Directions: Questions (1-29) Circle the one best answer

C 1. An asymptomatic patient wants to be tested for factor V leiden because his mother is heterozygous for factor V leiden and recently had the third episode of DVT. The test is performed and patient is found to be homozygous for factor V leiden. Based upon this information, you will now recommend:
(A) Anticoagulation with warfarin for life
(B) Start IV heparin followed by warfarin
(C) No further therapy is needed at this time
(D) Anticoagulation with LMWH for life

B 2. What kind of reaction does white blood cell filtered blood prevent?
(A) Delayed hemolytic reaction
(B) Febrile reaction
(C) Allergic reaction
(D) Immediate hemolytic transfusion reaction

D 3. Schistocytes are seen on peripheral smear in the following conditions except:
(A) TTP
(B) Hemolytic uremic syndrome
(C) DIC
(D) Autoimmune hemolytic anemia

A 4. A 26-year-old female with sickle cell anemia is admitted to the hospital with history of fever, dyspnea and left sided pleuritic chest pain of 3 days duration. She has been admitted four times with the painful crisis in the last one year. The blood tests reveal a Hb 9g/dL, HCT 27%, WBC 13000/uL. The chest x-ray shows infilterates in the left lower lobe. The gram stain of the sputum reveals no WBC's or bacteria. Blood gases reveal Po2 55mm Hg, Pco2 40 mm Hg and pH 7.39. The patient is started on O2 and broad- spectrum antibiotics but no improvement is noted in the next 24 hours.
Based upon the above information you will now recommend:
(A) Exchange transfusion now and followed by hydroxyurea therapy
(B) Long term transfusion therapy
(C) Bone marrow transplantation
(D) Start heparin followed by warfarin

5. A 30-year-old women who has been taking oral contraceptives for the last 10 years is admitted with acute DVT. Her brother had an episode of DVT at the age of 33 years. She is started on LMWH and warfarin and oral contraceptives are discontinued. The LMWH is discontinued when INR reaches 2-3. The warfarin therapy is stopped after 6 months. Two weeks after discontinuation of warfarin, she undergoes coagulation studies which reveal her to be heterozygous for the factor V leiden.
Based upon the above information you will now recommend:
(A) Restart warfarin and continue indefinitely at a target INR of 2-3
(B) Restart warfarin and add low dose aspirin
(C) Advise patient not to resume oral contraceptives and no additional therapy is required
(D) Restart warfarin and continue indefinitely at a target INR 3-4

6. A 70-year-old female presents with a history of low back pain and weakness for the last 3 months. The x-rays of the lumbar spine reveal marked osteopenia. The blood tests reveal Hb 9 g/dL, WBC 6000/uL, platelet count 200000/uL, sedimentation rate 100 mm/h, serum calcium 12 mg/dL, phosphorus 4 mg/dL, alkaline phosphatase 75 U/L (nl: 30-120), BUN 60 mg/dL and a Creatitine of 2.5 mg/dL. The serum electrophoresis reveals hypogammaglobunemia.
Based upon the above information you will now recommend:
(A) Bone scan
(B) Urine for immunoelectrophoresis
(C) Serum cryoglobulins
(D) ANA

7. A 25-year-old female presents with marked weakness of 2 weeks duration. The examination reveals mild scleral icterus and a palpable spleen tip. The blood tests reveals Hb 5g/dl, HCT 15%, platelet count 250000/uL, reticulocyte count of 150000/uL, reticulocyte index 5%, LDH 300/L (nl: 60-100), bilirubin 4 mg/dL and a direct bilirubin of .5 mg/dL The blood smear shows numerous spherocytes, polychromatophilia but no fragmented RBC'S. The fecal occult blood is negative.
Based upon the above information, the most likely diagnosis is:
(A) Congenital spherocytosis
(B) TTP
(C) Autoimmune hemolytic anemia
(D) Acute leukemia

Confirm w/ Coombs Test

8. A 30-year-old female is hospitalized with DVT affecting the right popliteal vein. She is started on low molecular weight heparin (enoxaperin) at a dose of 1 mg/Kg S/C BID and warfarin 5 mg/day. The next day PTT is 32 sec (nl: <42sec) and PT is 14 sec with an INR ratio of 1.2. You will now recommend:
(A) Increase warfarin to 10 mg/day
(B) Increase dose of low molecular weight heparin
(C) No change in therapy
(D) Change low molecular heparin to IV unfractionated heparin

