

Pharma Hemato

1. A 58-year-old woman who is obese presents to the emergency department with diaphoresis and crushing chest pain that radiates to her left arm. The physician orders an ECG and checks her cardiac enzymes to confirm his suspicion of myocardial infarction. Because of the quick response and intervention, she survives and is ultimately discharged with a prescription for low-dose daily aspirin to inhibit platelet aggregation. Two weeks after discharge, she takes ibuprofen for a tension headache. What is the effect of the ibuprofen on her anticoagulation regimen?

- a) Excessive antiplatelet activity because of a synergistic action between aspirin and ibuprofen on platelets
- b) Excessive antiplatelet activity because of ibuprofen's effects on endothelial cells combined with aspirin's effects on platelets
- c) Insufficient antiplatelet activity because ibuprofen induces liver cytochrome P450 Metabolism of aspirin
- d) Insufficient antiplatelet activity because of inadequate platelet cyclooxygenase inhibition
- e) No change

2. A 60-year-old woman suffers an anterior wall myocardial infarction. She recovers well initially but so on develops left heart failure. Her physician prescribes multiple medications to treat different aspects of patient, including cilastazol. about this agent?

- a) Blocks the activity of ADP at its receptor
- b) Causes excess fluid elimination
- c) Increases cardiac inotropy
- d) Inhibits production of angiotensin II
- e) contraindicated in patients with heart failure

3. A 73-year-old man with a history of coronary disease and angina pectoris is taking aspirin and dipyridamole. The most likely mechanism of action of this agent involves which of the following?

- a) Increased levels of cAMP
- b) Increased levels of cGMP
- c) Increased levels of cGTP
- d) Increased levels of prostacyclin
- e) Increased levels of thrombin

4. A 61-year-old man with hypertension develops atrial fibrillation. His medications include simvastatin and metoprolol. His physician prescribes an anticoagulant for clot prophylaxis, which directly inhibits thrombin. Which drug is this?

- a) Aspirin
- b) Dabigatran
- c) Heparin
- d) Ticlopidine
- e) Warfarin

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5. A 58-year-old man presents to the emergency department (ED) after experiencing a sudden loss of motor control on his left side accompanied by aphasia. By the time he reached the ED, his symptoms had already resolved. He is given a prescription for a drug that binds platelet ADP receptors to prevent their aggregation. Which drug is this?

- a) Clopidogrel
- b) Enoxaparin
- c) Eptifibatide
- d) Tirofiban
- e) tPA

6. A 61-year-old female is hospitalized for COPD exacerbation. She is obese and not able to ambulate very far on her own. Upon discharge, the physician wants to send her home on heparin to reduce the risk of Deep vein thrombosis. Why would the physician choose low-molecular weight heparin (LMWH) instead of unfractionated heparin (UFH)?

- a) LMWH is a better inhibitor of thrombin
- b) LMWH carries no risk of bleeding
- c) LMWH does not cause HIT
- d) LMWH is easier to manage for outpatients
- e) LMWH is more easily reversible

7. A 52-year-old female presents to the emergency room with swelling over her right calf for the past 3 days. Her right calf is warm, erythematous, and tender to palpation. A duplex is performed and shows a deep vein thrombosis (DVT). This is her first DVT. She is started on warfarin and told that she must continue it for the next 3 months. What effect does warfarin have on the coagulation panel?

- a) Decreases partial thromboplastin time
- b) Decreases prothrombin time
- c) Increases bleeding time
- d) Increases partial thromboplastin time
- e) Increases prothrombin time

8. A 78-year-old man presents to the emergency room with acute-onset left-sided weakness and slurred speech that started 40 min ago. A CT scan of his brain confirms an ischemic stroke. The patient is started on alteplase immediately. What is the mechanism of action of alteplase?

- a) Binds to glycoprotein receptor IIb/IIIa
- b) Blocks ADP receptors
- c) Converts plasminogen to plasmin
- d) Inhibits COX-1 and COX-2
- e) Inhibits thrombin

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9. A 45-year-old man with a family history of hyperlipidemia and heart disease comes to the ER diaphoretic with chest pain radiating to his left arm. An ECG shows ST segment elevation in Leads II, III, and aVF. The doctor administers alteplase intravenously. How does alteplase work?

- a) Activates antithrombin III
- b) Activates plasminogen**
- c) Activates thrombin
- d) Blocks production of thromboxane A₂
- e) Blocks platelet ADP receptors

10. A newly built hospital with the latest equipment and medication therapies purports a very high rate of salvage of strokes such that patients have significant recovery of normal function. Alteplase is the first-line agent administered in this facility. For the purported maximum salvage rate following stroke, this agent must be administered in which of the following time intervals?

- a) Within 3 h**
- b) Within 6 h
- c) Within 9 h
- d) Within 12 h
- e) Within 24 h

11. A 75-year-old man is brought to the emergency department with right calf pain and swelling. Three weeks ago, he underwent a radical cystectomy for invasive bladder cancer. Ultrasound reveals a right pelvic vein deep venous thrombosis. The patient was treated with a bolus of heparin, and a heparin drip was started. One hour later, he was bleeding profusely from the intravenous site. The heparin therapy was suspended, but the bleeding continued. Protamine sulfate was administered intravenously that works in which of the following ways?

- a) Activates the coagulation cascade
- b) Activates tissue plasminogen activator
- c) Degrades the heparin
- d) Inactivates antithrombin
- e) Ionically combines with heparin**

12. A 47-year-old man is recovering from a heart attack. He takes a daily baby aspirin to prevent further attacks. He also takes phenelzine for refractory panic disorder. Which of the following characteristics do aspirin and phenelzine share?

- a) Antiplatelet activity
- b) Irreversible inhibition**
- c) Inhibit the same enzyme
- d) Should not be taken with tyramine-containing foods
- e) Side effect of hypertension

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J.M. is a 72-year-old woman (height 64 inches, weight 57 kg) who presents to the hospital with nonvalvular atrial fibrillation (NVAF). After her heart rate is controlled with metoprolol, she is asymptomatic. She also has hypertension, dyslipidemia, and depression. Her current medications include metoprolol 100 mg twice daily, enalapril 10 mg twice daily, and citalopram 20 mg daily. Her heart rate is currently 78 beats/minute and blood pressure is 134/86 mm Hg. Her serum creatinine (SCr) is 0.8 mg/dL and creatinine clearance (CrCl) is 60 mL/minute/1.73 m²; she has normal hepatic function.

13. Which best depicts J.M.'s CHA₂DS₂-VASc score and HAS-BLED score?

- a) CHA₂DS₂-VASc score of 1 and a HAS-BLED score of 1.
- b) CHA₂DS₂-VASc score of 3 and a HAS-BLED score of 1.
- c) CHA₂DS₂-VASc score of 5 and a HAS-BLED score of 4.
- d) CHA₂DS₂-VASc score of 3 and a HAS-BLED score of 2.

14. Which is the most appropriate stroke prevention strategy for J.M.?

- a) Aspirin 325 mg once daily.
- b) Rivaroxaban 20 mg once daily.
- c) Apixaban 2.5 mg twice daily.
- d) Edoxaban 30 mg once daily.

15. J.M. was initiated on dabigatran and, 3 months later, is involved in a motor vehicle accident resulting in an intracranial hemorrhage. Which is the most appropriate reversal strategy for J.M.?

- a) Protamine.
- b) Fresh frozen plasma (FFP).
- c) Andexanet alfa.
- d) Idarucizumab.

B.T. is a 68-year-old man (height 72 inches, weight 96 kg) who recently underwent surgical aortic valve replacement with a bioprosthetic valve and is recovering well. He also has hypertension, dyslipidemia, systolic heart failure, and a history of sustained ventricular tachycardia. His current medications include carvedilol 25 mg twice daily, lisinopril 10 mg daily, furosemide 40 mg daily, amiodarone 400 mg daily, and atorvastatin 80 mg daily. His CrCl is 40 mL/minute/1.73 m², his hepatic function is normal, and his other laboratory data are within normal limits.

16. Which is the most appropriate antithrombotic regimen for B.T.?

- a) Aspirin 81 mg daily.
- b) Warfarin 7.5 mg daily to an international normalized ratio (INR) of 2.5–3.5.
- c) Apixaban 5 mg twice daily.
- d) Dabigatran 150 mg twice daily.

17. Which best depicts how long B.T. should receive therapy?

- a) At least 1 month.
- b) At least 3 months.
- c) At least 1 year.
- d) Indefinitely.

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M.R. is a 51-year-old woman (height 65 inches, weight 98 kg, body mass index [BMI] 36 kg/m²) who presents to the emergency department with pain, swelling, and redness in her right leg up into her thigh. She also has some shortness of breath and pain in the middle of her chest. She reports that she had a hysterectomy about 2 weeks ago and has not been moving around much at home in the past 2 weeks. On physical examination, her right leg is warmer than the left and tender to touch. Her cardiac examination appears normal, with vital signs of heart rate of 80 beats/minute, blood pressure 146/96 mm Hg, respiratory rate 20 breaths/minute, and oxygen saturation 92% on room air. Her initial laboratory information includes a positive D-dimer, a negative troponin, and a CrCl of 65 mL/minute/1.73 m². Duplex ultrasound detects a right femoral-popliteal deep venous thrombosis (DVT), and computed tomography (CT) reveals a pulmonary embolism (PE). Her other conditions include hypertension, diabetes mellitus, and dyslipidemia. She also reports smoking 1 pack/day of cigarettes for the past 30 years. Her current medications include lisinopril 10 mg daily, chlorthalidone 25 mg daily, metformin 1000 mg twice daily, pravastatin 40 mg daily, and hydrocodone 5 mg/acetaminophen 500 mg every 6 hours as needed for pain.

