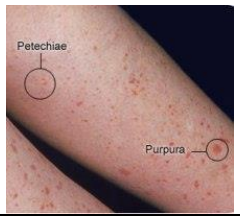
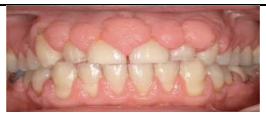
Hematology
Examination

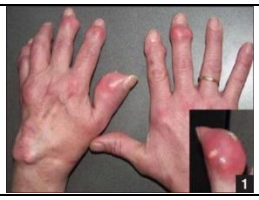
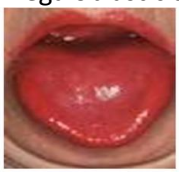
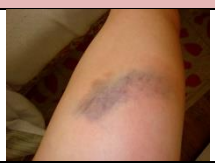
Examination	
Subject steps	Pics / Notes
A-Preparation: Pre-exam Checklist: WIPE	
1- Wash your hands	Very important. Ask the patient about his racial origin (e.g. Thalassaemia)
2- Introduce yourself to the patient, confirm patient's ID, explain the examination & take consent.	
3- Positioning of the patient "**lying flat**" and insure his/her Privacy.	
4- Exposure. Full exposure of the trunk.	
B-General appearance: ABC2DEVs	
1- Appearance: young, middle aged, or old, and looks generally ill or well.	Observe the patient's general appearance (age, state of health, nutritional status and any other obvious signs e.g. jaundice, cyanosis, dyspnea)
2- Body built: normal, thin, or obese	♣ Begin by observing the patient's general health from the end of the bed. ♣ The patient looks well (not cachectic), overweight (don't say obese), not connected to IV line nor O2 mask, no obvious pallor or cyanosis, no respiratory or pain distress (not tachypnic). Oriented to time, place and person. ♣ Also look for syndromes that associated with cardiac disease (Marfan, Down and Tunner syndromes).
3- Connections: such as nasal cannula (mention the medications), nasogastric tube, oxygen mask, canals or nebulizer, Holter monitor, I.V. line or cannula (mention the medications).	
4- Color: jaundiced, pale, or cyanosed.	
5- Distress: in pain, respiratory (using accessory muscles), or neurological (abnormal movements) distress	
6- Else: mental functions: consciousness, alertness, and orientation.	
7- Vital signs: 1) Pulse rate* 2) Blood pressure (BP) 3) Temperature 4) Respiratory rate ***Tachycardia** in anemic patient: Increased cardiac output due to reduced oxygen-carrying capacity of their blood.	Take the patient's radial pulse (Determine the Rate, Rhythm and the Character of the pulse). Take his/her blood pressure (Lying and standing or sitting-postural hypotension). **Rate:** counting over 30 seconds, normally 60-100. **Rhythm:** regular or irregular. Synchronization by comparing with the other side (radio radial or radio femoral delay). **Character and volume:** determined from the carotid. **Blood pressure (BP)** Normal BP defined as a systolic reading less the 140, and diastolic reading less than 90. **Temperature:** Normal body temperature ranges from 36.6-37.20C. **Respiratory rate:** It is traditional to count it while taking the pulse. The normal rate at rest should not exceed 25 beat per minute (range 16-25).

Hematological Examination

1- Physical examination – inspection
2- Abdominal examination especially splenomegaly
3- Lymphadenopathy
4- Special hematological exams