9. All of the following conditions are associated with an increase risk of acute leukemia except:
(A) CML
(B) Myelodysplasia
(C) PNH
(D) CLL

10. A 50-year-old male patient presents with weakness of few days duration. He has history of CHF, hypertension and atrial arrhythmia. At present he is on digoxin, captopril, quinidine, methyldopa and furesemide. The blood tests reveal Hb 8g/dL, Hct 25%, WBC 7500, platelet count 300000/uL, reticulocyte count 250000/uL, blood smear shows numerous spherocytes, LDH 650 U/L (nl: 60-100 U/L), direct coombs is positive with both C3 and IGG and indirect coombs is positive without adding any of the drugs.
Based upon the above information you will now recommend:
(A) Discontinue all drugs patient is taking until hematocrit retuns to normal and then add one drug at a time
(B) Discontinue methyldopa and start high dose prednisone
(C) Discontinue Quinidine and start high dose prednisone
(D) Start high dose prednisone and continue all other drugs

11. A 48-year-old male presents with a 3-day history of dry cough. The physical examination reveals nontender lymphnodes in both cervical and axillary area. The spleen tip is palpable. The lab tests reveal Hb 13 g/dL, WBC count 30000/uL with a predominant population of mature looking lymphocytes. The chest x-ray is normal.
Based upon the above information you will now recommend:
(A) Bone marrow examination
(B) Observation
(C) Prednisone and Chlorambucil
(D) Hetrophile antibody

12. A 35-year-old female presents to the emergency room with a history of left sided weakness of 4 hours duration. About one year ago, she had an episode of thrombophlebitis of the left leg. She was treated with heparin followed by warfarin for 6 months. She is not on any medications at this time. She is married with no children and gives history of two prior abortions. The physical examination reveals left hemiparesis and a grade 1/6 ejection systolic murmur over left sternal border. The CT scan reveals a right parietal infarct. The laboratory studies reveal a Hb of 13g/dL, Hct 38%, WBC 5600/uL, platelet count 70000/uL, PT 12 s, PTT 60 s. The PTT does not correct when patient plasma is mixed with normal plasma.
Based upon the above information, the most likely diagnosis is :
(A) Paradoxical embolism
(B) Antiphospholipid antibody syndrome
(C) Prolapse mitral valve with cerebral embolism
(D) Antithrombin III deficiency

B 13. A 42-year-old male patient with long standing history of Crohn's disease presents with weakness. He gives history of 2-3 loose bowel movements with blood and mucous daily. The laboratory studies reveal a Hb of 9 g/dL, Hct 27%, MCV 78 fL, sed rate 80, serum iron 15 ug/dl (nl: 50-150), total iron binding capacity 180 ug/dL (nl: 228-428), transferrin saturation of 8%, serum ferritin 45 ng/ml and the ratio of transferring receptor to log of ferritin is 3.
Select the appropiate therapy to correct the anemia:
(A) Ferrous sulphate
(B) Ferrous sulphate plus erythropoietin
(C) Erythropoietin
(C) Cyanocobalamin

B 14. A 55-year-old male is admitted to the CCU with unstable angina. He is started on IV heparin, aspirin, IV nitroglycerine and atenolol. The next day he feels much better with no chest pain and ischemic changes on EKG have resolved. On the 4th day, he suddenly develops right sided pleuritic chest pain and shortness of breath. A spiral CT scan confirms the diagnosis of pulmonary embolism. The blood tests reveal an Hb of 13g/dL, Hct 40%, WBC 5200/uL, platelet count 40000/uL. The platelet count was normal on admission.
How should this patient be treated now?
(A) Continue heparin and put a venocaval filter
(B) Discontinue heparin and start IV lepirudin or argatroban
(C) Discontinue heparin and start warfarin
(D) Continue heparin and start thrombolytic therapy

