain, Pallor, Paralysis, Paralysis, Paraesthesia, Perishingly cold and pulselessness. The limb would be pale not pink.*

**Question 8- Answer A- Atrial Septal Defect**

*The 4 key features of tetralogy of fallow are ventricular septal defect, pulmonary stenosis, hypertrophy of the right ventricle and overriding aorta. I find it helpful to think of the VSD overloading the already narrow/stenosed pulmonary outflow track and this is why you get the hypertrophy of the right ventricle.*

**Question 9- Answer C- 145/95**

*Clinic Readings: Stage 1= >140/90. Stage 2= >160/100. Severe HTN= >180/110*

*Ambulatory readings (C) 145/95= Stage 1 HTN. (D) 165/105 =Stage 2 HTN. (E) 180/110= Severe HTN*

**Question 10- Answer E- Xanthelasma**

*Distinctive signs of infective endocarditis are splinter haemorrhages, Osler's nodes, Janeway lesions, Roth spots and fever. (E) Xanthelasma are cholesterol deposits around the eyes.*

**Gastrointestinal (I)**

**Question 11-Answer B-IBS**

- (A) *The generalised abdominal pain and bloating with it being affected by food did suggest it could be Coeliac Disease however this commonly presents with pale smelly stools that are hard to flush away.*
- (B) *Generalised abdominal pain which gets better after passing wind and/or defecation, bloating and changes in bowel habits typically suggest a case of IBS*
- (C) *Crohn's typically has pain on the right side of the abdomen along with bloody stools and other extra-intestinal features such as mouth ulcers, erythema nodosum and episcleritis although these aren't always the case.*
- (D) *UC only affects the colon so it you tend to get pain in the lower left quadrant of the abdomen instead of generalised abdominal pain. Also, there is blood and mucus in the stool too*
- (E) *Infective gastroenteritis does have diarrhoea and abdominal pain, but the patient did not have any other symptoms that suggested it was infective e.g. fever, vomiting or any foreign travel*

**Question 12-Answer E-Mallory Weiss Tear**

- (A) Peptic ulcer ruptures do cause haematemesis but there are no indications to suggest he could have a peptic ulcer. He doesn't have any epigastric pain, any pain eating or when he's hungry or take any medications especially NSAIDs
- (B) It is very unlikely that there is an oesophageal malignancy. There are no sinister oesophageal symptoms e.g. any difficulty swallowing (difficulty swallowing solids then liquids is a red flag) or any systemic symptoms suggesting malignancy such as weight loss
- (C) GORD doesn't present with vomit in the blood
- (D) Achalasia doesn't cause patients to vomit blood and there is no indication of achalasia as the patient doesn't complain of difficulty eating/drinking
- (E) Mallory Weiss tears occur when there is a tear in the mucosal lining at the oesophagogastric junction due to a sudden increase in intra-abdominal pressure. Things such as recurrent retching, vomiting etc. can force stomach contents into the oesophagus, dilate it and tear it resulting in haematemesis

**Question 13-Answer B-Omeprazole**

Explanation: The clinical presentation suggests this is a case of gastroesophageal reflux disease (

- (A) Sulfasalazine is used to treat UC
- (B) Omeprazole is a proton pump inhibitor commonly given as first line medication for GORD
- (C) Amoxicillin is an antibiotic and is not necessary in this scenario
- (D) Prednisolone is a corticosteroid and would have no benefit in this scenario
- (E) Ranitidine is an H2 antagonist which can be used in GORD, but it isn't the first line medication

**Question 14-Answer D-Autoimmune Gastritis**

- (A) *H. Pylori* is the most common cause of peptic ulcers
  - a. Lives in gastric mucus, secretes urease which splits urea in stomach into CO<sub>2</sub> + ammonia. Ammonia + H<sup>+</sup> → ammonium. Ammonium, proteases, phospholipases and vacuolating cytotoxin A damages gastric epithelium. Causes inflammatory response reducing mucosal defence → mucosal damage
  - b. Also causes increased acid secretion
    - i. Gastrin release (from G cells) → more acid secretion
    - ii. Triggers release of histamine → more acid secretion
    - iii. Increases parietal cells mass → more acid secretion
    - iv. Decreases somatostatin (released from D cells) → more acid secretion
- (B) Increased acid production is a cause of peptic ulcers
  - a. Overwhelms mucosal defence
  - b. Acid attacks mucosal cells
  - c. Cells die → formation of ulcer
  - d. Stress can also increase acid production
- (C) Recurrent NSAID use is a common cause of peptic ulcers
  - a. Mucus secretion stimulated by prostaglandins
  - b. COX-1 needed for prostaglandin synthesis
  - c. NSAIDs inhibit COX-1
  - d. No COX-1 = mucous isn't secreted
  - e. Reduced mucosal defence → mucosal damage
- (D) Autoimmune gastritis is not a cause of peptic ulcers
- (E) Mucosal ischaemia can cause peptic ulcers
  - a. Stomach cells not supplied with sufficient blood
  - b. Cells die off and don't produce mucin
  - c. Gastric acid attacks those cells
  - d. Cells die → formation of ulcer

**Question 15-Answer C-Small bowel obstruction**

*This is a clinical presentation of a small bowel obstruction. These can be characterised by abdominal pain higher up the abdomen compared to large bowel obstruction, early onset of vomiting, constipation and bloating. He has had a previous appendectomy when he was 8 so this small bowel obstruction is most likely caused by adhesions which have developed. Note the difference in vomiting presenting 7 days ago and not passing stool for last 3 days (therefore 4 days when still able to pass stool). If this was large bowel obstruction not passing stools would occur much more closely to the onset of symptoms. Vomiting/not passing stools are not prominent features of coeliac, crohn's or IBS.*

**Question 16-Answer D-Clarithromycin/metronidazole, amoxicillin and omeprazole**

*H. Pylori infections are to be treated using clarithromycin/metronidazole, amoxicillin and a proton pump inhibitor e.g. omeprazole/lansoprazole. An easy way to remember it is CAP*

**Question 17-Answer E-Recurrent endoscopies**

*GORD is caused by relaxation of the lower oesophageal sphincter causing gastric acid, pepsin, bile etc. to flow back into the oesophagus. A-D are all things that can affect the lower oesophageal sphincter.*

**Question 18-Answer A-Abdominal X-ray**

*This clinical presentation suggests a large bowel obstruction and an abdominal x-ray is the first line investigation when suspecting an obstruction.*

**Question 19-Answer C-Achalasia**

*If GORD is left untreated, it can result in gastric acid persistently refluxing and irritating the oesophagus resulting in oesophagitis, oesophageal ulcers and strictures. It can also cause metaplasia of the oesophageal tissue turning it into stomach epithelium which has an increased risk to become malignant. Achalasia is a condition in which the lower oesophageal sphincter fails to open during swallowing causing a back-up of food into the oesophagus*

**Question 20-Answer B- They cause pain several hours after eating, pain gets better when eating**

*Duodenal ulcers tend to cause abdominal pain several hours after eating due to the presence of acid from the stomach in the duodenum. Pain caused by gastric ulcers is relieved by eating.*

**Gastrointestinal (II)**

**Question 21- Answer C- Has skip lesions**

*(A) Ulcerative Colitis is a continuous and circumferential inflammatory condition which can affect from the rectum to the ileocaecal valve and does not extend proximal to the ileocaecal valve.*

*(B) This condition affects males and females equally unlike Crohn's which affects females more.*

*(D) Smoking appears to be protective for UC, as it is 3 times more common in non/ex-smokers, whereas Crohn's risk is increased 3-4-fold by smoking.*

*(E) Crohn's has a stronger genetic link with 1/5 having a first degree relative with the condition compared to 1/6 with UC. Also, mutations on NOD2 gene, Ch16 increase the risk of Crohn's disease.*