18. Which best depicts M.R.'s number of venous thromboembolism (VTE) risk factors?

- a) 3.
- b) 4.
- c) 5.
- d) 6.

19. Which is the most appropriate treatment strategy for M.R.?

- a) Enoxaparin 100 mg every 12 hours and dabigatran 150 mg twice daily; after 5 days, enoxaparin can be discontinued.
- b) Rivaroxaban 15 mg twice daily for 7 days, followed by 20 mg once daily.
- c) Enoxaparin 100 mg every 12 hours for 5 days; then initiate edoxaban 60 mg once daily.
- d) Unfractionated heparin (UFH) 4000-unit bolus, followed by 1000 units/hour and warfarin 7.5 mg to an INR of 2.0–3.0, discontinuing UFH when a therapeutic INR is reached.

20. T.G. (weight 125 kg) is admitted for the treatment of a DVT with a PE. He is given a 10,000-unit bolus of UFH and initiated on an infusion of 2250 units/hour. Twelve hours into the infusion, he begins to vomit blood. Which is the most appropriate protamine dose for T.G.?

- a) 100 mg.
- b) 50 mg.
- c) 39 mg.
- d) 22.5 mg.

21. P.M. recently had knee replacement surgery. She has normal renal and hepatic function. Which is the most appropriate regimen for preventing VTE in P.M.?

- a) Dabigatran 110 mg, followed by 220 mg once daily.
- b) Enoxaparin 40 mg subcutaneously once daily.
- c) Fondaparinux 2.5 mg subcutaneously once daily.
- d) Edoxaban 60 mg once daily

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B.D. is a 73-year-old man (height 69 inches, weight 80 kg) with newly diagnosed NVAf. He also has a history of hypertension, dyslipidemia, stable ischemic heart disease, and systolic heart failure. His current medications include aspirin 81 mg daily, enalapril 10 mg daily, atorvastatin 80 mg daily, metoprolol succinate 200 mg daily, furosemide 40 mg daily, spironolactone 25 mg daily, and amlodipine 10 mg daily. His current heart rate is 72 beats/ minute and blood pressure is 122/72 mm Hg. His laboratory values include potassium 4.9 mEq/L, stable SCr 1.9 mEq/L, and blood glucose 101 mg/dL.

22. Which best depicts B.D.'s CHA₂DS₂-VASc score?

- a) 2.
- b) 3.
- c) 4.
- d) 5.

23. Which statement is most accurate regarding DOAC therapy for reducing the risk of stroke in patients with NVAf?

- a) All of the DOACs significantly reduced ischemic stroke in the phase III trials compared with warfarin.
- b) All of the DOACs significantly reduced hemorrhagic stroke in the phase III trials compared with warfarin.
- c) Apixaban is more effective than rivaroxaban because apixaban was superior to warfarin in the ARISTOTLE trial and rivaroxaban was only noninferior to warfarin in the ROCKET-AF trial.
- d) Dabigatran was studied in the highest-risk patients across the phase III trials and should not be used in patients with a CHADS₂ score of less than 3.

24. Which is the most appropriate regimen for reducing B.D.'s risk of stroke?

- a) Dabigatran 75 mg twice daily.
- b) Rivaroxaban 20 mg once daily.
- c) Apixaban 5 mg twice daily.
- d) Edoxaban 60 mg once daily.

25. Six months later, B.D. needs to undergo percutaneous coronary intervention for management of his coronary artery disease. He has had no medication changes, and his vital signs and laboratory information remain consistent. Which is the best available evidence-based approach to his antithrombotic therapy?

- a) Rivaroxaban 10 mg daily, plus clopidogrel 75 mg daily.
- b) Apixaban 2.5 mg twice daily, plus clopidogrel 75 mg daily.
- c) Adjusted-dose warfarin to an INR of 2.0–3.0, plus aspirin 81 mg daily, plus clopidogrel 75 mg daily.
- d) Edoxaban 15 mg once daily, plus aspirin 81 mg daily, plus clopidogrel 75 mg daily.

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S.D. is a 62-year-old woman (height 65 inches, weight 80 kg) with a history of significant primary mitral regurgitation. Her echocardiogram reveals significant leaflet fating that is not amenable to mitral valve repair. She also has a history of hypertension, dyslipidemia, and gout. Her current medications include lisinopril 10 mg daily, hydrochlorothiazide 25 mg daily, simvastatin 40 mg daily, and allopurinol 300 mg daily. Her heart rate is 68 beats/minute and blood pressure is 128/74 mm Hg. Her CrCl is 68 mL/minute/1.73 m². She is scheduled to undergo valve replacement surgery and will receive a mechanical mitral valve. You are discussing the oral anticoagulation post-operative plan with S.D.'s team.

26. Which is the optimal regimen for preventing thrombosis?

- a) Adjusted-dose warfarin to an INR goal of 2.5–3.5, plus aspirin 81 mg daily.
- b) Adjusted-dose warfarin to an INR goal of 2.0–3.0, plus aspirin 81 mg daily.
- c) Adjusted-dose warfarin achieves a goal INR of 2.0–3.0.
- d) Adjusted-dose warfarin to an INR goal of 2.5–3.5.

27. Which statement best describes thrombotic risk in patients with valve replacement surgery?

- a) Bioprosthetic valves carry a higher risk of thrombosis than mechanical valves.
- b) The highest risk of thrombosis with bioprosthetic valve placement is during the first year after surgery.
- c) All patients with mechanical heart valves require bridging therapy during invasive procedures.
- d) Valve replacement in the mitral position carries a higher risk of thrombosis than in the aortic position.

28. B.G. is a 62-year-old man (height 69 inches, weight 110 kg) hospitalized for a heart failure exacerbation. He has symptoms when doing only limited exertion and has been out of bed only to use the bathroom for the past 3 days. His medical history also includes stable ischemic heart disease, hypertension, type 2 diabetes, and a PE 2 years ago. He currently smokes 2 packs/day and drinks 1 glass of wine with dinner most evenings. His current medications include bisoprolol 5 mg daily, lisinopril 10 mg daily, aspirin 81 mg daily, ranolazine 1000 mg twice daily, furosemide 40 mg daily, spironolactone 25 mg daily, and metformin 850 mg twice daily. His blood pressure today is 110/70 mm Hg and heart rate is 58 beats/minute. His laboratory values are normal except for a brain natriuretic peptide of 1498 ng/mL. Which is the most appropriate VTE prevention strategy for B.G.?

- a) Give fondaparinux 5 mg subcutaneously daily.
- b) Give apixaban 2.5 mg orally twice daily.
- c) Give enoxaparin 40 mg subcutaneously daily.
- d) B.G.'s risk does not warrant prophylactic therapy.

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29. R.S. is a 48-year-old man (height 70 inches, weight 90 kg) who presents to the emergency department with pain and swelling in his left leg. On examination, his leg is warm to the touch and tender and has 3+ pitting edema below the knee. His D-dimer is positive, and his duplex ultrasonography identifies a femoral-popliteal DVT. He understands that he will need to receive anticoagulant therapy but wants to avoid any injections, if possible. He has good insurance coverage. His other medical conditions are hypertension, HIV, and dyslipidemia. His medications include benazepril 20 mg daily, ritonavir 100 mg daily, darunavir 800 mg daily, emtricitabine 200 mg/tenofovir disoproxil fumarate 300 mg daily, and atorvastatin 10 mg daily. His vital signs are stable, and his CrCl is 78 mL/minute/1.73 m². Which is the most appropriate anticoagulant regimen to initiate for R.S.?

- a) Rivaroxaban 15 mg twice daily for 21 days, followed by 20 mg daily.
- b) Edoxaban 60 mg daily.
- c) Warfarin 2.5 mg daily.
- d) Apixaban 5 mg twice daily for 7 days, followed by 2.5 mg twice daily

30. K.D. is a 49-year-old man (height 68 inches, weight 100 kg) who was given a diagnosis of an idiopathic DVT 3 weeks ago. He currently takes warfarin 8 mg daily. He missed his INR readings last week when he went on a short vacation. Today, his INR is 10.4. He is not currently bleeding and has no risk factors for bleeding. In addition to holding his warfarin dose, which is the best initial strategy for managing K.D.'s high INR?

- a) Give vitamin K 2.5 mg orally.
- b) Give 4PCC 50 units/kg.
- c) Give vitamin K 5 mg orally.
- d) Give vitamin K 10 mg intravenously.

31. J.W. is a 58-year-old man receiving enoxaparin 40 mg subcutaneously daily for VTE prophylaxis. While trying to shave himself at 6 p.m., he cuts his neck, and the medical team cannot stop the bleeding. His last enoxaparin dose was given at 8 a.m. Which would be the most appropriate protamine dose for J.W.?

- a) 10 mg.
- b) 20 mg.
- c) 40 mg.
- d) 50 mg.

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32. A 62-year-old man presents to the emergency department (ED) with the chief concern of chest pain that woke him from sleep and radiates to his jaw. An electrocardiogram (ECG) reveals ST-segment depression in leads II, III, and aVF. His blood pressure is 112/62 mm Hg and heart rate is 60 beats/minute. Cardiac enzymes have been obtained, and the first troponin result was slightly positive. Preparations are under way to take the patient to the cardiac catheterization laboratory for evaluation. Which medication regimen is most appropriate for this patient at this time?