C 15. A 30-year-old black male consults you because of weakness, exertional dyspnea of 2 days duration. He has been on TMP/SMX for treatment of urinary tract infection for the last 4 days. He denies any significant past medical illness The physical examination shows pulse 90/minute, BP 110/70 and scleral icterus +. The laboratory studies reveal HCT 28%, WBC 12000/uL, platelet count 200000/ uL, retculocyte count 10%. The stool is negative for blood. The peripheral smear shows the presence of few bite cells. The coombs test is negative and G6PD levels are normal. Based upon the above information, the most likely diagnosis is
(A) Paroxysmal nocturnal hemoglobinuria
(B) Thrombotic thrombocytopenic purpura
(C) G6PD deficiency
(D) Pyruvate kinase deficiency

→ Hemolysis

16. A 62-year-old female patient consults you because of recurrent ecchymosis, large hematoma in the gluteal area and swollen and tender right knee joint of 2 weeks duration. A diagnostic aspiration of the knee joint reveals gross blood. Coagulation studies reveal a bleeding time of 5 minutes (nl < 8), PTT 80 seconds (control 28s), PT 12 seconds (nl 12-14 s). When patient plasma is mixed 1:1 with normal plasma, PTT fails to correct.
Based upon the above information, the most likely diagnosis is :
(A) Disseminated intravascular coagulation
(B) Antiphospholipid syndrome
(C) Acuired factor VIII inhibitor
(D) Acquired factor V inhibitor

17. A 34-year-old female presents with history of fatigue, dyspnea on exertion, bleeding of the gums, excessive menstrual blood loss and recurrent skin ecchymoses of few weeks duration. She had a resection of 3 feet of terminal ileum for Crohn's disease 5 years ago. She denies any GI complaints. The laboratory studies reveal Hb 7 g/dL, Hct 24 %, MCV 116 fL, WBC 2200/uL, platelet count 18000/ uL, reticulocyte count 20000/uL, LDH 950 U/mL (nl: 200-450 U/mL).
Based upon the above information, the most likely diagnosis is:
(A) Immune thrombocytopenia
(B) Folic acid deficiency
(C) Cobalamine deficiency
(D) Acute leukemia

18. A 76-year-old male patient presents with marked weakness, fatigue, easy bruising and dyspnea on exertion. Examination reveals pallor ++, bilateral pedal edema and grade 1/6 ejection systolic murmur radiating to both carotids. Laboratory studies reveal Hb 8 g/dL, Hct 27 %, MCV 108 fL, WBC 2400/uL, platelet count 70000/ uL, reticulocyte count 18000 /uL, normal folic acid & cobalamine levels. Peripheral smear shows hypogranulation of neutrophils and Pelger-Huet cells The bone marrow shows megaloblastic changes with 15% blasts and some ring sideroblasts. Based upon the above information, the most likely diagnosis is :
(A) Acute leukemia
(B) Sideroblastic anemia
(C) Myelodysplastic syndrome
(D) Bacterial endocarditis

B 19. You are asked to evaluate a 68year-old -man because of gum bleeding, hematuria, spontaneous bruising, and excessive bleeding from venipuncture sites. He was admitted 2 weeks ago for acute cholangitis and treated with IV cefoxitin. Abdominal sonogram revealed gallstones and dilated common bile duct. He underwent cholecystectomy and removal of common duct stones 6 days ago. He is afebrile now and tolerating liquid diet. Laboratory studies reveal Hb 13 g/dL, Hct 40 %, platelet count 175000 /uL, WBC 6000/uL, PTT 40 s (control 28 s), PT 18 s (control 12 s). Mixing patient plasma with normal plasma corrects the abnormal PT and PTT. → ϕ inhibitors present
Based upon the above information, the most likely diagnosis is:
(A) Disseminated intravascular coagulation
(B) Vitamin K deficiency
(C) Acquired factor VIII inhibitor
(D) Antiphospholipid syndrome

B 20. A-24-year-old male is found to have mild anemia on routine blood testing Physical examination reveals no abnormality except palpable spleen tip. He is taking no medications.
Laboratory Studies:
CBC..... Hb 11.2 g/dL, Hct 34 %, MCV 68fL, WBC 4000/ uL
Serum iron .....130 ug/dL (nl : 60-160),
Iron-binding capacity… 300ug/dL(250-460 ug/dL)
Transferrin saturation.... 38%
Serum ferritin..... 200 ng/mL (nl : 15-400 ng/mL
Hemoglobin electrophoresis..Hb A 96 %, Hb A2 level 3% (nl 3-4%), Hb F 1%
Based upon the above information , most likely diagnosis is :
↓ Normal Hgb electrophoresis
(A) Beta thalassemia trait
(B) Alpha thalasemia trait
(C) Iron deficiency
(D) Sideroblastic anemia