**Question 22- Answer B- Coeliac Disease**

*Coeliac disease presents with smelly floaty stools (Steatorrhea), diarrhoea and weight loss. Also note the presence of a rash; some coeliac patients present with skin changes in the extensor surface known as Dermatitis Herpetiformis, this is an immunological response to gluten which manifests in the skin. Having a family history of autoimmune disease- in this case Type 1 diabetes- increases the likelihood that it is an autoimmune cause of symptoms.*

*A)C)E) Note the absence of blood in stools which is often seen in Crohn's, UC and bowel cancer. The weight loss in this case is perhaps not a drastic enough amount to be worried about cancer initially.*

**Question 23- Answer E- Spicy food**

*Spicy food is not a known risk factor for Oesophageal Cancer*

*(A)Achalasia is a swallowing disorder in which peristalsis is reduced, which is needed to pass food down along the oesophagus, this often results in the food being brought back up.*

*(B)Alcohol in large quantities is a risk factor as it irritates and inflamed the epithelium.*

*(C)Obesity is a risk factor, due to increased GORD. GORD causes repeated gastric acid exposure to the oesophagus and thus repeated damage. This can progress to Barrett's Oesophagus. This is where the stratified squamous epithelium changes to a simple columnar with interspersed goblet cells- this can progress to cancer in some people.*

*(D)Smoking is a risk factor as it contains carcinogens and the substances in the smoke irritate the oesophagus.*

**Question 24- Answer B- Colonoscopy**

*Colonoscopy is the gold standard investigation for bowel cancer.*

*(A)Blood tests are useful for monitoring but not diagnostic (tumour markers are not specific enough).*

*(C)Double contrast barium enema is second line to colonoscopy and avoids risk of perforation but misses small lesions.*

*(D)CT colonoscopy is useful for older patients and is good at excluding cancer.*

**Question 25- Answer E- Distal Colon**

*Around 38% of colon cancer is found in the distal colon; this includes the anus, rectosigmoid junction, sigmoid colon, and rectum. These often can be detected by digital rectal examination. Also, the closer the cancer is to the outside of the body the more visible blood and mucus will be.*

**Question 26- Answer C- Gluten-free diet**

*A life-long gluten free diet is the first line treatment for Coeliac disease with serum antibody testing to monitor.*

*A)B)E) Although performing a Dexa scan, correcting vitamin imbalance and referral to a dietician are things that would be done they are not what would be done first.*

*D) Prednisolone is only prescribed in refractory coeliac disease, which is rare. This is where the symptoms persist even after switching to a gluten free diet.*

**Question 27- Answer B- Ectopic Pregnancy**

*All of the answers are differential diagnoses for abdominal pain, note that the most likely diagnosis is in fact appendicitis due to the patients age and symptoms of pain migration.*

*Note that the patient is male (his umbilical region..., he is pyrexia...) and therefore you should not suspect ectopic pregnancy.*

**Question 28- Answer A- Alcohol**

*Alcohol is not said to cause the development of diverticula.*

*(B) Fibre softens stools and makes them larger so if low fibre diet there is more pressure on the intestinal wall to pass faeces, which results in the colonic mucosa being pushed through the gaps in the muscular wall where arteries penetrate.*

*(C),(D),(E) Obesity, smoking and prolonged NSAID use have been linked to diverticula formation.*

**Question 29- Answer D- Haemorrhoids**

*The correct answer is haemorrhoids because the blood is more so out of the stool and it being present on wiping indicates its more external. She also admits to straining which loosen and “bulkify” the spongy vascular tissue of the anus making it protrude form a pile.*

*(A) It is less likely to be a fistula as she hasn’t complained of pain, itching or mucus. Moreover, there is no mention of the main causes of a fistula such as Crohn’s, TB etc.*

*(B) It is less likely to be a fissure because she hasn’t complained of extreme pain during defecation.*

*(C) It is not likely to be IBD as there is no mentioned family history/autoimmune conditions/pain/change in bowel habits.*

*(E) It is less likely to be cancer due to the absence of major weight loss.*

**Question 30- Answer A- Anaemia due to Iron and Folate deficiency**

*This woman has Crohn’s disease. Her age range and history of urgent diarrhoea and abdo pain; suggest IBD. Smoking and stress are risk factors and stress can trigger flare ups. Mouth ulcers are an extraintestinal sign of Crohn’s disease. Therefore, the correct answer is A – iron and folate deficiency anaemia is commonly due to malabsorption.*

*(B) is incorrect as the history does not indicate any infective cause. (C) these are the investigation and findings of Coeliac disease. (D) Crohn’s disease is an inflammatory disorder, therefore the inflammatory markers ESR and CRP would be **raised**. (E) (Anti-neutrophilic cytoplasmic antibody) pANCA may be positive in Ulcerative Colitis but in Crohn’s it is negative.*

**Genitourinary**

**Question 31- Answer B- Hypervolaemia**

*(A) Acute tubular necrosis is the most common cause of AKI’s, tubular epithelial cells of the kidneys die impairing the kidneys ability to filter waste products.*

*(B) Hypovolemia is more likely to cause AKI than hypervolaemia.*

*(C) Nephrotoxins cause intrinsic or renal AKI; the kidneys are directly damaged impairing their ability to function.*

*(D) Prostatic hyperplasia causes post-renal AKI; the urinary tract is obstructed and this increases intra-tubular pressure, which decreases the GFR and so increases urea and creatinine remaining in the blood.*

*(E) Sepsis is a prerenal cause of AKI; the blood pressure falls leading to renal hypoperfusion and a decreased glomerular filtration rate, which causes a rise in serum urea and creatinine.*

**Question 32- Answer B- Stage 3a**

Stage 1 > 90 ml/min with evidence of renal damage

Stage 2 60-89 ml/min with evidence of renal damage

Stage 3a 45-59 ml/min with or without renal damage

Stage 3b 30-44 ml/min with or without renal damage

Stage 4 15-29 ml/min with or without renal damage

Stage 5 <15 ml/min, established renal failure

**Question 33- Answer D- Pregnancy**

- (A) Diabetics have excess glucose in their blood, which can damage blood vessels in the kidneys
- (B) CKD has genetic components e.g. polycystic kidney disease, a cause of CKD, is genetic.
- (C) Kidney function deteriorates with age.
- (D) Pregnant women with CKD may have an increased risk of complications, but healthy women shouldn't be at a significantly increased risk of developing CKD through getting pregnant.
- (E) Recurring UTI's can cause permanent kidney damage.

**Question 34- Answer C- E.coli**

While all five organisms cause pyelonephritis, E.coli causes the majority of cases. E. coli from the patient's own bowel Flora cause the infection.

**Question 35- Answer B- Midstream urine MC&S**

- (A) FBC might show raised WCC count and inflammatory markers.
- (B) MC&S of midstream urine is the best investigation as it identifies the bacteria and the best antibiotic to treat it.
- (C) A nuclei acid amplification test is commonly used to test for chlamydia.
- (D) An ultrasound may be useful in searching for renal stones or structural abnormalities.
- (E) A urine dipstick can be useful as it detects nitrites and leukocytes that suggest an infection.

**Question 36- Answer D- Prostatitis**

- (A) BPH is also unlikely, firstly due to Alex's age and also it is unlikely to cause post ejaculatory pain.
- (B) Cystitis may explain the dysuria but not much else.
- (C) Prostate cancer is unlikely as Alex is fairly young and your DRE did not note any lumps or irregularities.
- (D) This is most likely prostatitis and in this case chronic prostatitis. Chronic prostatitis is characterised by pelvic or perineal pain lasting longer than 3 months as the key symptom. Also trauma causing nerve damage in the lower urinary tract is a risk factor for chronic prostatitis.
- (E) Pyelonephritis is unlikely with this presentation.

**Question 37- Answer E- Trimethoprim**

- (A) Amoxicillin is generally safe
- (B) Cephalexin can be used to treat UTI's though it wouldn't be first line.
- (C) Fosfomycin is generally safe in pregnancy
- (D) Nitrofurantoin is first line in pregnant women with lower urinary tract infections, however it should be avoided at term as it may cause neonatal haemolysis.
- (E) Trimethoprim carries a teratogenic risk in the first trimester as it inhibits folate synthesis.