- a) Aspirin 325 mg, clopidogrel 600-mg loading dose (LD), and unfractionated heparin (UFH) infusion 80-unit/kg bolus, followed by 18 units/kg/hour and metoprolol 5 mg intravenously.
- b) Aspirin 81 mg; prasugrel 60-mg LD; UFH infusion 60-unit/kg bolus, followed by 12 units/kg/hour; and intravenous enalaprilat.
- c) Aspirin 325 mg, ticagrelor 180-mg LD, and UFH infusion 60-unit/kg bolus, followed by 12 units/kg/hour.
- d) Aspirin 81 mg, prasugrel 60-mg LD, nitroglycerin infusion at 10 mcg/minute, and bivalirudin 0.75-mg/kg bolus and 1.75-mg/kg/hour infusion.

33. An 81-year-old African American man (weight 90 kg) presents to the ED with chest pressure (10/10 on a pain scale). His ECG reveals ST-segment depression in the inferior leads. His medical history is significant for hypertension and chronic kidney disease. Pertinent laboratory results are troponin 5.8 ng/L, serum creatinine (SCr) 3.7 mg/dL, and estimated creatinine clearance (eCrCl) 20 mL/minute. The patient has been given aspirin 325 mg single dose; a nitroglycerin drip, initiated at 5 mcg/minute, will be titrated to chest pain relief and blood pressure. The patient consents for cardiac catheterization after adequate hydration. Which anticoagulation strategy is most appropriate to initiate in this patient?

- a) Intravenous heparin 4000-unit intravenous bolus, followed by a 1000-unit/hour continuous infusion.
- b) Enoxaparin 90 mg subcutaneously every 12 hours.
- c) Fondaparinux 2.5 mg subcutaneously daily.
- d) Bivalirudin 67.5-mg bolus, followed by a 157-mg/hour infusion.

34. A 56-year-old man presents to the hospital with the chief concern of chest pain that was unrelieved at home with sublingual nitroglycerin. His ECG reveals ST-segment depression and T-wave inversion. Cardiac markers show an elevated troponin I. The cardiologist has requested that the patient go to the cardiac catheterization laboratory for further evaluation. The patient has a history of coronary artery disease (CAD) and had a myocardial infarction (MI) about 6 months ago. During his previous hospitalization, he was confirmed to have developed heparin-induced thrombocytopenia (HIT) after his platelet count (Plt) dropped to 40,000/mm³ and he had a positive ELISA (enzyme-linked immunosorbent assay) upon serologic testing after his previous catheterization. Given this patient's diagnosis and history, which treatment regimen would be most appropriate during his cardiac catheterization?

- a) Abciximab.
- b) Bivalirudin.
- c) Enoxaparin.
- d) Tenecteplase.

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35. A 60-year-old man (weight 75 kg) presents to the ED with crushing substernal chest pain and ST-segment elevations on ECG. He has a medical history of diabetes and a 40 pack-year history of smoking. He is taken immediately to the catheterization laboratory for primary PCI, and a drug eluting stent is placed in his left anterior descending artery. In addition to aspirin, which regimen would best maintain this patient's stent patency?

- a) Clopidogrel 300-mg LD, followed by 75 mg daily for 12 months.
- b) Prasugrel 60-mg LD, followed by 10 mg daily for 12 months.
- c) Ticagrelor 180-mg LD, followed by 90 mg daily for 6 months.
- d) Clopidogrel 600-mg LD, followed by 75 mg daily for 6 months.

36. A 66-year-old woman (weight 70 kg) with a history of MI, hypertension, hyperlipidemia, and diabetes mellitus presents with sudden-onset diaphoresis, nausea, vomiting, and dyspnea, followed by a bandlike upper chest pain (8/10) radiating to her left arm. She had felt well until 1 month ago, when she noticed her typical angina was occurring with less exertion. Her ECG reveals ST-segment depression in leads II, III, and aVF and hyperdynamic T waves and positive cardiac enzymes. Blood pressure is 150/90 mm Hg, and all laboratory results are normal; SCr is 1.2 mg/dL. Home medications are aspirin 81 mg/day, simvastatin 40 mg every night, metoprolol 50 mg twice daily, and metformin 1 g twice daily. Which regimen is best for this patient?

- a) Aspirin 325 mg, ticagrelor 180 mg one dose, and UFH 60-unit/kg bolus; then 12 units/kg/hour titrated to 50–70 seconds with an early invasive approach.
- b) Aspirin 325 mg and enoxaparin 70 mg subcutaneously twice daily with an early invasive approach.
- c) An ischemia-guided strategy with tirofiban 25 mcg/kg; then 0.15 mg/kg/minute plus enoxaparin 80 mg subcutaneously twice daily, aspirin 325 mg/day, and clopidogrel 300 mg one dose; then 75 mg once daily.
- d) An ischemia-guided strategy with aspirin 325 mg and ticagrelor 180 mg one dose; plus UFH 70-unit/kg bolus; then 15 units/kg/hour.

37. A 45-year-old patient underwent an elective percutaneous transluminal coronary angioplasty and drug-eluting stent placement in her right coronary artery. Which best represents the minimum time DAPT should be continued?

- a) 1 month.
- b) 3 months.
- c) 6 months.
- d) 12 months.

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38. A 52-year-old man (weight 100 kg) with a history of hypertension and hypertriglyceridemia presents at a major university teaching hospital with a cardiac catheterization laboratory. He has had 3 hours of crushing 10/10 substernal chest pain radiating to both arms that began while he was eating his lunch (seated), which is accompanied by nausea, diaphoresis, and shortness of breath. He has never before had chest pain of this character or intensity. He usually can walk several miles without difficulty and smokes 1.5 packs/day of cigarettes. Home medications are lisinopril 2.5 mg/day and aspirin 81 mg daily. Current vital signs include heart rate 68 beats/minute and blood pressure 178/94 mm Hg. His ECG reveals a 3-mm ST-segment elevation in leads V2–V4, I, and aVL. Serum chemistry values are within normal limits. The first set of cardiac markers shows positive troponins, 0.8 mcg/L (normal defined as less than 0.1 mcg/L). Which regimen is best for this patient's STEMI?

- a) Reperfusion with primary PCI and stenting of occluded artery, together with tirofiban 25 mcg/kg; then 0.15 mg/kg/minute, clopidogrel 300 mg one dose, and aspirin 325 mg one dose.
- b) Reperfusion with a reteplase 10-unit bolus twice, 30 minutes apart, plus a UFH 60-unit/kg bolus and a 12-unit/kg/hour infusion, clopidogrel, and aspirin.
- c) Reperfusion with tenecteplase 25-mg intravenous push one dose, enoxaparin 30-mg intravenous bolus plus 100 mg subcutaneously twice daily, aspirin 325 mg one dose, ticagrelor 180 mg one dose, and bivalirudin 0.75 mg/kg followed by 1.75 mg/kg/hour.
- d) Reperfusion with primary PCI with stenting, prasugrel 60 mg one dose, aspirin 325 mg one dose, and bivalirudin 0.75 mg/kg followed by 1.75 mg/kg/hour.

39. A 76-year-old male smoker (weight 61 kg) has a history of hypertension, benign prostatic hypertrophy, and lower back pain. Three weeks ago, he began to have substernal chest pain with exertion (together with dyspnea), which radiated to both arms and was associated with nausea and diaphoresis. These episodes have increased in frequency to four or five times daily; they are relieved with rest. He has never had an ECG. Today, he awoke with 7/10 chest pain and went to the ED of a rural community hospital 2 hours later. He was acutely dyspneic and had ongoing pain. Home medications are aspirin 81 mg/day for 2 months, doxazosin 2 mg/day, and ibuprofen 800 mg three times daily. Vital signs include heart rate 42 beats/minute (sinus bradycardia) and blood pressure 104/48 mm Hg. Laboratory results include blood urea nitrogen (BUN) 45 mg/dL, SCr 2.5 mg/dL, and troponin 1.5 ng/L (normal value less than 0.1 ng/L). His ECG reveals a 3-mm ST-segment elevation. Aspirin, ticagrelor, and sublingual nitroglycerin were given in the ED. The nearest hospital with a catheterization laboratory facility is 2½ hours away. Which regimen is best?

- a) Give alteplase 15 units intravenously plus enoxaparin 30-mg intravenous bolus.
- b) Use an ischemia-guided treatment strategy with UFH 4000-unit intravenous bolus, followed by 800 units intravenously per hour.
- c) Give tenecteplase 35 mg intravenously plus UFH 4000-unit intravenous bolus followed by 800 units intravenously per hour.
- d) Transfer the patient to a facility for primary PCI.

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40. A 78-year-old man presents after a ground-level fall. He has a history of atrial fibrillation and his medications include rivaroxaban (Xarelto), which his family confirms he took this morning. On physical exam, he is withdrawing to pain and mumbling incomprehensible sounds. He has a parietal scalp hematoma. CT of the head shows a large subdural hematoma with 2mm midline shift. Neurosurgery plans to perform craniotomy. The best strategy for reversing the patient's anticoagulation is:

- a) No reversal is required if the INR is <2
- b) Administer the specific FDA-approved reversal agent idarucizumab
- c) Administer platelets
- d) Administer platelets and FFP
- e) Administer 4-factor prothrombin complex concentrate (PCC)

41. A 58-year-old man presents to clinic with a new diagnosis of colovesical fistula secondary to diverticulitis. A colonoscopy reveals no evidence of malignancy. His past medical history is significant for coronary artery disease for which he underwent coronary stenting of the left anterior descending artery with a drug-eluting stent 3 months ago. His current medications include aspirin and clopidogrel. He is being evaluated for sigmoid colectomy. What is the best perioperative strategy with regard to his platelet inhibitors?