1-Physical examination – inspection

A-Skin and its appendices	
Paleness	anemia
Plethoric aspect	polyglobulia
Jaundice	haemolytic anaemia, pernicous anaemia(vit B12 deficiency)
Thrombocytopenic purpura[1] (petechia, ecchymoses, suffusion) 1 sort of bruising due to hemorrhage into the skin. petechiae: small bruising , eccchymoses: large bruising. Systemic vasculitis: petechiae are raised (palpable purpura), painful.	Thrombocytopenia 
Skin infections	neutropenia
dry skin, brittle hair and nail, hair loss, itching	Iron deficiency
B-Oral cavity, Mucous membranes	
plummer-vinson syndrome	mucous membrane atrophy in iron deficient anaemia
Hunter's glossitis	vitamin B12 deficiency
Petechia	thrombocytopenia
Gingiva hypertrophy	Leukaemia 
Aphthosus stomatitis, angina	agranulocytosis, leukaemia 
Confluent tonsillitis	mononucleosis
C-Hands	
Koilonychias (Dry, brittle, ridged, spoon-shaped nails)	Sever iron deficiency anemia. Occasionally due to fungal infection 
Digital infarction	Abnormal globulins

Pallor of palmar creases	Hemoglobin level is less than 8.1g/dl.
Gouty tophi	
Arthropathy	Hemophilia
D-Face	
Eyes: -jaundice, hemorrhage, injection - conjunctival pallor: more reliable than nail beds or palmar creases for diagnosing anemia	
Mouth:	
Hypertrophy of the gum	Leukemia
Gum bleeding	
Ulceration, infection and hemorrhage of buccal and pharyngeal mucosae	
Atrophic glossitis	Megaloblastic anemia, iron deficiency anemia 
Waldeyer's ring enlargement Waldeyer's ring Is a circle of lymphatic tissue in the posterior part of the oropharynx and nasopharynx, and includes the tonsils and adenoids.	Non-Hodgkin lymphoma
E-Legs	
bruising	
pigmentation	
Palpable pleura	Henoch-Schönlein purpura
Scratch marks	
Leg ulcer	Hemolytic anemia (including sickle cell anaemia and hereditary spherocytosis), probably as a result of tissue infarction due to abnormal blood viscosity.
Neurological abnormalities	vitamin B12 deficiency

1-Abdominal Examination

- Hepatomegaly.
- Splenomegaly.
- Para-aortic adenopathy: lymphoma, lymphatic leukemia.

• Splenomegaly:

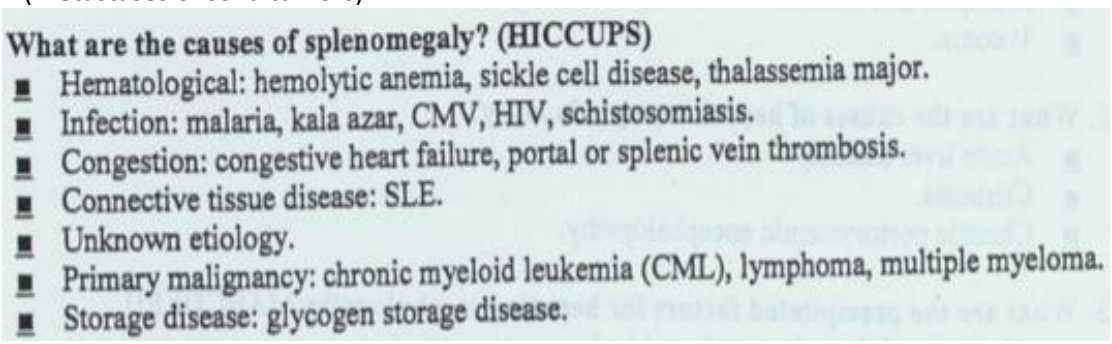
• Palpation, percussion, auscultation
• Size, tenderness, pain
• Soft, thicken, hard
• "Hypersplenism" – pancytopenia due to sequestration

Ludwig Traube (spleen triangle): superiorly by the sixth rib, laterally by the mid-axillary line and inferiorly by the left costal margin that is normally resonant to percussion.