D 21. A 60-year-old heavy smoker presents with history of recurrent attacks of dizziness and generalized itching of few weeks duration. The physical examination including complete neurological examination is normal
Laboratory Studies:
CBC.....Hb 19 g/dL, Hct 60%, WBC 14000/uL, Platelet count 425000/uL
Blood gases... PO2 80 mm Hg, PCO2 40 mm Hg, pH 7.36, O2 saturation 94% → normal
The erytropoietin level is low
Most likely diagnosis is:
(A) Polycythemia induced by COPD
(B) Relative polycythemia (Gaisbock's syndrome)
(C) Polycythemia caused by tumor
(D) Polycythemia vera

22. A 34-year-old woman is admitted to the hospital because of marked weakness, fever and mental confusion. She has been on alpha methyldopa (aldomet) for treatment of mild hypertension. Physical examination reveals multiple ecchymoses over the whole body, temperature of 101 F, marked pallor and mental confusion.
Laboratory studies:
CBC..... Hb 5.5 g/dL, WBC 14000/uL, Platelet count 8000/uL
Peripheral smear..... Many fragmented RBC's
PT& PTT.....Normal
LDH.....600 U/L (60-100 U/L)
Coomb's test..... Direct positive, indirect negative
Based upon the above information, most likely diagnosis is :
(A) Immune thrombocytopenia
(B) Autoimmune hemolytic anemia
(C) Thrombotic thrombocytopenic purpura
(D) Disseminated intravascular coagulation

23. A 34-year-year old man is found to have elevated PTT during routine preoperative evaluation for inguinal hernia surgery. The patient denies any history of excessive bleeding in the past. Physical examination is normal.
Laboratory Studies:
CBC..... Hb 14.5 g/dL. HCT 44%, WBC 8500/uL, Platelet count 250000/uL
PTT..... 85 s (control 28 s)
PT.....11 s (control l0 s)
Bleeding time.....normal
Based upon the above information , most likely diagnosis is :
(A) Factor VII deficiency
(B) Factor VIII deficiency
(C) Factor IX deficiency
(D) Factor XII deficiency

24. A 20-year-old woman consults you because of menorrhagia, recurrent spontaneous ecchymoses and excessive bleeding after minor trauma. She is not on any medications. On physical examination she is noted to have few ecchymoses on her legs.
Laboratory Studies:
CBC...Hb 13.5g/dL, Hct 44%, Platelet 200000/uL
PTT 40 s (control 28 s), PT normal, Bleeding time18 minutes (nl < 10 min)
Factor VIII coagulant activity... 30% (nl 50-200 %)
Von Willibrand's factor antigen...25% (nl 50-200%)
Ristocetin co-factor activity.....25%
Based upon the above information, the most likely diagnosis is :
(A) Hemophilia A
(B) Hemophilia B
(C) Von Willebrand's disease
(D) Glanzmann's thrombasthenia

B 25. A 65-year-old female is started on warfarin for atrial fibrillation. She had two episodes of DVT in the past. Several members of her immediate family have history of venous thrombosis and pulmonary embolism. Few days later patient develops a large necrotic area involving her right breast.
Based upon the above information, the most likely diagnosis is:
(A) Anti-thrombin III deficiency
(B) Protein C deficiency
(C) Protein S deficiency
(D) Dysfibrinogenemia

C 26. A 55-year-old patient presents with history of increasing shortness of breath and peripheral edema. He was diagnosed to have diabetes about 3 years ago and has been on oral glyburide. Physical examination reveals +++ edema of both feet and legs, rales at both lung basis, hepatomegaly and atrophic testes. Chest x-ray shows cardiomegaly and slight pulmonary congestion.
Laboratory Studies:
Hb 12 g/dL, Hct 39%, WBC 6000/uL, Serum iron 200 ug/dL (nl : 60-160 ug/dL)
Iron binding capacity 250 ug/dL (nl: 250-460 ug/dL), Transferrin saturation 80%
Based upon the above information, the most likely diagnosis is :
(A) Amyloidosis
(B) Cardiomyopathy secondary to diabetes
(C) Hemochromatosis
(D) Ischemic cardiomyopathy