- a) Transfuse platelets and proceed with surgery immediately
- b) Stop aspirin and clopidogrel immediately, then proceed with surgery in seven days
- c) Continue aspirin, stop clopidogrel immediately, then proceed with surgery in seven days
- d) Wait 3 months, then stop clopidogrel for five days and proceed with surgery
- e) Wait 9 months, then stop clopidogrel for five days and proceed with surgery

42. A 61-year-old woman with a history of aortic stenosis and chronic renal insufficiency underwent aortic valve replacement. Unfractionated heparin was started 6 hours after surgery. On post-operative day 5, she developed pain in the right lower extremity. Examination demonstrated a cool extremity with absent distal pulses. Platelet count fell from 220 000/mm³ on day 3 to 90 000/mm³ on day 5, and creatinine increased from 1.8mg/dL on day 3 to 2.9mg/dL on day 5. She was taken to the operating room where she underwent thrombectomy of the right femoral artery. Intraoperatively, extensive white clot was present in the superficial femoral artery. Which therapeutic option is most appropriate at this time?

- a) Discontinue unfractionated heparin and start argatroban
- b) Discontinue unfractionated heparin and start enoxaparin
- c) Discontinue unfractionated heparin and start lepirudin
- d) Increase unfractionated heparin
- e) Discontinue anticoagulation

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43. A 26-year-old previously healthy woman is admitted to the surgical ICU after appendectomy for perforated appendicitis with peritonitis. Post-operatively she required reintubation for progressive shortness of breath and hypoxia. A chest X-ray demonstrates diffuse bilateral infiltrates. On the first postoperative day, platelet count is 75 000/mm³, PT 19 s, PTT 50 s, oozing is noted from IV sites, and blood is suctioned from her endotracheal tube. Which of the following test results would be consistent with the diagnosis of disseminated intravascular coagulation?

- a) Increased antithrombin level
- b) Elevated fibrin degradation products**
- c) Decreased bleeding time
- d) Elevated fibrinogen level
- e) Decreased D-dimer

BIO Dr. Sirdah Hemato

1. Which of the following is correct regarding 2,3 DPG molecule:

- a) it exhibited higher levels in RBC of people living at sea level compared to high altitude livings.
- b) Produced by Luebering–Rapoport shunt and it increases the affinity of hemoglobin to Oxygen.
- c) Its level is affected by the severity of G6PD mutation, with no differences between hemizygous G6PD deficient males and homozygous G6PD deficient females.
- d) Its level is not affected by the severity of G6PD mutation, but lower levels are expected in G6PD deficient males than heterozygous G6PD females.
- e) The higher the altitude, the higher the 2,3 DPG level and thus more loading of the hemoglobin with oxygen.
- f) None of the above

2. An alpha-thalassemia silent carrier man married to an alpha-thalassemia -1- trait woman of a cis configuration. Assuming no genetic recombination or crossover, which of the following is NOT a possible genotype presentation of their offspring?

- a) Normal individuals
- b) alpha-thalassemia silent carrier
- c) alpha- thalassemia -1- trait (cis)
- d) alpha- thalassemia -1- trait (trans)
- e) Hb H disease
- f) none of the choices is correct

3. A hemoglobin capillary electrophoresis for 15- years old boy showed: Hb A = 63.0 %, Hb S = 35%, Hb A2 = 2.0 %. The most likely interpretation is:

- a) Sickle cell anemia
- b) HbS β -thalassemia
- c) HbS α -thalassemia
- d) Hb SC disease
- e) β thalassemia minor
- f) sickle cell disease
- g) none of the choices is correct

4. Parents with hemoglobin SC disease:

- a) Could not have a child with sickle cell anemia.
- b) Have different mutations on the same codon in each copy of their beta-globin gene.
- c) frequently die in utero from complications of the hemoglobinopathy.
- d) Is a mild condition and Never experience significant clinical consequences.
- e) Exhibit an excess of embryonic zeta (ζ)-chains in their adult red blood cells.
- f) none of the choices is correct

BIO Dr. Sirdah Hemato

5. Severe anemia at birth is a feature of?

- a) Alpha-thalassemia major
- b) Beta-thalassemia major
- c) Hb SC
- d) HbS β -thalassemia
- e) Sickle cell anemia
- f) none of the choices is correct

6. The major abnormal form of hemoglobin that accumulates in a fetus with the severest form of alpha-thalassemia is composed of:

- a) A tetramer of 4 beta-subunits (β_4)
- b) A tetramer containing 2 gamma subunits and 2 beta –subunits ($\gamma_2 \beta_2$)
- c) A tetramer containing 2 zeta-subunits and 2 gamma-subunits ($\zeta_2 \gamma_2$)
- d) A tetramer of 4 delta-subunits (δ_4)
- e) A tetramer of 4 gamma-subunits (γ_4)
- f) none of the choices is correct

7. The most likely mutational mechanism in $\delta\beta$ -thalassemia is:

- a) A duplication.
- b) An insertion.
- c) Two nucleotides deletion
- d) A missense mutation.
- e) A large deletion
- f) Frameshift mutation
- g) None of the choices is correct

8. Which of the following is not true about G6PD deficiency?

- a) Commonly presents as chronic non-spherocytic hemolytic anemia
- b) Leads to intravascular hemolysis after certain infections or drugs
- c) x-linked and much more prevalent in males (hemizygous) than females (homozygous)
- d) Heterozygous females are asymptomatic and never got acute hemolytic anemia like in hemizygous G6PD deficient males
- e) Mainly due to a single-base substitutions leading to missense mutation
- f) It is a cause of neonatal jaundice
- g) When the hemolytic crises is triggered by fava bean ingestion it called favism

BIO Dr. Sirdah Hemato

9. For differentiation of α -thalassemia-1 trait from α thalassemia- 2 trait we perform:

- a) Capillary electrophoresis
- b) Cellulose acetate alkaline electrophoresis (normal time) followed by citrate agar gel acidic electrophoresis
- c) Shorter time Cellulose acetate alkaline electrophoresis
- d) Blood film to identify poikilocytosis
- e) alpha to beta -globin mRNA synthesis ratio
- f) Complete blood count (CBC) with RBC indices (MCV and MCH) and blood film for poikilocytes

10. Which of the following is the primary site of hematopoiesis in fetus life around 20 weeks of gestation?

- a) All bone marrow
- b) Yolk sac
- c) Liver and spleen
- d) Placenta
- e) Long bone marrow
- f) Only the central bone marrow
- g) None of the choices is correct

Hemato

Histo - Dr. Mahmoud Shbair

1. Regarding neutrophils (polymorphonuclear leukocytes), all of the following are true except

- a) They are the most numerous peripheral blood leukocytes.
- b) They contain both specific and azurophilic granules.
- c) They have deeply acidophilic staining specific granules.
- d) Their life span in blood is shorter than in connective tissue.
- e) They have segmented nuclei with great variability in shape and number of segments.

2. Basophils are best differentiated from eosinophils by

- a) being more numerous in peripheral blood.
- b) anucleus that is divided into 2-5 irregular lobes.
- c) increase in number in response to parasitic infestation.
- d) large specific granules overlying the nucleus and usually obscuring its shape.
- e) markedly larger size.

3. During erythropoiesis hemoglobinization of the cytoplasm is first noted in

- a) proerythroblast
- b) basophilic erythroblast.
- c) orthochromatophilic erythroblast.
- d) reticulocyte.
- e) polychromatophilic erythroblast.

4. A normal megakaryocytes characterized by all of the following except

- a) Multiple nuclei that have been yielded by endomitosis.
- b) Huge size reaching 150 um in diameter.
- c) Typically sited in the bone marrow close to sinusoidal capillaries.
- d) Ability to produce few thousands of platelets.
- e) Branching processes penetrating through the sinusoidal endothelium

5. Mature RBC

- a) Is a denucleated cell
- b) Is thinner at the center than the periphery
- c) Has a pale staining center
- d) All of the above

6. Which of the following is not agranulocyte?

- a) Lymphocyte
- b) Monocyte
- c) Neutrophil
- d) None of above

Hemato

7. Most frequent white blood cells are

- a) Neutrophils
- b) Basophils
- c) Monocytes
- d) Eosinophils

8. Most of stained granules in platelets under light microscopy are

- a) Alpha granules
- b) Delta granules
- c) Both of above
- d) None of above

9. The denucleated cell in erythropoiesis is

- a) Proerythroblast
- b) Reticulocyte
- c) Orthochromatophilic erythroblast
- d) Polychromatophilic erythroblast

10. Band cell is an intermediate stage that appears in the differentiation of

- a) Neutrophils
- b) Basophils
- c) Eosinophils
- d) Lymphocytes

11. In human body, neutrophils can exist in

- a) Granulopoietic compartment
- b) Storage compartment
- c) Circulating compartment
- d) Marginating compartment
- e) All of above

12. The largest cell in the bone marrow is

- a) Megakaryocyte
- b) Band
- c) Normoblast
- d) Metamyelocyte

Hemato

Histo - Dr. Momen Zeineddin

1. Which statement is the best to describe the structure of the thymus?

- a) It is divided by connective tissue septa into complete lobules.
- b) It contains a well-developed cytotreticulum formed by reticular cells.
- c) The thymic cortex contains T lymphocytes, macrophages & plasma cells.
- d) No lymphoid nodules characterize the parenchyma.
- e) Filled with huge amount of adipose tissue in infants.