Causes:

• Portal hypertension
– Liver cirrhosis
– Hepatic, portal or splenic vein thrombosis
• Storage disorders – Gaucher, Niemann-Pick
• Systemic diseases – Sarcoidosis, amyloidosis, RA
• Infections
– Acute
Sepsis, IE, typhus abdominalis, Mononucleosis sy.
– Chronic
Tuberculosis, brucellosis, syphilis, malaria, leishmaniasis, schistosomiasis

Haematological disorders
– Haemolysis (RES hyperplasia): thalassaemia major and intermedia, sickle cell anaemia, any type of haemolytic anaemia
– Malignancies
• Lymphoid: CLL, HCL, Lymphoma, ALL
• Myeloid: CML, MF, PRV, AML
• (Metastases of solid tumors)



1-Lymphadenopathy

• Palpable – non-palpable
• Regional – generalized
•Size (soliter, conglomerate), speed of development
• Tenderness, pain
• Soft, thicken, hard
• Relation to the surrounding tissues (fixed or mobile)
• Fluctuation, abscess/fistula formation
• Mass effect (Tracheal/bronchial obstruction, bowel obstruction, DVT)

Lymph nodes examination

Site	Palpable nodes may be localized to one region (e.g. local infection, early lymphoma) or generalized (e.g. late lymphoma) The palpable lymph nodes areas are: - **Epitrochlear** - **Axillary** - **Cervical** - **Supraclavicular** - **Para-aortic (rarely palpable)** - **Inguinal** - **Popliteal**
Size	Large nodes are usually abnormal (greater than 1 cm)
consistency	**Hard** nodes suggest carcinoma deposits; **soft** nodes may be normal; and **rubbery** nodes may be due to lymphoma
Tenderness	This implies infection or acute inflammation
Fixation	Nodes that are fixed to underlying structure are more likely to be infiltrated by carcinoma than mobile nodes
Overlying skin	Inflammation of the overlying skin suggests infection, and tethering to the overlying skin suggest carcinoma

DDX of lymphadenopathy

I. Infectious
- Viruses: mononucleosis sy.(EBV, CMV, HIV), hepatitis infectiosa, herpes simplex, rubella
- Bacterias: Streptococcus, Staphylococcus, Brucella, Francisella tularensis, Treponema pallidum, Chlamydia, mycobacterias
- Fungi: histoplasmosis, coccidiomycosis
- Parazites: toxoplasmosis, leishmaniasis, trypanosomiasis

II. Malignant disorders
- Primary hematoligical disorders: lymphomas; myeloid disorders (acute and chronic myelomonocytic leukaemia)
- Solid tumor metastases

III. Disorders with immunpatomechanism
- Autoimmun disorders: SLE, RA, MCTD, Sjögren-sy., vasculitis
- Sarcoidosis

IV. Storage diseases Gaucher, Niemann–Pick-, Fabry-, Tangier-disease

V. Endocrin disorders (lymphoid hyperplasia) Hyperthyreosis

VI. Other rare disorders - Castleman disease - Kikuchi disease - Histiocytosis - Dermatopathic lymphadenitis - Mucocutan lymphnode sy.(Kawasaki disease)

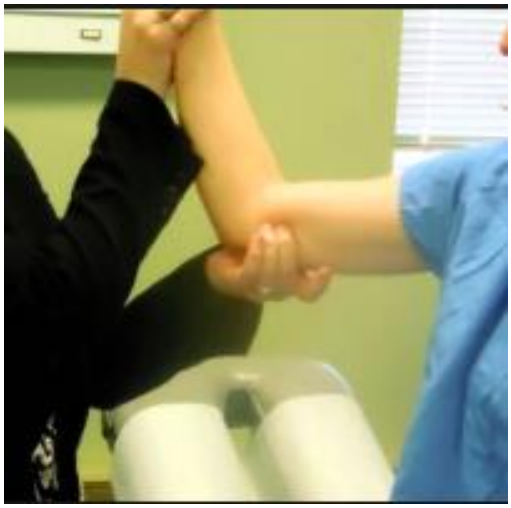
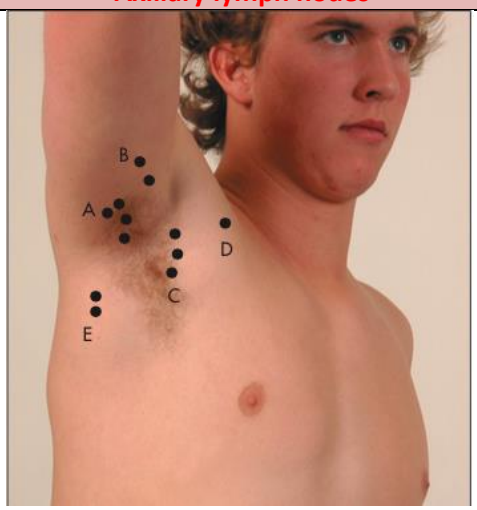
1-Special hematological exams