**Question 38- Answer D - Reiter's syndrome**

- (A) Bechet's syndrome consists of a triad of oral aphthous ulcers, genital ulcers and ocular inflammation
- (B) Budd-Chiari syndrome presents with abdominal pain, ascites and liver enlargement
- (C) Charcot's triad refers to fever, right upper quadrant pain and jaundice
- (D) Reiter's syndrome, also known as reactive arthritis, is the classic triad of conjunctivitis, urethritis, and arthritis occurring after an infection
- (E) Saint's triad- hiatus hernia, cholelithiasis and colonic diverticulosis

**Question 39- Answer B- 50%**

*It is 50% as it is an autosomal dominant condition, meaning only one copy of the gene is needed to cause disease. Ray is heterozygous for PKD meaning 1 PKD chromosome and 1 normal chromosome. There is a 50% chance that his child will inherit the PKD chromosome.*

*Note that there is also a rare version of polycystic kidney disease with autosomal recessive inheritance, but this is much more severe and is diagnosed very early on in life, so it is safe to assume Ray has the more common variant.*

**Question 40- Answer C- Nephrotic syndrome**

- (A) PKD causes hypertension, which can result in cardiovascular disease.*
- (B) Kidney stones may form in those with PKD as urine travels more slowly in the kidneys of these patients allowing more time for stones to develop.*
- (C) Nephrotic syndrome has its own causes such as autoimmune diseases and diabetes and PKD is not one of them.*
- (D) Polycystic liver disease can occur as people with PKD develop cysts in other organs.*
- (E) PKD is associated with Berry's aneurysms and if they rupture results in a subarachnoid haemorrhage.*

**Haematology**

**Question 41- Answer C- Presence of Reed-Sternberg cells in HL on histological observation and absence of such cells in NHL**

*Lymphomas are histologically divided into Hodgkin's and non-Hodgkin's types. In Hodgkin's lymphoma, characteristic cells with mirror-image nuclei are found, called Reed-Sternberg cells.*

*Although systemic 'B' symptoms (loss of appetite, weight loss and drenching night sweats) may be less common in NHL, nevertheless they can be present in both types of lymphoma and hence do not differentiate between the 2.*

*The disease can spread beyond lymph nodes in both HL and NHL.*

*Auer rods are found on bone marrow biopsy in Acute Myeloid leukaemia and help differentiate it from the other leukaemias.*

*Lymphadenopathy can be seen in both HL and NHL.*

**Question 42- Answer D- Progestogen-only pill (POP)**

*Risk factors for DVT are - Recent surgery, immobilisation/leg fracture/Plaster of Paris, Oestrogens (Oral combined contraceptive pill, hormone replacement therapy, pregnancy, etc), Malignancy, History of DVT or PE, Long haul flights/travel (rare), Inherited thrombophilia.*

*Therefore, we can see that the single best answer for this question is Progestogen only contraceptive pill. In fact, since the Combined hormonal contraceptives (pill, transdermal patch or vaginal ring) contain oestrogen and are hence contraindicated in someone with a history of venous-thromboembolism, NICE recommends Progestogen-only pill (POP) as one of the options for contraception in women with a history of venous thromboembolism (VTE), known thrombogenic mutations, or who is taking anticoagulants for current VTE.*

**Question 43- Answer C- Plasmodium falciparum**

*Malaria is a protozoal infection. It can be caused by 5 species of the same family (plasmodium). Plasmodium falciparum = can cause most severe form of malaria (complicated malaria) and has the highest mortality, it is most prevalent in Sub-Saharan Africa. Others include: plasmodium ovale, plasmodium vivax, plasmodium malariae , plasmodium knowlesi*

*Giardia lamblia (A) - causes giardiasis. Faeco-oral spread. Diarrhoea and other key features - Cramps, bloating, flatulence. Risk factors - recent travel and childcare. Trophozoites/cysts seen in stool. Treated with metronidazole.*

*Trypanosoma brucei gambiense (B) - causes African Trypanosomiasis - "Sleeping sickness". transmitted via Tsetse fly bite (you get a chancre). Flu like symptoms. CNS involvement (sleepy, confusion, personality change). Diagnosed on blood film (you can see the protozoa in blood film) or CSF.*

*Toxoplasma gondii (D) - Ingestion of contaminated food and water/feline faeces. (ONLY CATS CAN PASS IT ON! So not acquirable form other ppl). If immunocompetent, then usually not a problem, but if immunocompromised devastating - can cause: - disseminated disease: - Toxoplasma Encephalitis, Chorioretinitis (Chorioretinitis is an inflammation of the choroid (thin pigmented vascular coat of the eye) and retina of the eye.) and subsequent scarring. Acute maternal infection can be devastating in pregnancy - can end in miscarriage, hydrocephalus, anencephaly, etc.*

*Anopheles gambiae (E) - a species of mosquito from the Anopheles family of mosquitoes. The female mosquitoes of this species are known to transmit malaria.*

**Question 44- Answer D- Plasma exchange**

*The correct treatment is urgent plasma exchange (replenishes ADAMTS13 and removes antibody). TTP has 90% mortality if untreated and this drops to 10 – 20% if treatment is started promptly! TREAT ASAP WITHOUT DIAGNOSTIC CONFIRMATION. It is a medical EMERGENCY.*

*Do NOT give platelets –increases thrombosis!!!*

*Hydroxycarbamide is a bone marrow suppressive drug and is used in treatment of polycythaemia rubra vera and sometimes also in sickle cell disease [prevention of vaso-occlusive complications].*

*Immunosuppression (reduce antibody level) is actually used as part of treatment of TTP but it is not the urgent treatment that was being asked by the question.*

*Broad spectrum antibiotics in the context of TTP is not appropriate. This treatment is usually used for sepsis or when as a consequence of a chemotherapy, a patient gets febrile neutropenia (haematological emergency - infection/fever with a low white cell count) and the appropriate management there is to perform ABC, blood cultures and start broad spectrum IV antibiotics(e.g. Tazosin and Gentamicin).*

*\*Extra knowledge nugget: TTP Signs & Symptoms - Pentad: microangiopathic haemolytic anaemia, ↓ platelets, aki, neurological symptoms (headache, palsies, seizure, confusion, coma), and fever. RBC fragments (schistocytes) on film.*

**Question 45- Answer E- Well's Score**

To be more accurate, the correct answer is DVT Well's score. Be aware that there is another Well's score called PE Well's score which is different from the DVT Well's score.

**Two-level DVT Wells score**

Clinical feature	Points	Patient score
Active cancer (treatment ongoing, within 6 months, or palliative)	1	
Paralysis, paresis or recent plaster immobilisation of the lower extremities	1	
Recently bedridden for 3 days or more or major surgery within 12 weeks requiring general or regional anaesthesia	1	
Localised tenderness along the distribution of the deep venous system	1	
Entire leg swollen	1	
Calf swelling at least 3 cm larger than asymptomatic side	1	
Pitting oedema confined to the symptomatic leg	1	
Collateral superficial veins (non-varicose)	1	
Previously documented DVT	1	
An alternative diagnosis is at least as likely as DVT	-2	
<b>Clinical probability simplified score</b>		
DVT likely	2 points or more	
DVT unlikely	1 point or less	

**Exceptions!!** - Refer immediately for same-day assessment and management, if deep vein thrombosis (DVT) is suspected in a woman who is pregnant or has given birth within the past 6 weeks.