2. Which structure is partially capsulated and covered by pseudo stratified ciliated colu epithelium?

- a) Lingual tonsils
- b) Palatine tonsils
- c) Peyers patch
- d) Hassal corpuscle
- e) pharyngeal tonsils

3. In the lymph node, T-lymphocytes are found mainly in

- a) The outer cortex
- b) Paracortex
- c) Lymphoid nodule
- d) Germinal center
- e) Cortical sinus

4. Which of the following is rich in blood sinusoids?

- a) Spleen
- b) Thymus
- c) Lingual tonsils
- d) Palatine tonsils
- e) Peyer patch

Hemato

Patho - Dr. Mahmoud Shbair

1. A 30-year-old woman complains of recent easy fatigability, bruising, and recurrent throat infections. Physical examination reveals numerous petechiae over her body and mouth. Abnormal laboratory findings include hemoglobin of 6 g/dL, (normal 12-14), WBC of 1,500/mL (normal 4,000-11,000), and platelets of 20,000/mL (normal 150,000-450,000). The bone marrow is hypocellular and displays increased fat. The pathogenesis of this woman's illness includes

- a) impairment of heme synthesis
- b) impairment of DNA synthesis
- c) immune mediated suppression of bone marrow progenitors
- d) mechanical destruction of red cells and consumptive thrombocytopenia
- e) antibody mediated phagocytosis of red cells and platelets

2. A 27-year-old pregnant woman comes to the obstetrician for a prenatal check-up. The obstetrician noticed jaundice and splenomegaly. Routine laboratory testing reveals a normocytic anemia and hyperbilirubinemia. The peripheral blood smear reveals many small, round, dark-staining (hyperchromic) red blood cells (RBCs) lacking central pallor. Which of the following best explains the pathogenesis of anemia seen in this patient?

- a) Abnormal membrane lipoprotein molecules
- b) Abnormal polymerization of spectrin molecules
- c) Decreased iron release in the bone marrow
- d) Destabilization of the lipid bilayer of the RBC membrane
- e) Oxidative denaturation of hemoglobin

3. Regarding Glucose 6 phosphate dehydrogenase (G6PD) deficiency, all of the following is true except

- a) Can be associated with extravascular hemolysis
- b) Younger red cells contain higher level of the enzyme than older ones
- c) Can present as neonatal jaundice
- d) Mediterranean variant is associated with more severe clinical phenotype
- e) Hemolysis most commonly follows ingestion of fava beans

4. In patients with sickle cell disease, which of the following factors is expected to decrease the rate and degree of sickling?

- a) Increased transit time of red cells in tissue vascular bed
- b) Concomitant inheritance of a thalassemia
- c) Intracellular acidosis
- d) Cellular dehydration
- e) Hb SS genotype

Hemato

5. α -Thalassemia

- a) is caused by inherited deletions of a globin genes on chromosome 11
- b) with 3 gene deletions is associated with less ineffective erythropoiesis compared to β thalassemia
- c) with 2 gene deletions can be easily diagnosed by hemoglobin analysis (electrophoresis)
- d) causes more skeletal complications compared to β thalassemia
- e) all of the above is true

6. Untreated β thalassemia major (transfusion dependent thalassemia) results in all of the following except

- a) Inadequate reticulocytes count in peripheral blood
- b) High hepcidin level
- c) Increased alimentary iron absorption
- d) Cortical bone thinning
- e) Extramedullary hematopoiesis

7. Regarding cold hemolysin disease, all of the following is true except

- a) It is a rare form of antibody induced hemolytic anemia
- b) Caused by cold reacting IgG antibody
- c) hemolytic events are mixed intravascular and extravascular
- d) Associated with low haptoglobin level

8. Which of the following best describes megaloblastic changes?

- a) An erythroid precursor with maturing cytoplasm in the presence of immature nucleus
- b) Increased size and polychromatophilia of peripheral red blood cells
- c) A huge erythroid precursor with multiple nuclei and increased cytoplasmic basophilia
- d) A large peripheral neutrophil with more than 5 segments in its nucleus
- e) Giant metamyelocytes and band forms

9. A 62-year-old man presents with pallor, fatigue, and dyspnea on exertion for 1 month. A complete blood count reveals microcytic hypochromic anemia. Blood film revealed anisocytosis, poikilocytosis, markedly increased central pallor of RBCs and pencil cells. The most likely cause of these findings is

- a) dietary deficiency of iron.
- b) increased iron requirement.
- c) hemodilution
- d) sideroblastic anemia
- e) gastrointestinal bleeding.

Hemato

10. A 23-year-old woman with epilepsy who is desirous of becoming pregnant is found to be anemic. Examination of a peripheral blood smear reveals oval macrocytes and hypersegmented neutrophils. Neurologic examination is entirely normal. Which of the following is not expected to be seen in this patient?

- a) An erythroid precursor in the bone marrow with nuclear to cytoplasmic asynchrony of maturation.
- b) Giant metamyelocytes and band cells.
- c) Abnormally large megakaryocytes
- d) Low reticulocyte count
- e) High homocysteine and methylmalonate concentrations

11. Glanzmann thrombasthenia is characterized by all of the following except

- a) Autosomal recessive mode of inheritance
- b) Defect in platelet adhesion
- c) Normal platelet morphology
- d) Bleeding that starts early in life
- e) Normal platelet count

12. A 55-year-old woman with chronic pancreatitis undergoes coagulation screening tests before surgery. The PT and APTT are found to be prolonged. Given the following choices, which of the following is the most likely reason for the abnormal coagulation test results?

- a) Congenital inherited bleeding disorder
- b) Vitamin K deficiency
- c) Glutamate deficiency due to impaired digestion of dietary protein
- d) Nutritional vitamin C deficiency

13. A 7-year-old boy presents with palpable purpura on the buttocks and legs, fever, abdominal pain and vomiting arthritis in his knees and ankles, melena, and hematuria. His mother states that he had an upper respiratory illness approximately 1 week ago. Blood tests reveal mild renal insufficiency. The most likely cause of the bleeding into the skin observed in this patient is

- a) coagulation factor deficiency.
- b) qualitative platelet dysfunction
- c) quantitative platelet dysfunction.
- d) immune complex mediated destruction of small vessels.
- e) vitamin deficiency.

Hemato

14. 25-year-old previously healthy woman develops spontaneous vaginal bleeding. The following day, she experiences a tonic-clonic seizure. On physical examination, she is febrile and jaundiced and has widespread purpura. Laboratory findings include a hemoglobin of 5.3 g/dL (normal 12-14) with 8% reticulocytes, a platelet count of 10,000/mL (normal 145,000-450,000) and urea of 48 mg/dL prothrombin time 12 seconds (normal 11-15), partial thromboplastin time 28 seconds (normal 25-35). The peripheral blood smear was remarkable for red blood cells fragments. The pathogenesis in this woman is expected to include all of the following except

- a) Excessive activation of platelets
- b) Accumulation of very high molecular weight multimers of von Willebrand factor in peripheral blood
- c) Deposition of hyaline microthrombi in the small blood vessels of brain
- d) Fibrin deposition in the small blood vessels of the kidney
- e) Intravascular hemolysis

15. All of the following is suggestive of a diagnosis of primary immune thrombocytopenic purpura except:

- a) Normal or increased megakaryocytes in the bone marrow
- b) Normal spleen size
- c) Low platelets count in peripheral blood
- d) Small size of the platelet in peripheral blood
- e) Bleeding is predominantly mucocutaneous

16. Microcytic anemia can be caused by

- a) B12 deficiency
- b) Aplastic anemia
- c) Myelofibrosis
- d) Thalassemia
- e) Glucose 6 phosphate dehydrogenase (G6PD) deficiency

17. manifestations of anemia include

- a) Pallor
- b) Fatty change in the liver
- c) Heart failure
- d) Faintness
- e) All of above

18. Pure red cell aplasia is characterized by all of the following except

- a) Moderate to severe anemia
- b) Increased erythropoietin
- c) Increased reticulocyte count
- d) Selectively absent erythroid precursors in bone marrow

Hemato

19. Anemia of chronic renal insufficiency results from

- a) Decreased erythropoietin production
- b) A uremic toxin suppression of erythropoiesis
- c) Malnutrition
- d) Blood loss
- e) All of above

20. Hemolytic anemia is characterized by

- a) Normal RBC life span
- b) Decreased erythropoiesis
- c) Excess bilirubin and jaundice
- d) All of above

21. Hereditary spherocytosis

- a) Has autosomal recessive mode of inheritance in the majority of cases
- b) Caused by absent hemoglobin chains
- c) Characterized by hyperchromic RBCs in peripheral blood
- d) All of above

22. Most common cause of hemolysis in G6PD deficiency patients is

- a) Infections
- b) Oxidant drugs
- c) Fava bean ingestions
- d) None of above

23. Autosplenectomy complicates

- a) Hereditary spherocytosis
- b) Thalassemia major
- c) Sickle cell disease
- d) Paroxysmal nocturnal hemoglobinuria

24. Heinz bodies are a feature of

- a) Sickle cell disease
- b) G6PD deficiency
- c) Iron deficiency anemia
- d) Thalassemia intermediate

25. Pathological Consequences of β -Thalassemia include

- a) Massive erythroid hyperplasia
- b) bony cortical thinning
- c) Extramedullary hematopoiesis
- d) Secondary hemochromatosis
- e) All of above

Hothifa Raed

Hemato

26. Morphological changes in β -Thalassemia include all of the following except

- a) Anisocytosis
- b) Poikilocytosis
- c) Target cells
- d) Microcytosis
- e) Hyperchromia

27. A patient with severe anemia has a peripheral blood smear with oval macrocytes, hypersegmented neutrophils, and decreased platelets. The most likely cause of the anemia is

- a) a red cell membrane protein defect.
- b) an amino acid substitution in the α -globin chain.
- c) iron deficiency.
- d) marrow hypoplasia.
- e) vitamin B12 or folate deficiency.