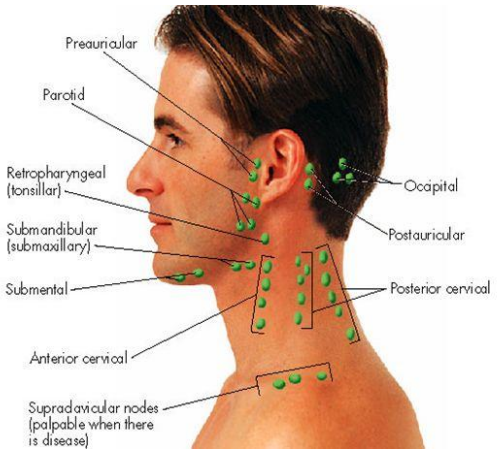
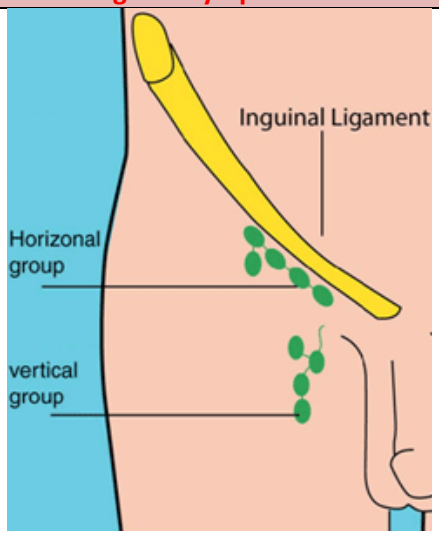
Useful laboratory tests:

<u>General</u>

• CBC, reticulocyte
• Peripheral blood smear MGG: cytomorhology

• ESR, CRP • EPO <u>Iron deficiency</u> • SeFe, Tf, Sat, SolTfR, Ferritin <u>Megaloblastic anaemia</u> • B12, folsav <u>Haemolysis</u> • SeBi, LDH • Direct Coombs, irregular antibodies • Haptoglobin, plasma free haemoglobin • HgbELFO • RBC enzyme activity <u>Blood loss</u> • Stool benzidin test, urine sediment <u>Plasma cell dyscrasia</u> • Total protein, ELFO, immunelfo, quantitative Ig
Useful haematopathological exams • Bone marrow aspiration, biopsy & Lymphnode biopsy – Cytomorhology, histology – Immunehistochemistry – Flow cytometry – Cytogenetics (metaphase analysis, FISH) – Molecular genetic FNAB of lympnodes is not recommended! Sometimes other organs (skin, stomach, bowel, spleen) for these examinations
Imaging techniques • Xray (bone laesions of MM) • US • CT • MRI • Gallium scan • PET/CT

Epitrochlear lymph nodes	Axillary lymph nodes
	 The main groups of axillary lymph nodes A = central; B = lateral; C = pectoral; D = infraclavicular; E = subscapular.

Cervical and supraclavicular lymph nodes	Inguinal lymph nodes
	 Horizontal group: along the inguinal ligament Vertical group: along the femoral vessels