- The risk of DVT is **likely** if the score is two points or more, and **unlikely** if the score is one point or less.
- For people who are **likely** to have DVT (based on the results of the two-level DVT Wells score):
  - Refer for a proximal leg vein ultrasound scan to be carried out within 4 hours. If a proximal leg vein ultrasound scan cannot be carried out within 4 hours of being requested:
    - Take a blood sample for D-dimer testing.
    - Give an interim 24-hour dose of a parenteral anticoagulant (note that the weight of the person will be required to calculate the dose of parenteral anticoagulant). For more information on prescribing parenteral anticoagulants, see the section on **Parenteral anticoagulants** in prescribing information.
    - Arrange for a proximal leg vein ultrasound scan (to be carried out within 24 hours of being requested).
- For people who are **unlikely** to have DVT (based on the results of the two-level DVT Wells score), offer D-dimer testing:
  - If the D-dimer test is positive, refer for a proximal leg vein ultrasound scan to be carried out within 4 hours. If a proximal leg vein ultrasound scan cannot be carried out within 4 hours of being requested:
    - Give an interim 24-hour dose of a parenteral anticoagulant (note that the weight of the person will be required to calculate the dose of parenteral anticoagulant). For more information on prescribing parenteral anticoagulants, see the section on **Parenteral anticoagulants** in prescribing information.
    - Arrange for a proximal leg vein ultrasound scan (to be carried out within 24 hours of being requested).
  - If the D-dimer test is negative, consider an **alternative diagnosis** to explain symptoms.

Provided there are no contraindications (such as pregnancy or cancer), people who have been diagnosed with deep vein thrombosis (DVT) will require maintenance treatment with an oral anticoagulant drug (warfarin or rivaroxaban) following acute treatment. Ensure that people with unprovoked DVT are investigated for the possibility of an undiagnosed cancer if they are not already known to have cancer (see Investigations for cancer for more information).

Ensure that people with unprovoked DVT have been offered thrombophilia testing, as appropriate (see Thrombophilia testing for more information).

Advise the person: To engage in regular walking exercise after they are discharged from hospital (unless a specialist advises against this). That the affected leg should be elevated when sitting. That extended travel, or travel by aeroplane, should be delayed until at least 2 weeks after starting anticoagulant treatment. Travel within 2 weeks of a DVT is not recommended without seeking advice from a specialist.

CHA2DS2VASc - Calculates stroke risk for patients with Atrial Fibrillation and is used to guide anticoagulant treatment. <https://cks.nice.org.uk/atrial-fibrillation#!scenarioClarification>

FRAX - gives 10 year probability of fracture <https://patient.info/doctor/frax-fracture-risk-assessment-tool>

HAS-BLED Score - Estimates risk of major bleeding for patients on anticoagulation to assess risk-benefit in atrial fibrillation care. <https://patient.info/doctor/has-bleed-score-for-major-bleeding-risk>

The QRISK®3 algorithm calculates a person's risk of developing a heart attack or stroke over the next 10 years. <https://qrisk.org/three/>

### **Question 46- Answer B- Stage IIIB**

Staging influences treatment and prognosis. Done by imaging ± marrow biopsy if B symptoms, or stage iii-iv disease.

I Confined to single lymph node region.

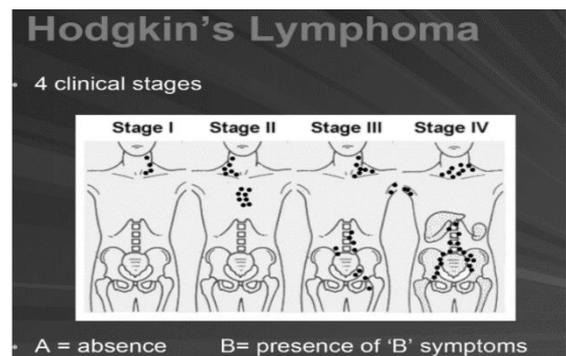
II Involvement of two or more nodal areas on the same side of the diaphragm.

III Involvement of nodes on both sides of the diaphragm.

IV Spread beyond the lymph nodes, e.g. liver or bone marrow.

Each stage is either 'a'—no systemic symptoms other than pruritus; or 'b'—presence of b symptoms: loss of appetite, weight loss and drenching night sweats.

In this scenario, patient has lymphoma in his axillary and inguinal lymph nodes (so on both sides of his diaphragm) but it has not spread beyond lymph nodes hence it is stage III. It is also mentioned that he has had weight loss and gets night sweats which are both systemic 'B' symptoms and therefore the clinical stage of his Hodgkin's lymphoma is III B.



### **Question 47- Answer B- Excessive Hair Growth**

Chemotherapy has a LOT of adverse effects. It is a very toxic treatment but usually the positives of therapy outweigh the negatives. Excessive hair growth (as far as my knowledge goes) is not a side effect whilst someone is on chemotherapy (although, I have read some forums where women experienced excessive facial hair growth POST chemo). In fact, alopecia (temporary hair loss) is a well-known side effect of chemotherapy. This was a question simply to raise awareness of the adverse effects of chemo, some of the most devastating being infertility, cytopenia and secondary malignancies. Nausea, constipation and diarrhoea are all also side effects of chemotherapy. Chemotherapy has numerous side effects. In such questions where you are not quite sure of the answer, it is best to work out the answer by eliminating the options which you know to not be the correct answer for the question.

**Question 48- Answer C- Dalteparin acutely then maintenance treatment with apixaban**

*Taken from BNF- management of Venous ThromboEmbolsism in post-hip replacement patients states... "Patients undergoing an elective hip replacement should be given thromboprophylaxis with either a low molecular weight heparin administered for 10 days followed by low-dose aspirin for a further 28 days, or a low molecular weight heparin administered for 28 days in combination with anti-embolism stockings until discharge, or rivaroxaban. If these options are unsuitable, apixaban or dabigatran etexilate can be considered as alternatives. If pharmacological prophylaxis is contra-indicated, anti-embolism stockings can be used until discharge". Note that guidance on the BNF for thromboprophylaxis/ management of DVT /PE varies depending on whether the patient has a medical cause, surgery cause and what specific surgery they've had etc.*

*Alteplase is a fibrinolytic drug used mainly in Acute myocardial infarction, PE and Acute ischaemic stroke.*

*Aspirin is usually used for secondary prevention of CVD, Management of unstable angina, non-ST-segment elevation myocardial infarction (NSTEMI) and ST-segment elevation myocardial infarction (STEMI), transient ischaemic attack and acute ischaemic stroke.*

**Question 49- Answer C- CD20**

*Rituximab is a monoclonal antibody. It targets a protein called CD20 on the surface of B-cells. Rituximab sticks to all the CD20 proteins it finds. Then the cells of the immune system pick out the marked cells and kill them. CD-20 is only found on B cells and nowhere else.*

*Rituximab is used for treatment of Non-Hodgkin's lymphoma, Chronic lymphocytic leukaemia, etc. A main side-effect = allergic reactions (wide range).*

*Trastuzumab is a targeted cancer drug and is also known by its popular brand name - Herceptin. It is a treatment for cancers that have large amounts of a protein called human epidermal growth factor receptor 2 (HER2), such as: early breast cancer, advanced breast cancer and advanced stomach cancer.*

*Adalimumab is a subcutaneously administered biological disease modifier for the treatment of rheumatoid arthritis and other chronic debilitating diseases mediated by tumour necrosis factor. Adalimumab binds with specificity to tumour necrosis factor-alpha (TNF-alpha) and inhibits some of its actions. It is used in the treatment of Rheumatoid arthritis, Psoriatic arthritis, Ankylosing spondylitis, etc.*

*The CD4 molecule plays an important functional role in the course of human immunodeficiency virus infection. It is usually expressed on helper T lymphocytes and it is these CD4 cells that the HIV virus target.*

*CD8 is a glycoprotein expressed on cells that are generally classified to be known as killer-T cells or CD8 cytotoxic T cells.*

**Question 50- Answer A- IV Artesunate**

*IV artesunate is the ideal first line treatment for severe/complicated malaria.*

*IV quinine + doxycycline is an alternative to IV artesunate in treating severe malaria if IV Artesunate is contraindicated or not available.*

*Oral chloroquine can be used as treatment for uncomplicated malaria/Treatment of non-falciparum malaria.*

*P. ovale and P.vivax can form hypnozoites in the liver which can lie dormant in the liver for years. Primaquine is used to eliminate these. Screening for G6PD deficiency is essential before treatment with primaquine is started as it can cause haemolysis in G6PD deficient individuals, which can be fatal. It is contraindicated in pregnancy and breastfeeding.*