28. A 23-year-old man presented to his primary care physician 2 weeks ago with a nonproductive cough and malaise. He was treated with the antibiotic azithromycin for "walking pneumonia" due to *Mycoplasma pneumoniae*. He now returns with fatigue and pallor. Laboratory studies demonstrate a decreased red blood cell count with polychromatophilia and an increase in indirect (unconjugated) bilirubin. The laboratory findings are most likely due to

- a) acute cold agglutinin disease.
- b) aplastic anemia.
- c) aplastic crisis.
- d) paroxysmal nocturnal hemoglobinuria.
- e) warm antibody autoimmune hemolytic anemia.

29. Paroxysmal nocturnal hemoglobinuria

- a) May present with pancytopenia
- b) May lead to venous thrombosis
- c) Caused by defect in CD55 and CD59
- d) Increase susceptibility to acute myeloid leukemia
- e) All of above

30. A 35-year-old woman presents with fever, fatigue, mucocutaneous bleeding, and changing neurologic signs. Laboratory examination reveals thrombocytopenia, anemia, and reticulocytosis, as well as increased concentrations of creatinine and urea nitrogen. Examination of a peripheral blood smear reveals many fragmented circulating red cells (helmet cells and schistocytes). The most likely diagnosis is

- a) Bernard-Soulier disease.
- b) DIC.
- c) ITP.
- d) TTP.
- e) von Willebrand disease.

Hemato

31. A 25-year-old man has a lifelong hemorrhagic diathesis. The PT and bleeding time are normal, but the APTT is prolonged. The most likely cause of the bleeding disorder is

- a) a platelet functional disorder.
- b) factor VII deficiency.
- c) factor VIII deficiency.
- d) factor IX deficiency.
- e) von Willebrand disease.

32. which of the following is/are suggestive of a diagnosis of primary immune thrombocytopenic purpura?

- a) Normal or increased megakaryocytes in the bone marrow
- b) Normal spleen size
- c) Low platelets count in peripheral blood
- d) Bleeding is predominantly mucocutaneous
- e) All of above

33. Thrombotic Thrombocytopenic Purpura (TTP) results from

- a) Deficiency in a plasma ADAMTS13 enzyme
- b) IgG antiplatelets antibodies
- c) Deficiency of platelets GP IIb-IIIa receptors
- d) Deficiency of platelets GP Ib IX receptors

Hemato

Patho - Dr. Momen Zeineddin

1. Bad prognostic markers of Acute lymphoblastic leukemia include all of the following except

- a) Adolescent patient
- b) t(12,21)
- c) CNS positive
- d) Infantile leukemia
- e) T cell phenotype leukemia

2. which is not true about Hodgkin's lymphoma?

- a) Localized nodal involvement is common
- b) The contiguous spread is seen
- c) Mesenteric nodes and Waldeyer's ring are rarely involved
- d) Extranodal involvement is common
- e) No leukemic phase

3. Which is true about lymphocyte depleted Hodgkin's lymphoma?

- a) Not associated with EBV
- b) Usually seen in old patients with HIV
- c) Classified as non-classical Hodgkin's lymphoma due to aggressive course.
- d) Positive for CD 15 and CD 45
- e) Carries a good prognosis

4. Which is not true about infectious mononucleosis?

- a) Seen in adolescents and young adults
- b) CMV can cause a similar clinical picture
- c) CDS T-lymphocytes with atypical dysplastic features is the classical blood smear finding.
- d) Splenomegaly due to hyperplasia in the periarteriolar lymphoid sheath.
- e) May cause splenic rupture

5. A 60-year-old woman with CLL, Over the past few months, she noticed swellings in the neck and axilla which was rapidly increasing in size. She complains of fever and experiences weight loss. The most likely explanation is

- a) Richter transformation
- b) Autoimmune thrombocytopenia
- c) EBV infection
- d) Immunodeficient hemolytic anemia
- e) CMV infection

Hemato

6. Which is suggestive of Leukemoid reaction rather than CML

- a) FISH positive for BCR-ABL
- b) Increased basophils
- c) Highly Positive leukocyte alkaline phosphatase stain
- d) Elevated serum vitamin B12
- e) Absence of infection

7. A peripheral smear with increased neutrophils, basophils, eosinophils, and platelets is highly suggestive of

- a) Acute myeloid leukemia
- b) Acute lymphoblastic leukemia
- c) Chronic myelogenous leukemia
- d) Myelodysplastic syndrome
- e) Aplastic anemia

8. Not true regarding Waldenstrom's macroglobulinemia is

- a) Lymphadenopathy is usually present
- b) Blood viscosity increased
- c) Immunoglobulin increased
- d) Hypercalcemia
- e) Baynaud phenomena can be seen

9. A 60-year-old male patient, on polycythemia rubra vera treatment for long time, recently get tired and needs frequent transfusions, Examination is remarkable for massive splenomegaly. The most likely explanation is

- a) Chronic myeloid leukemia
- b) Myelofibrosis
- c) Polycythemia vera
- d) Essential thrombocythemia
- e) Myelodysplasia

10. Which is true about the morphology of Multiple myeloma

- a) Rouleaux formation are seen in blood smear
- b) Atypical plasma cells with multiple prominent nuclei
- c) Characterized by increased number of plasma cells in the bone marrow
- d) Russell bodies are large homogeneous cytoplasmic inclusion bodies containing immunoglobulins
- e) Dutcher bodies are cytoplasmic inclusion bodies in plasma cells

Hemato

11. A 9-year-old boy living in Uganda has had increasing pain and swelling on the right side of his face over the past 8 months. On physical examination, there is a large, nontender mass involving the mandible, which deforms the right side of his face. There is no lymphadenopathy or splenomegaly, and he is afebrile. A biopsy of the mass is performed and microscopic examination shows intermediate-sized lymphocytes with a high mitotic rate. A chromosome analysis shows a 46,XY,t(8;14) karyotype in these cells. The hemoglobin concentration is 13.2 g/dL, platelet count is 272,000/mm³, and WBC count is 5820/mm³. Infection with which of the following viruses is most likely to be causally related to the development of these findings?

- a) Cytomegalovirus
- b) Epstein-Barr virus**
- c) Hepatitis B virus
- d) HIV
- e) Human papillomavirus

12. A 63-year-old man has noticed a lump in his neck for 2 months. Examination reveals a group of three discrete nontender right posterior cervical lymph nodes, and a mass of enlarged right axillary lymph nodes. Chest and abdominal CT scans show mediastinal lymphadenopathy and hepatosplenomegaly. Microscopic examination of a cervical lymph node biopsy reveals abundant large CD15+ and CD30+ binucleate cells with prominent acidophilic nucleoli, scattered within a sparse lymphocytic infiltrate. What is molecular analysis of this lesion most likely to reveal?

- a) Clonal EBV integration in the large cells**
- b) BCL6 gene rearrangements in the large cells
- c) Deletions of 5q in all the cells
- d) Helicobacter pylori infection in all the cells
- e) JAK2 gene mutations in the lymphocytes

13. One of the following is not correctly matched:

- a) t(9,22) >> Chronic myeloid leukemia
- b) t(15,17) >> acute myelomonocytic leukemia**
- c) t(11,14) Mantle cell lymphoma
- d) t(14,18) >> Follicular lymphoma
- e) t(8,14) >> Burkitt lymphoma

Hemato

14. A 39-year-old woman felt a lump in her breast 1 week ago. On physical examination, she has a firm, fixed, irregular 3-cm mass in the upper outer quadrant of the right breast and a firm, nontender lymph node in the right axilla. A lumpectomy and axillary node dissection are performed, and microscopic examination shows an infiltrating ductal carcinoma in the breast. Flow cytometric analysis of the node shows a polyclonal population of CD3+, CD19-, CD20-, and CD68+ cells with no aneuploidy. Microscopic examination of the axillary lymph node is most likely to reveal changes characteristic of which of the following conditions?

- a) Acute lymphadenitis
- b) Diffuse large B-cell lymphoma
- c) Metastatic infiltrating ductal carcinoma
- d) Necrotizing granulomas
- e) Sinus histiocytosis

Hemato

Immuno

1. All the following are TRUE in Immune thrombocytopenic Purpura (ITP) EXCEPT

- a) Acute ITP occurs equal in both genders
- b) Presence of schistocytes in the blood film
- c) Prothrombin Time (PT) & Partial Thromboplastin Time (PTT) are normal
- d) Increased megakaryocytes in the bone marrow

2. A 32-year-old woman presents with the recent onset of petechiae of her lower extremities. Physical examination is remarkable for petechiae of both legs. There is no hepatosplenomegaly. The rest of physical examination is normal. Platelets count is 8000/L. Hb and WBCs are normal. Peripheral smear reveals reduced platelets and an occasional giant platelet.