C 27. A 22- year-old woman presents with sudden onset of profuse vaginal bleeding, petechiae over both legs and bleeding from the gums.
Laboratory studies:
Hb 11 gm/dl, Hct 35%, WBC 7500 , Platelet count 14000/uL
Bone marrow...Increased number of megakaryocytes
Platelet associated IGG...Negative, PT/PTT...Normal
Based upon the above information, the most likely diagnosis is :
(A) Von Willebrand's disease
(B) Disseminated intravascular coagulation
(C) Immune thrombocytopenia
(D) Acute leukemia

C 28. A 26-year-old patient in the 37th week of pregnancy presents with vaginal bleeding, multiple ecchymotic areas over skin and oozing of blood from the gums. Laboratory studies reveal a platelet count of 16000/uL, PTT 80 s (nl < 40 s), PT 24 s (nl 12-14s), elevated fibrin split products and D Dimer
The best treatment to correct the underlying disorder is:
(A) Intravenous heparin
(B) Fresh frozen plasma
(C) Prompt delivery of the fetus and placenta
(D) Intravenous antibiotics

C 29. A 75-year-old man presents because of weakness and left upper quadrant abdominal pain of few weeks duration. Physical examination reveals pallor and marked splenomegaly. Laboratory studies show Hb 9 gm/dL, Hct 28 %, WBC 2900/uL, platelet count 78000/uL and peripheral smear shows atypical lymphocytes with filaments on surface. These cells are positive for tartar resistant acid phosphatase. The bone marrow could not be aspirated and the biopsy shows marked fibrosis

The best treatment for this patient should be:

Hairy cell Leukemia

(A) Splenectomy
(B) Alpha interferon
(C) 2-Chlorodeoxyadenosine (2-CDA)

Directions: Questions 30-50 are true and false questions. Mark T for statements which are correct and F for statements that are false

30-32 The true statements about hematological manifestation of HIV disease include:

F (30) Immune thrombocytopenia usually does not occur unless CD4 count is below 200

T (31) Anemia caused by zidovudine is associated with a high MCV

T (32) Aplastic crisis caused by Parvovirus infection may respond to treatment with immunoglobulin

33-35 Indications for chemotherapy in chronic lymphocytic leukemia include :

T (33) Hb <11g/dL

T (34) Platelet count < 100000 / uL

F (35) WBC count of 30000/uL

36-38 True statements about various leukemias include

T (36) CML can be differentiated from the leukemoid reaction by the presence of Philadelphia chromosome & low leukocyte alkaline phosphatase

T (37) Hydroxyurea is the drug of choice to lower WBC count in chronic phase CML

T (38) Leukostasis is more common with AML than ALL & usually occurs when blast count is > 100,000/ul

39-42 A 64-year-old woman presents with the history of headache, dizziness and visual disturbance of few days duration. The routine blood tests reveal a platelet count of 1.5 million. Bone marrow examination shows a marked increase in megakaryocytes. The appropiate management should include:

F (39) Heparin

T (40) Hydroxyurea

T (41) Plateletpheresis

T (42) Aspirin

43-47 Disorders associated with the increased risk of thrombosis include :

T (43) Prothrombin 20210 mutation

T (44) Anti-thrombin III deficiency

T (45) Protein C deficiency

T (46) Antiphospholipid syndrome

T (47) Resistance to activated protein C

48-50 True statements about low molecular heparin include:

T (48) Prophylactic and treatment doses are different

T (49) Bleeding risk is similar to unfractionated heparin

F (50) The effect can be reversed by protamine or fresh frozen plasma

Answers to Hematology Questions

1.	C	26.	C
2.	B	27.	C
3.	D	28.	C
4.	A	29.	C
5.	C	30.	F
6.	B	31.	T
7.	C	32.	T
8.	C	33.	T
9.	D	34.	T
10.	B	35.	F
11.	B	36.	T
12.	B	37.	T
13.	B	38.	T
14.	B	39.	F
15	C	40.	T
16.	C	41.	T
17.	C	42.	T
18.	C	43.	T
19.	B	44.	T
20.	B	45.	T
21.	D	46.	T
22.	C	47.	T
23.	D	48.	T
24.	C	49.	T
25.	B	50	F