*Artemisinin combination therapy (ACT) is the preferred treatment for mixed infection in uncomplicated malaria.*

*\*\*Ensure that all cases of malaria have been notified to Public Health England!*

*\*\*extra haematology nugget related to iron: remember, ferritin is a protein that stores iron, releasing it when your body needs it. Ferritin usually lives in your body's cells, with very little actually circulating in your blood.*

*Transferrin is a protein that combines with ferritin to transport it to where new red blood cells are made. Imagine transferrin as a dedicated taxi for iron.*

**ICS- Pathology**

**Question 51- Answer C- Suppuration**

*The 5 key signs of acute inflammation are (A) rubor- redness, (B) dolor- pain, Calor- heat, (D)- tumor- swelling, (E) loss of function.*

*(C)Suppuration- creation of pus- a potential outcome following acute inflammation*

**Question 52- Answer D- Neurones**

*(A)(B)(C)(E)Pneumocytes, hepatocytes, osteocytes, gut epithelial cells are capable of regeneration  
(D)Neurones are not capable of regeneration*

*Note: skin epithelial cells and all blood cells are also capable of regeneration*

**Question 53- Answer A- Increased size of tissue due to increase in number of constituent cells**

- (A) Hyperplasia= Increased size of a tissue due to increase in number of constituent cells
- (B) Hypertrophy= Increased size of a tissue due to increase in size of constituent cells
- (C) Metaplasia= Change in differentiation of a cell from one fully differentiated type to a different fully differentiated type
- (D) Neoplasia= Abnormal growth of tissue in a body which persists despite removal of initial stimulus
- (E) Describes apoptosis= Decreased size of a tissue due to programmed cell death

**Question 54- Answer D- Leiomyosarcoma**

- (A) Rhabdomyoma= Benign striated muscle neoplasm
- (B) Leiomyoma= Benign smooth muscle neoplasm
- (C) Liposarcoma= Malignant adipose tissue neoplasm
- (D) Leiomyosarcoma= Malignant smooth muscle neoplasm
- (E) Rhabdomyosarcoma=Malignant striated muscle neoplasm

**Question 55- Answer D- Neutrophils**

- (D) Neutrophil polymorphs predominate during acute inflammation
- (A)(B)(E) B lymphocytes, Macrophages, T lymphocytes predominate during chronic inflammation
- (C) Mast cells are seen in allergic reactions and release histamine

**Question 56- Answer A- Acute cholecystitis**

Acute cholecystitis will resolve, all others are permanent.

**Question 57- Answer C- Aggregate of epithelioid histiocytes**

- (A) Neutrophil polymorphs are seen in acute inflammation
- (B) Lymphocytes are seen in chronic inflammation
- (C) Correct
- (D) New connective tissue+ microscopic blood vessels forming on wound surface is the definition of granulation tissue
- (E) Incorrect

**Question 58- Answer C- Fragments of RBCs**

Atherosclerotic plaques contain (A) connective tissue, (B) foam cells- lipid-laden macrophages, (D) T lymphocytes, (E) smooth muscle cells. Others; cholesterol, lipid deposits, fragments of destroyed internal elastic lamina  
(C) fragments of RBCs are not present in atherosclerotic plaques

**Question 59- Answer B- Simple columnar**

(B) Barrett's oesophagus occurs where the oesophageal stratified squamous cells undergo metaplasia to simple columnar cells. (C) stratified squamous is what the oesophagus is originally. (A)(D)(E) are incorrect.

**Question 60- Answer A- Hard, craggy prostate on digital rectal examination**

A hard, craggy prostate on DRE (A) is the most indicative of prostate cancer from the options given, if felt you should order further investigations such as prostate biopsy. History of urinary frequency and dribbling (B) is a generic lower urinary tract symptom and whilst it may be present in prostate cancer it is not necessarily specific to prostate CA as it could be present in BPH. A history of weight loss (C) is a red flag symptom for cancer in general but not specific to prostate cancer, it could also be benign e.g the patient may have hyperthyroidism. A raised PSA (D) is a non-specific marker, it is raised following DRE and raised in BPH. Raised CRP/ESR (E) is suggestive of general inflammation/infection not specifically prostate.

## Liver and Friends

### **Question 61- Answer B- Atrial Fibrillation**

*AF does not have any strong evidence linking it to Liver failure.*

*(A) Alcohol excess causes cirrhosis of the liver and eventual liver failure by the destruction of the liver cells. (C) Budd-Chiari syndrome is an eponymous condition involving an obstruction of the Hepatic vein via either a tumour or a thrombus, resulting in Hepatic ischaemia and eventual liver failure.*

*(D) Haemochromatosis is an inherited disorder of Iron metabolism which results in iron deposition in the joints, liver, heart, pancreas and skin, presenting with fatigue, slate grey skin, signs of liver failure and pancreatic failure. (E) Wilson's disease is a rare disorder of copper excretion, which results in excess deposition in the liver and CNS, resulting in personality changes, tremor, ataxia, dysarthria and liver cirrhosis. It classically has the Kaiser-Fleischer rings, copper rings around the iris. It is treatable and somewhat reversible with penicillamine so screen for it with cirrhosis.*

### **Question 62- Answer E- N-acetyl cystine**

*Chlordiazepoxide is prescribed in alcohol withdrawal / as a treatment of delirium tremens.*

*Desferrioxamine is given to reverse iron overdose. Flumazenil is given to reverse benzodiazepine overdose. Naloxone is given to reverse opiate overdose. . N-acetyl cysteine is the antidote to paracetamol poisoning by restoring the bodies level of glutathione, a product which is needed to safely metabolise paracetamol.*

### **Question 63- Answer D- Kayser-Fleischer rings**

*(D) Kayser-fleischer rings are rust coloured rings around the iris in the eye caused by deposits of copper as a result of Wilson's disease, not liver failure.*

*(A) Asterixis is also called a liver flap, is caused by abnormal liver function. (B) Dupuytren's contractures is a progressive shortening and thickening of the palmar fascia causing finger contractures, associated with liver failure and alcohol abuse. (D) Leukonychia, or white nails, is a common sign of liver failure/liver disease. (E) Spider Naevi are small, swollen blood vessels just below the skin, causing a red mark which looks like a spider and are again associated with liver failure and alcohol excess.*

### **Question 64- Answer A- Acute Pancreatitis**

*Pain in the epigastric region radiating to the back is a classic presentation of pancreatitis and the very elevated Amylase is also extremely suggestive of Acute Pancreatitis which when severe is a surgical emergency.*

*(B) Appendicitis typically presents with generalised pain in the abdomen before localising to a sharp, stabbing pain in the RIF. (C) DKA is only in a diabetic patient, almost always type 1, and it presents with drowsiness, N+V, polydipsia and polyuria. Yes, Abdo pain is a symptom of DKA but this case lacks the other defining features of DKA. (D) Duodenal ulcer is usually a chronic condition generally associated with NSAID use , or previous ulceration. It would cause a raised Serum Amylase. (E) A Paracetamol overdose would also not cause such a raised serum amylase and would typically present with a reduced GCS and frequently as history of depression or other psychiatric conditions. He is also not the typical demographic for a paracetamol overdose but is around the right age for an alcohol induced case of acute pancreatitis.*

**Question 65- Answer E- Primary Biliary Cholangitis (PBC)**

*PBC is an autoimmune condition which damages the interlobular bile ducts in the Liver. It is very slow to present and is often found as an incidental finding due to raised ALP. It is treated symptomatically, so treat the pruritis with rifampicin or cholestyramine. If it is uncontrollable or the disease has reached a late stage, Liver transplantation is the curative treatment.*