- a) Thrombocytopenic thrombotic purpura
- b) Hemolytic Uremic Syndrome
- c) Disseminated Intravascular Coagulopathy
- d) Idiopathic thrombocytopenic purpura

3. In warm autoimmune hemolytic anemia, all true except:

- a) In warm AIHA positive IgG direct coombs test
- b) The IgG antibodies are the main cause of hemolysis in the warm AIHA
- c) In drug induced warm AIHA the gold treatment is splenectomy
- d) The blood film shows increased reticulocyte count and small spherocytes

4. All true cold autoimmune hemolytic anemia except

- a) In cold AIHA there is positive direct C3coomb's test
- b) The IgM antibodies with the aid of classical complement pathway is the main mechanism for hemolysis in Cold AIHA
- c) The main hemolysis type in cold AIHA is intravascular hemolysis with (+) CD59 and(+)CD55
- d) Infections could be a secondary cause for cold AIHA

5. 25-year-old male presented to the ER with persistent cough, dark urine and chest pain, CXR was done and showed that there is atypical pneumonia. CBC was done to reveal the cause of dark urine and showed a normocytic anemia. Urine analysis showed: hemoglobinuria. Also, there was hemoglobinemia and a decrease in the level of haptoglobin, what do you think the cause of such condition?

- a) Chlamydia pneumonia with cold AIHA
- b) Chlamydia psittaci with warm AIHA
- c) Chlamydia pneumonia with warm AIHA
- d) Mycoplasma pneumonia with warm AIHA
- e) Mycoplasma pneumonia with cold AIHA

Hemato

anatomy + physio

1. What lymphatic structure absorbs lipids in the intestine

- a) collecting vessel
- b) vein
- c) lymph trunk
- d) lacteal

2. Afferent vessels enter the side of the lymph node, and Efferent vessels exit the side of the lymph node

- a) convex, concave
- b) concave, convex
- c) top, bottom
- d) bottom, top

3. Thymosin is a hormone that will cause to mature

- a) B. cell
- b) T. cell
- c) T and B cells
- d) Macrophages

4. Which of the following characteristics of the Erythrocytes allow for the easy exchange of oxygen and carbon dioxide

- a) Lack of nucleus
- b) Lack of organelles
- c) Flattened shape
- d) Small size

5. The life span of white blood cells is

- a) seconds to minutes
- b) months to even years
- c) minutes to days
- d) 7 days

6. Which of the following stimulates the release of erythropoietin?

- a) Decreased amount of Vit B12
- b) Excess amount of oxygen going to the kidneys
- c) Decreased amount of oxygen going to the kidneys
- d) vasodilatation of renal artery

Hemato

7. Which substance along with thromboxane A2 helps activate other platelets during platelet plug formation?

- a) serotonin
- b) ADP
- c) ATP
- d) lysosomes

8. Which group of nodes form a line directly below the inguinal ligament?

- a) Superficial inguinal nodes
- b) Superficial sub-inguinal nodes
- c) Deep sub-inguinal nodes
- d) Popliteal nodes

9. How to distinguish eosinophils from basophils?

- a) Eosinophils have a bilobed nucleus and basophils have a single round nucleus
- b) Eosinophils are granulated while Basophils are non granulated
- c) Eosinophils have a single nucleus and basophils have a silobed nucleus
- d) Eosinophils stain blue while basophils stain pink

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In patients with Chronic Myeloid Leukemia

- a) Splenomegaly is unusual
- b) The fusion gene bcr-abl forms a protein with tyrosine kinase activity
- c) Philadelphia chromosome-positive patients respond poorly to Imatinib
- d) ABL gene on Chr.22 is trans-located to BCR gene on Chr.9

Regarding chronic immune thrombocytopenic purpura, all of the following is true EXCEPT

- a) Caused by autoantibodies mostly of the IgG class
- b) Associated with foamy histiocytes in the splenic red pulp
- c) Autoantibodies don't affect megakaryocytes
- d) Bone marrow reveals increased number of megakaryocytes

Children have the following peculiarities of leukocyte formula:

- a) lymphocytes predominate at birth
- b) neutrophils predominate on the 5th year
- c) lymphocytes predominate at 2 years old
- d) leukocyte formula is the same as in adults on the 5th day of life

In which part of the lymph node T cells are most abundant?

- a) Medullary sinuses
- b) Paracortex
- c) Lymphoid nodules
- d) Subcapsular sinus
- e) Germinal center

A 25-year-old previously healthy woman develops spontaneous vaginal bleeding. The following day, she experiences a tonic-clonic seizure. On physical exam, she is febrile and jaundiced and has widespread purpura. Laboratory findings include a hgb of 5.3g/dL with 8% reticulocytes, a platelet count of 10,000, and a BUN of 48mg/dL. The peripheral blood

smear is shown in this image. Which of the following is the appropriate diagnosis?

- a) Drug-induced thrombocytopenia
- b) Henoch-schonlein purpura
- c) Idiopathic thrombocytopenic purpura
- d) Thrombotic thrombocytopenic purpura
- e) Von Willebrand disease

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Which of the following is NOT true regarding paroxysmal nocturnal hemoglobinuria (PNH)

- a) Venous thrombosis is the leading cause of death
- b) Susceptibility to acute myeloid leukemia
- c) Acidosis causes episodes of hemolysis in affected patients
- d) May manifest as pancytopenia
- e) Inherited in an X linked pattern

Lymph nodes draining infected skin wound are swollen because

- a) formation of germinal centers for B-cell proliferation in nodes cortex.
- b) Enlargement and increased activity of the node's high endothelial venule
- c) increased flow of lymph Through the nodes afferent lymphatic
- d) increased thickness of each antigen-presenting cell in each nodes medulla

Highest LAP score is seen in?

- a) Polycythemia Vera
- b) Chronic myeloid leukemia
- c) Acute Myeloid Leukemia
- d) Paroxysmal Nocturnal Hemoglobinuria

Monocyte is the precursor of all the following cells EXCEPT

- a) Non of above
- b) Microglia
- c) Macrophages
- d) Osteoclasts
- e) NK cells

A patient with sickle cell disease and multiple splenic infarcts that led to autosplenectomy, this puts him at risk of

- a) Cholelithiasis
- b) Membranous nephropathy
- c) Megaloblastic anemia
- d) Autoimmune gastritis
- e) Pneumococcal Pneumonia

Which of the following best describes erythroid megaloblastic changes in bone marrow?

- a) Appropriate cytoplasmic maturation with poor nuclear maturation
- b) Cytoplasmic basophilia is retained throughout maturation
- c) Early nuclear chromatin clumping
- d) Erythroid nuclear fragmentation

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Which of the following is not a feature of Disseminated Intravascular Coagulation?

- a) Prolonged Prothrombin time
- b) High fibrinogen**
- c) High fibrin degradation products
- d) Low platelets
- e) Prolonged partial thromboplastin time

Presence of schistocytes is a feature of

- a) Immune hemolytic anemia
- b) Macroangiopathic hemolytic anemia**
- c) All of above
- d) Hereditary spherocytosis
- e) Sick cell disease

Regarding sickle cell disease, all of the following is true except

- a) Caused by amino acid substitution in the beta globin chain
- b) Affected hemoglobin undergoes polymerization when deoxygenated**
- c) Can present as neonatal hemolytic anemia and jaundice
- d) Vascular occlusion cause most serious clinical sequelae
- e) Inherited in an autosomal recessive pattern

A patient presenting with mediastinal mass with sheets of epithelial cells giving arborizing pattern of reactivity along with interspersed lymphoid cells. The most probable diagnosis would be

- a) Primary mediastinal lymphoma
- b) Non-Hodgkin lymphoma
- c) Thymoma**
- d) Thymic carcinoid

In B-thalassemia major, all of the following is true EXCEPT

- a) Most common in north America and Europe**
- b) Caused by homozygous mutation in β chain gene
- c) The very low hemoglobin is composed mainly of Hb F
- d) Sequelae of hemochromatosis are the main cause of death
- e) Lead to severe anemia and death without transfusion

Regarding anemia of chronic disease, all of the following is true EXCEPT

- a) Pathogenesis involves ineffective use of iron stored within bone marrow macrophages
- b) Increased amount of iron stored in the bone marrow**
- c) Characterized by increased total iron binding capacity
- d) Erythrocytes can be either normocytic or microcytic
- e) Caused by chronic inflammatory conditions

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Lymph nodes are all EXCEPT

- a) Delivery sites for phagocytized organisms
- b) Located throughout the body
- c) Peyer patches in the gastrointestinal tract
- d) Location of T- and B-cell maturation

Which of the following describes the pathogenesis of megaloblastic anemia?

- a) Defective heme synthesis
- b) Clonal stem cell abnormality
- c) Impaired DNA synthesis
- d) Immune destruction of circulating erythrocytes
- e) Bone marrow fibrosis

Leukocyte alkaline phosphatase (LAP) score is increased in all except

- a) Hodgkin's lymphoma
- b) sickle cell anemia
- c) obstructive jaundice
- d) pregnancy

Which of the following best describes erythroid megaloblastic changes in bone marrow

- a) Appropriate cytoplasmic maturation with poor nuclear maturation
- b) Cytoplasmic basophilia is retained throughout maturation
- c) Early nuclear chromatin clumping
- d) Erythroid nuclear fragmentation

Mechanisms of redistributive leukopenia are

- a) low rate of leukocytes released from the marrow storage pool
- b) increased leukocyte destruction by the spleen
- c) increased leukocyte destruction in the vascular bed

Which of the following best describes erythroid megaloblastic changes in bone marrow?