*(A) Appendicitis does not present like this – it's an acute course with generalised Abdo pain, progressing to a sharp localised pain, usually in the RIF. (B) Acute pancreatitis typically presents with epigastric pain radiating to the back, with raised serum amylase. It is also, as the name suggests an acute course, and this is a chronic condition. (C) Coeliac disease is a chronic condition, but it typically presents with diarrhoea, weight loss, Abdo pain, mouth ulcers and steatorrhea (pale, buoyant, foul smelling stools). In Coeliac disease, anti-transglutaminase is almost always raised, and Hb and ferritin/B12 are low. (D) SLE is a tricky one as it can basically present as anything, anywhere but this would be grossly abnormal clinical picture. Reynaud's syndrome, alopecia, lymphadenopathy, and a relapsing-remitting course would be more typical. Also, typically antinuclear antibodies (ANA) anti double stranded DNA (anti-dsDNA) and antiphospholipid antibodies will be raised in Lupus.*

**Question 66- Answer B- Diarrhoea**

*Diarrhoea can occur in upper GI bleeds, but it is not characteristic – it's essentially the wrong end of a very long tube to be totally related.*

*(A)(D)Coffee ground vomit and melaena are both classic Upper GI bleed symptoms - the blood is coffee coloured as it has generally not long been in the GI tract and melaena is black because it has been through the digestive tract. (C)(E)Hypotension and tachycardia are both associated with each other and with bleeds – if your body loses blood you lose circulating volume, hence your Heart's preload is reduced (remember Frank-Starling curve) so the cardiac output of each beat is reduced. The HR increases as a response to this, but it is not able to fully compensate when significant volume has been lost so the patient becomes hypotensive.*

**Question 67- Answer D- Mumps**

*Remember the mnemonic for pancreatitis GET SMASHED: Gall stones, Ethanol excess, Trauma, Steroids, Mumps, Autoimmune, Scorpion venom, Hyperlipidaemia (or hypercalcaemia and hypothermia), ERCP or emboli and finally Drugs.*

*(C) Horner's syndrome is a neurological condition characterised by loss of sweating, dilated pupil and drooping eye lid (anhidrosis, miosis and ptosis) unilaterally.*

**Question 68- Answer B- Ascending Cholangitis**

*The challenge in this question is differentiating between Biliary colic (C) and Ascending Cholangitis (B)- both present with RUQ pain, made worse by eating fatty meals and jaundice. Ascending cholangitis is however characterised by Charcot's triad of jaundice, RUQ and fever with rigors.*

*(A)Acute pancreatitis typically presents with epigastric pain which radiates to the back, with very high serum amylase. PBC is often diagnosed after incidental findings on LFT's and typically presents with lethargy and pruritis preceding Jaundice by up to years in some cases. Vincent's Angina is a condition characterised by ulceration of the mouth and gingivitis (inflammation of gums), typically affecting smokers.*

**Question 69- Answer C- Chlordiazepoxide**

*The main complication to be concerned about in alcohol withdrawal, especially within the first 72 hours of withdrawal, is seizures. The 1<sup>st</sup> line treatment of withdrawal seizures is chlordiazepoxide (C). Adrenaline (A) would be of no help in this case (unless there was also some cardiac insufficiency requiring a Norad infusion. Amiodarone (B) is used to pharmaceutically cardiovert patients as a last resort. Methadone (D) is the pharmaceutical treatment for Opioid addiction (it is essentially a lab made version of heroin, which addicts can be given in safe, controlled areas and doses). Morphine (E) is an opiate analgesic which is not indicated for the patient in this case.*

**Question 70- Answer B- Vitamin B1 (Thiamine)**

*Wernicke's Encephalopathy and its related, more severe syndrome Korsakoff's syndrome are caused by a lack of Vitamin B1 or Thiamine in the brain of chronic alcoholics. This deficiency is caused by a mixture of poor diet in chronic alcoholism and the increased use of thiamine in patients with persistent high levels of blood alcohol. (A)(C)Folate and B12 are involved in cell replication and deficiencies are common causes of Macrocytic anaemia. (D) Vitamin C is involved with cell repair and immune function. (E)Vitamin K is involved with clotting and is the "antidote" to Warfarin.*

**Musculoskeletal**

**Question 71- Answer D- Stomach**

*Breast, lung, prostate, kidney and thyroid cancers all commonly metastasise to bone. Whilst stomach cancers can metastasise to bone this only occurs in exceptional cases, more common sites include the liver and peritoneum. Top tip: Think of a tasty BLT for bone= Bacon, Lettuce, Tomato, Kosher Pickle= Breast, Lung, Thyroid, Kidney, Prostate → bone.*

**Question 72- Answer D- Oesophagitis**

*Alendronic acid is a bisphosphonate. Bisphosphonates can cause oesophagitis and so it is recommended that patients take them first thing in the morning and remain upright for at least 30 minutes.*

*(A)Cough is a side effect of celecoxib, an NSAID used to manage Rheumatoid Arthritis, osteoarthritis and ankylosing spondylitis.*

*(B)(E)Gout can be precipitated by methotrexate use, a DMARD used in severe Rheumatoid Arthritis. Gout can also be precipitated by thiazide and loop diuretics, a side effect of which is urinary frequency.*

*(C)Haemolytic anaemia is a side effect of sulphasalazine, a DMARD used in severe Rheumatoid Arthritis.*

**Question 73- Answer C- Soft tissue swelling**

*Richard is likely to have osteoarthritis, given the gradual onset monoarticular presentation with short duration morning stiffness and a history of injury. The X ray signs for OA can be remembered with the mnemonic LOSS: Loss of joint space, Osteophytes, Subchondral sclerosis and Subchondral cysts. Bony deformity is typical of OA whereas soft tissue swelling is more typical of RA.*

**Question 74- Answer C- Schirmer's test**

*Sjogren's syndrome is the immune destruction of exocrine glands and often presents with arthritis, dry eyes and dry mouth. The Schirmer test involves placing a small strip of paper in the eye to measure tear production and is used in the diagnosis of Sjogren's, alongside lacrimal gland biopsy and antibody testing.*

*EMG may be used in the diagnosis of polymyositis to show fibrillation*

*Joint aspirates are used in the diagnosis of gout, pseudogout and septic arthritis*

*Annual spirometry and ECG are recommended for patients with systemic sclerosis due to the risk of interstitial lung disease*

*X rays are used in a multitude of rheumatological diagnoses but are less commonly used in Sjogren's due to its lesser impact on joints. Chest X rays may be used in Sjogren's to look for pneumonitis.*

**Question 75- Answer B- Pencil in cup**

*Pencil in cup describes the image seen in an X ray of arthritis mutilans, a severe form of psoriatic arthritis. Bamboo spine is found in ankylosing spondylitis, Periarticular erosions are found in gout, Osteophytes are found in osteoarthritis, Rhomboid crystals are not an X ray sign. They are seen under microscopy of aspirate from a joint with pseudogout.*

**Question 76- Answer B- Ibuprofen**

*The patient is presenting with symptoms concerning of Ankylosing Spondylitis (aching back pain that wakes at night, loss of movement, improvement with exercise), one of the only MSK conditions to preferentially affect young men. Patients with suspected AS should undergo further testing, including blood tests and X rays, to confirm the diagnosis. In the meantime, an NSAID such as ibuprofen is the first line management. Paracetamol may be used if ibuprofen is contraindicated. Infliximab, alongside other DMARDs and anti-TNF drugs may be used in severe AS that is refractory to other treatments such as NSAIDs. The lack of red flags is reassuring against a malignant diagnosis and so chemotherapy is not warranted. Watch and wait is not going to address this man's symptoms, although is a valid management plan for mechanical lower back pain alongside exercise advice.*

**Question 77- Answer B- Pseudogout**

*Terry is most likely to have pseudogout. Pseudogout typically presents as an acute onset of monoarthritis, often in the knee. A fever may also be present. Risk factors include IV fluids and parathyroidectomy (the benign tumour in his neck) as these can derange calcium levels.*

*Gout more typically presents as an acute onset of monoarthritis in the toe, although can affect a range of joints. Gout is often precipitated by a particular event, such as an overindulgent meal or starting a new medication, often on a background of other lifestyle related conditions such as hypertension. Terry is fit and well and describes no trigger, making gout less likely.*

*Reactive arthritis usually occurs following a GI or GU infection and, despite having a fever, Terry reports no infectious symptoms.*