- a) Appropriate cytoplasmic maturation with poor nuclear maturation
- b) Erythroid nuclear fragmentation
- c) Early nuclear chromatin clumping
- d) Cytoplasmic basophilia is retained throughout maturation

Which of the following is a common consequence of TCR and CCR7 signaling?

- a) positive selection
- b) Th2 induction
- c) T cell migration
- d) Th1 induction

Direct Coomb's test is an evaluation for:

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- a) Anti-white blood cells antibodies in the serum
- b) Anti-platelet antibodies bound to the patients platelets
- c) Anti-red blood cells antibodies in the serum
- d) Anti-red blood cells antibodies bound to the red blood cell membrane

The tertiary lymphoid organs:

- a) Coordinate the functions of primary and secondary lymphoid tissue
- b) Is associated with autoimmune reaction
- c) Is the place of contact between primary and secondary lymphoid systems
- d) It is just an alternative name for the secondary lymphoid system during chronic inflammation.

Which of the following bleeding pattern is NOT seen in coagulation factor defects?

- a) Hemarthrosis
- b) Urinary tracts bleeding
- c) The gastrointestinal bleeding
- d) Deep muscular tissue bleeding
- e) Pinpoint skin hemorrhages

A 9-year-old girl develops widespread pinpoint skin hemorrhages. She recovered from a flu-like illness 1 week earlier. Laboratory findings reveal a platelet count of 20,000/mL, but no other abnormalities. Her bone marrow shows an increased number of megakaryocytes. The platelet count is normal after 2 months. Which of the following is the appropriate diagnosis?

- a) Acute immune thrombocytopenic purpura
- b) Hemolytic-uremic syndrome
- c) Thrombotic thrombocytopenic purpura
- d) Disseminated intravascular coagulation
- e) Antiphospholipid syndrome

Raynaud's phenomenon more often presents with:

- a) G6PD deficiency
- b) Cold Agglutinin Type hemolytic anemia
- c) Sickle cell disease
- d) Warm Antibody Type hemolytic anemia

A patient with sickle cell disease and multiple splenic infarcts that led to autosplenectomy is at risk of:

- a) Membranous nephropathy
- b) Cholelithiasis
- c) Pneumococcal Pneumonia
- d) Autoimmune gastritis
- e) Megaloblastic anemia

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Which of the following is a common consequence of TCR and CCR7 signaling?

- a) T cell migration
- b) Th1 Induction
- c) Th2 induction
- d) positive selection

All of the following are a function of T cells EXCEPT:

- a) Mediation of cytolytic reaction
- b) Mediation of delayed Hypersensitivity reactions
- c) Regulation of the immune system
- d) Synthesis of antibody

Lymphangiogenesis:

- a) is a reversible process
- b) Normal process during infection
- c) Correlate with cancer poor prognosis
- d) Correlate with cancer good prognosis

You would expect normal test of coagulation PT and aPTT in:

- a) Hemophilia A
- b) Hemophilia B
- c) Thrombotic thrombocytopenic syndrome
- d) Disseminated intravascular coagulation

All the followings are true about lymphatic system EXCEPT:

- a) The flow of lymph in the lymphatic vessels a bidirectional
- b) The flow of lymph in the lymphatic vessels a unidirectional
- c) lymph return back to the blood
- d) lymph is a filtrate of blood

Which of these all types aids the activation of T-lymphocytes by antigens?

- a) Macrophages
- b) Neutrophils
- c) Mast cells
- d) Natural killer cells

A 7 years old patient who has anemia, jaundice and splenomegaly. His blood smear showed many dark staining red cells lacking central pallor. His RBCs showed increased..... Fragility but coomb's test is negative What additional abnormality you would expect in his peripheral blood smear ?

- a) Marked increase in red cells distribution width (RDW)
- b) Increased mean corpuscular hemoglobin concentration(MCHC)
- c) Low reticulocyte count
- d) Markedly low mean corpuscular volume (MCV)

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All of the following are causes of decreased PLT production EXCEPT:

- a) Vitamin B12 deficiency
- b) Heparin therapy
- c) Cytotoxic drug therapy
- d) Leukemia
- e) Myelodysplastic syndromes

Which one of the following statements is NOT true regarding iron?

- a) Its ferric state is more absorbable than ferrous state
- b) The major compartment inside the body is functional
- c) is transported in plasma by transferrin
- d) Its absorption is strictly regulated by hepcidin
- e) Stored in the form of either ferritin or hemosiderin

One of the followings is NOT involved in cancer:

- a) Angiogenesis
- b) Immune cell recruitment
- c) MHC class1 upregulation
- d) Lymphangiogenesis

Naive T lymphocytes enter the lymph nodes via:

- a) Germinal centers
- b) Afferent lymphatics
- c) Efferent lymphatics
- d) High endothelial venues

A 36-year-old man presents with increasing fatigue. He has a 3-year history of tuberculosis, and CBC shows a mild microcytic anemia. Blood work-up demonstrates low serum iron, low iron-binding capacity, and increased serum ferritin. The pathogenesis of anemia in this patient is most likely caused by which of the following mechanisms?

- a) Hypoxemia
- b) Clonal stem cell defect
- c) Synthesis of structurally abnormal globin chains
- d) Toxic damage to bone marrow stem cells
- e) Impaired utilization of iron from storage sites

Regarding the thymus, all of the following is true except:

- a) Has a lightly stained outer cortex surrounding a dark basophilic medulla
- b) The main organ for T cell development
- c) Its connective tissue capsule sends septa that divides it into lobules
- d) Bilobed structure in the mediastinum
- e) Less functional with advancing age

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Hemolysis caused by G6PD deficiency is:

- a) All of above
- b) Extravascular
- c) Intravascular
- d) Non of above

An 18 months old child was brought to the clinic by his mother because of increasing pallor and easy fatigability, a CBC revealed a microcytic hypochromic anemia, which of the following parameters is most helpful in defining this patient's anemia as hypochromic?

- a) Mean corpuscular volume
- b) Red blood cell count
- c) Mean corpuscular hemoglobin concentration
- d) Hemoglobin
- e) Hematocrit

A 20 year old thin fashion model complains that she cannot concentrate and is always tired. She has heavy menstrual bleeding every month but is otherwise healthy. The peripheral blood smear is shown in the image. Which of the following laboratory findings would be expected in this patient?

- a) Increased serum ferritin
- b) Vitamin B12 deficiency
- c) Positive direct Coombs test

Intravascular hemolysis is best differentiated from extravascular hemolysis by the absence of:

- a) Methemoglobinuria
- b) Hemoglobinemia
- c) Splenomegaly
- d) Hemoglobinuria
- e) Hyperbilirubinemia

The role of sphingosine-1-phosphate on endothelial cells:

- a) is to activate T cells in lymph node
- b) is to facilitate entrance of T cells to draining lymph node
- c) is to presentation of antigen to T cells .
- d) is to facilitate exit of T cells from lymph node

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Lymph vessels of submandibular gland drain into

- a) submental nodes
- b) Jugulo digastric nodes
- c) Submandibular nodes
- d) Jugulo omohyoid nodes

Which of the following cells function in the formation of pus following soft tissue infection?

- a) Cells with polymorphic multiply lobed nuclei.
- b) Cells with bilobed nuclei and many acidophil cytoplasmic granules
- c) Very small cell-like elements with no nuclear but many granules
- d) Biconcave cells with no nuclei
- e) Cells with spherical nude and scant cytoplasm

All of the following constituents are normally included in lymph except

- a) Foreign invaders as bacteria and viruses
- b) white blood cells and lymphocytes
- c) Red blood cells
- d) Excess interstitial fluid
- e) Fats, proteins and minerals

What is the earliest stage at which specific granulocyte types can be distinguished from one another

- a) Metamyelocyte
- b) Reticulocyte
- c) Myelocyte
- d) Promyelocyte
- e) Band form

Which process occurs during granulopoiesis but not during erythropoiesis?

- a) Euchromatin content increases
- b) Cells lose their capacity for mitosis
- c) Overall cell diameter decreases
- d) Nucleus becomes increasingly lobulated
- e) Overall nuclear diameter decreases

The following is true regarding polycythemia vera?

- a) Decrease LAP score
- b) Thrombocytopenia
- c) Raised ESR
- d) Leukocytosis

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Which of the following is not a minor diagnostic criterion for multiple myeloma

- a) Plasmacytosis greater than 20%
- b) Lytic bones lesions
- c) Monoclonal globulin spike on serum electrophoresis of
- d) Plasmacytosis on biopsy

Lymph nodes draining an infected skin wound are swollen because

- a) Formation of germinal centers for B-cell proliferation in each node
- b) Enlargement and increased activity of the nodes high end verules
- c) Increased flow of lymph through the nodes afferent
- d) increased thickness of each node precortes
- e) De Arrival of antigen-presenting lots in each nodes medula

In sickle cell anemia, all of the following conditions are associated with increased risk of sickling EXCEPT

- a) increased mean cell hemoglobin concentration MCHC
- b) acidosis
- c) Tissue inflammation
- d) Higher Hb
- e) Homozygosity for HbS (HbSS)

The spleen:

- a) is supplied with parasympathetic fibers from coeliac plexus
- b) has an identifiable notch on its posterior border
- c) lymphatic drainage is to coeliac node
- d) lies between the 8th and 11th ribs
- e) weights 15 ounces