*Rheumatoid arthritis has a far more gradual onset.*

*Septic arthritis also often occurs in the knee but patients with septic arthritis are often systemically unwell. Patients often also have specific risk factors, such as immunosuppression or joint prostheses. It also tends to have a sub-acute onset over a week or so.*

**Question 78- Answer A- Allopurinol**

*Allopurinol, a xanthine oxidase inhibitor, is prescribed for long term prevention of gout (Allo-long time). Colchicine (B) is prescribed during acute attacks of gout and is something that should be given today, but the question specifically asks what should be given to prevent future attacks and hence the answer is allopurinol.*

*NICE recommend a proton pump inhibitor such as lansoprazole (D) should be co-prescribed for gastric protection when using NSAIDs. NICE also recommend paracetamol (E) as an adjunct for pain relief if needed. Hydroxychloroquine (C) is a DMARD medication and has limited benefit in cases of gout, instead is used in treatment of rheumatoid arthritis.*

**Question 79- Answer C- Osteopenia**

*Beryl has osteopenia. A T score of -1 to -2.5 suggests osteopenia, whereas a score of under -2.5 suggests osteoporosis. Osteoarthritis is a degenerative condition resulting in gradual onset joint pain and deformity. Osteomalacia is an adult version of Rickets, where the bones become soft usually due to vitamin D or calcium deficiency. Osteosarcoma is a soft tissue malignancy more common in younger patients.*

**Question 80- Answer C- Reactive Arthritis**

*Jack is suffering from Reactive arthritis secondary to a Chlamydia infection. This can cause Reiter's triad of conjunctivitis, urethritis and arthritis (can't see, can't pee, can't climb tree) as well as keratoderma blennorrhagium (the rash on his feet) and mouth ulcers. It usually settles on its own. Dermatomyositis usually presents with purple rash on the face and red rashes on the knuckles, as well as arthritis. A rash on the soles is uncommon in this disease.*

*Fibromyalgia more typically presents with widespread joint pain and fatigue.*

*Sjogren's can cause dry eyes and a dry mouth but is unlikely to cause urethritis and feet rashes.*

*Systemic sclerosis causes excess collagen deposition and may cause rashes but does not commonly cause urethritis or conjunctivitis.*

**Neurology**

**Question 81- Answer A- CT imaging of head**

*(A) is the correct answer as emergency scanning is key to finding which type of stroke it is and tailoring treatment accordingly.*

*(B) incorrect as we do not yet know if it is ischaemic cause (if it is an ischaemic stroke then stopping anti-coagulation therapy could lead to more clot formation) (C) incorrect as we do not yet know if it is haemorrhagic cause (if it's haemorrhagic and you give alteplase you prevent any chance of the bleed clotting) (D) MRI is sensitive and specific for strokes but it is not as readily available as CT and requires more setup, (E) it is important to rehabilitate the patient but you want to stabilise them first.*

**Question 82- Answer A- Amaurosis Fugax**

*(A) is the correct answer as the man's symptoms match the classic presentation of painless, unilateral vision loss secondary to emboli such as to lodge within the retinal artery.*

*(B) painful and blurry vision with halos around objects – seen in diabetes, (C) also painful and blurry vision – seen in MS, (D) associated with headaches which this patient does not have, (E) this is painless but the resulting vision loss is prolonged.*

**Question 83- Answer E- Sodium Valproate**

*(A) unless the patient happens to have another seizure, this is not needed as it is used to control acute seizures, (B) Gabapentin used as 2<sup>nd</sup> line for focal seizures, (C) Rivastigmine is an Ach-esterase inhibitor mainly used in the treatment of Alzheimer's, (D) an unprovoked epileptic seizure needs preventative treatment against further episodes, (E) sodium valproate is first line for generalised seizures such as the one described.*

**Question 84- Answer C – Hands shaking when trying to reach for something**

*(A) Hypomimia, or masked facies, is a common diagnostic factor for PD. It is often noted by the partner of the patient. (B) Aka micrographia, thought to be caused by neurodegeneration of the basal ganglia. (D) Rigidity and (E) bradykinesia are both classical features of PD. (C) Shaking when trying to reach for something describes an intention tremor, patients in PD experience a resting tremor (pill-rolling tremor) which is present at rest but absent on movement.*

**Question 85- Answer A- Ascending paralysis from the lower limbs**

*(A) is the correct answer as it is a feature of Guillain-Barre syndrome which is an autoimmune neurological disorder and is highly unlikely to be seen in patients with a brain tumour without GBS. (B) Coma is a late stage feature of brain tumours, secondary to raised ICP. (C) cerebellar signs – DANISH– are focal neurological signs that can be caused by mass effect of brain tumours (Dysidiadokinesia, ataxia, nystagmus, intention tremor, slurred/staccato speech, hypotonia. (D) due to raised ICP. (E) Another focal neurological sign as the regular electrical activity of the brain is disturbed by the tumour.*

**Question 86- Answer B- Oral prednisolone**

*(B) is the correct answer. The patient has giant cell (temporal) arteritis which commonly occurs with polymyalgia rheumatica (she complained of weak shoulders and hips.) It is advised to give a high dose of oral prednisolone especially as the patient is experiencing vision loss (due to ophthalmic arteries also being involved). Steroids such as prednisolone counteract the inflammation from the vasculitis and allow the patient to recover.*

*(A) Give IM benzylpenicillin form in cases of suspected bacterial meningitis in pre-hospital settings prior to secondary care admission. (C) Will relieve the pain but does not treat the underlying cause. (D) Patients with GCA require urgent same-day referral if they have visual symptoms. (E) Not useful as the vasculitis cannot be visualised on the scan.*

**Question 87- Answer A- Cauda equina syndrome**

*(A) is the correct answer as the clinical features of cauda equina syndrome are: inability to open bowels/urinate, reduced anal tone, saddle anaesthesia (numbness around pelvic girdle). The syndrome is caused by a prolapsed disc going into the cauda equina and pressing on the sacral nerves there.*

*(B) compression of spinal cord is incorrect as there would be additional sensory loss one dermatome below where the sensation is already reduced, as well as UMN signs below the level of the compression. (D) Nerve root compression would affect only one nerve root and result in pain shooting down the leg and decreased sensation in that dermatome. (C) and (E) are incorrect answers as they do not match the neurological signs.*

**Question 88- Answer A- Acetylcholinesterase inhibitors**

*(B) describes L-dopa/Levodopa which is mainly used to treat Parkinson's disease. (C) This is the mechanism of action of ACEi e.g. ramipril (D) describes COX inhibitors such as Ibuprofen, (E) describes Mannitol's action to reduce ICP in cases of haemorrhage or other raised ICP cases. (A) is the correct answer and the drugs in the question seek to restore Acetylcholine to the synaptic cleft as it is depleted in myasthenia gravis, causing the loss of control of skeletal muscles - esp. eyes, mouth, throat and limbs.*

**Question 89- Answer C- Lymphoedema**

*(C) correct answer as it is the only one that has minimal association with nerve damage and instead concerns arms/legs swelling secondary to damaged or removed lymph nodes.*

*(A) is one of the most common polyneuropathies, leading to loss of sensation in a 'glove and stocking' nerve distribution. (B) Hep C viral infection, diphtheria, leprosy, HIV, Lyme disease can all cause neuropathies. (D) Connective tissue disorders such as Sjogren's and SLE can lead to polyneuropathies. (E) Alcoholism can lead to Thiamine deficiency which leads to polyneuropathy.*

**Question 90- Answer B- <4.5hrs**

*(B) is the correct answer as per current NICE guidelines. IV alteplase – a clot busting drug or tissue plasminogen activator – must be administered as early as possible – ideally within 4.5 hours, to a patient with acute ischaemic stroke. It is also necessary before administration that intracranial haemorrhage has been excluded by imaging such as CT.*

**Respiratory**

**Question 91- Answer A- Haemophilus Influenzae**

*The most common bacterial organisms that cause infective exacerbations of COPD are:*

- *Haemophilus influenzae (most common cause)*
- *Streptococcus pneumonia*
- *Moraxella catarrhalis*

*Respiratory viruses account for 30% of COPD exacerbations with rhinovirus being the most common viral cause.*

**Question 92- Answer A- Arterial Blood Gas Sampling**

*In the vignette above Harry is suffering from an exacerbation from COPD. Our first step in his management is to assess the severity of Harry's respiratory difficulty and to treat appropriately, an ABG is important in managing acute COPD exacerbations as by looking at the PO<sub>2</sub>, PCO<sub>2</sub> and his acid-base status shown on an ABG and our clinical assessment so far, we can establish whether Harry needs further respiratory support such as BIPAP (option C) or referral to Intensive Care for invasive ventilation.*

*Options B, D & E are investigations that may be done later in managing the patient, but initially assessing and treating his breathing difficulty takes priority.*

*Venous bloods can be taken whilst inserting a cannula and sent to the labs. An arterial blood gas is taken with an ABG needle/syringe and is read on the ABG machine which will be situated in the A&E department itself and so is a cheap test which gives quick results in just a couple of minutes.*

*ABGs are often repeated later on in COPD patients to look for improvement / response of the patient to treatment.*

**Question 93- Answer B- SpO2 92%**

The British Thoracic Society 2019 guidelines categorizes the levels of an acute severe asthma attack in the following way.

Table 15: Levels of severity of acute asthma attacks in adults<sup>566-571</sup>

<b>Moderate acute asthma</b>	Increasing symptoms PEF >50–75% best or predicted No features of acute severe asthma	
<b>Acute severe asthma</b>	Any one of: - PEF 33–50% best or predicted - respiratory rate ≥25/min - heart rate ≥110/min - inability to complete sentences in one breath	
<b>Life-threatening asthma</b>	Any one of the following in a patient with severe asthma:	
	<b>Clinical signs</b>	<b>Measurements</b>
	Altered conscious level	PEF <33% best or predicted
	Exhaustion	SpO <sub>2</sub> <92%
	Arrhythmia	PaO <sub>2</sub> <8 kPa
	Hypotension	'normal' PaCO <sub>2</sub> (4.6–6.0 kPa)
	Cyanosis	
	Silent chest Poor respiratory effort	
<b>Near-fatal asthma</b>	Raised PaCO <sub>2</sub> and/or requiring mechanical ventilation with raised inflation pressures <sup>555-557</sup>	

**Question 94 – Answer E- Salbutamol Inhaler**

Salbutamol is a short acting beta agonist. It is designed to work selectively on the beta 2 adrenergic receptors found in the lungs, which relaxes the smooth muscle of the airways. However, the drug isn't completely selective and so some of the drug acts on the sympathetic receptors in the heart (causing tachycardia) and sympathetic receptors in skeletal muscle (causing a tremor).

Another important side effect of salbutamol is hypokalaemia.

Options A and C (Beclametasone and Proprionate) are inhaled corticosteroids, important side effects of these are oral candida and stunted growth in children.

Option B (montelukast) is a leukotriene receptor antagonist.

Option D (prednisolone) is a corticosteroid.

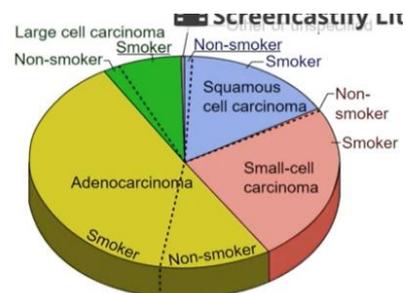
**Question 95- Answer A- Adenocarcinoma**

Adenocarcinoma is the most common type of primary lung cancer among non-smokers; however most cases of adenocarcinoma are still seen in smokers. It is currently (as of April 2020) the most common type of lung cancer seen in the UK. It arises from the mucus secreting glandular cells of the lung. It is typically sited peripherally in the lungs.

Small cell lung carcinoma is the most associated with smoking. This type of lung cancer can secrete ADH (causing hyponatraemia) and ACTH (causing Cushing's syndrome). It progresses rapidly and metastasizes early. It is typically sited centrally.

Squamous cell carcinoma is also highly associated with smoking and typically sited centrally. This type can secrete parathyroid hormone-related protein which causes hypercalcaemia.

The diagram (right) is based on lung cancers in the US and so may not be accurate to the UK distribution of primary lung cancers, however it does demonstrate the relationship of smoking to the different types.



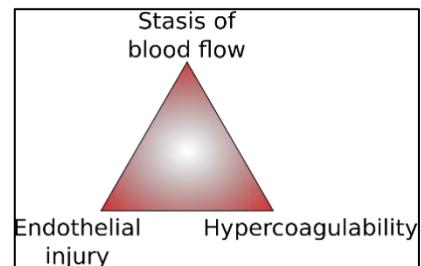
**Question 96- Answer C- Mesothelioma**

Mesothelioma is highly associated with asbestos exposure. It arises from the mesothelioma cells of the pleural lining. If a case of mesothelioma is seen, a patient should be informed that they can apply for industrial compensation. There is a significant amount of time from exposure of asbestos to the development of mesothelioma, estimated at around 20-40 years. Deaths from mesothelioma must be sent to the HM Coroner.

Jobs highly associated with asbestos exposure are those at shipbuilding yards and power stations. Asbestos is also associated with other lung conditions such as asbestosis (fibrosis of the lungs), pleural plaques, pleural thickening and lung cancer.

**Question 97- Answer E- Pulmonary Embolism**

The mostly likely cause is a pulmonary embolism, the classic symptoms of a pulmonary embolism are pleuritic chest pain (worse on deep breaths), shortness of breath and haemoptysis. Pregnancy is a risk factor for pulmonary embolisms as during pregnancy the blood is in a more hypercoagulable state. The majority of PE's during pregnancy are seen in the third trimester. Diagram (right)= Virchow's triad



**Question 98- Answer C- Early mobility post-surgery**

Early mobility post-surgery decreases the risk of a DVT or a PE. Immobility increases the risk. All of the other options are risk factors for a DVT or PE. (Refer again to Virchow's triad above)

**Question 99- Answer C- 3**

Mick's CURB65 score is a 3 overall due to his age, confusion and urea levels. NICE guidance suggests that intensive care should be considered for patients scoring a 3 or above. A CURB65 score should be used alongside clinical judgement. One point is scored for each of the categories below

C	Confusion (abbreviated mental test score $\leq 8/10$ )
U	urea $> 7$ mmol/L
R	Respiration rate $\geq 30$ /min
B	Blood pressure: systolic $\leq 90$ mmHg and/or diastolic $\leq 60$ mmHg
65	Aged $\geq 65$ years

**Question 100- Answer D- TB**

*The diagnosis here is TB. The sputum culture showing acid fast bacilli is what leads us to a diagnosis of TB in Jeremy's case. Symptoms of haemoptysis, cough and fevers/night sweats, fatigue and weight loss are all typical features in a patient with TB and the chest xray showing a cavity in an upper lobe would be the TB causing formation of a Ghon focus. Homelessness is a risk factor for TB development.*

*All the options above can cause haemoptysis however only TB would show acid fast bacilli on sputum culture.*

*A bacterial pneumonia is a good differential as it could cause a cough, haemoptysis and the chest xray presentation.*

*Lung cancer is also an important differential in anyone with a cough over 3 weeks with haemoptysis and could look similar to TB on a chest xray.*

**Google Form Scores/Feedback**

- **Record your scores-** this enables us to calculate an average mark for the mock and gauge the difficulty of the paper as a whole. Note that this data is anonymous. No identifying information will be released.
- **Inform us of mistakes-** from spelling mistakes, to incorrect explanations let us know where we've gone wrong so we can change it.
- **Ask for more clarification-** maybe you want a clearer explanation of the difference between 2 answers or more justification for the single best answer, ask us and we'll get on it.

PAPER 1 Google Form- <https://forms.gle/Q1HPgsCgwSR9xg2dA>

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

**Andrew Maud**

**PTS 2a Coordinator 2020**