BLOCK H OSPES

BY FATIMA HAIDER
KGMC

TABLE 5-1. MAJOR DIFFERENCES BETWEEN BENIGN AND MALIGNANT TUMORS

Feature	Benign	Malignant
Growth	Slow	Fast
	Expansive	Invasive
Gross appearance		
External surface	Smooth	Irregular
Capsule	Present	Not obvious
Cross section	Homogeneous	Variable
Color	Uniform	Variable
Microscopic		
Differentiation	Resembles tissue of origin	Anaplastic, does not resemble tissue of origin
Nuclei	Normal size and shape	Atypical, pleomorphic
		Hyperchromatic
Mitoses	Few	Numerous, often abnormal

38. List the important diseases that are associated with an increased incidence of cancer.

Disease	Type of Cancer
Solar keratosis of the skin	Squamous carcinoma
Cirrhosis	Hepatocellular carcinoma
Ulcerative colitis	Colic adenocarcinoma
Reflux esophagitis/Barrett esophagus	Esophageal adenocarcinoma
Atrophic gastritis	Gastric adenocarcinoma
Paget disease of bone	Osteosarcoma
Immunodeficiency disorders	Lymphoma
Gonadal dysgenesis	Germ cell tumors

39. List important infectious diseases associated with an increased incidence of some cancers.

Disease/Pathogen	Type of Cancer
Epstein-Barr infection	Burkitt lymphoma, nasopharyngeal cancer (especially in China)
Viral hepatitis B and C	Hepatocellular carcinoma
Human papilloma virus infection	Carcinoma of cervix
Human T-cell lymphoma/ leukemia	T-cell lymphoma/leukemia leukemia virus
AIDS	Lymphoma, Kaposi sarcoma

Carcinogens

1. Polycyclic aromatic hydrocarbons
2. Aromatic azo dyes
3. Benzene
4. Aflatoxin B1
5. Nickel
6. Arsenic
7. Asbestos

TUMOR SUPPRESSOR GENES

1. P53
2. Rb
3. APC
4. NF1, NF2
5. WT1
6. VHL
7. BRCA1, BRCA2

Apoptosis gene

1. Bcl2

IMPORTANT POINTS

* Cancer cells have an upregulated telomerase activity
* Desmoplasia - formation of connective tissue in response to tumors
* Cells that act against tumor cells - NK cells, macrophages, cytotoxic T cells
*

OSPE IDENTIFICATION POINTS

* FIBRO ADENOMA
-loose connective tissue around ducts
-glandular structures and ducts which are compressed

* LIPOMA
-mature adipocytes with eccentrically placed nuclei
-fibrous septa

* SQUAMOUS CELL CARCINOMA
-keratin pearls
-intercellular bridges
-loss of polarity

KIL

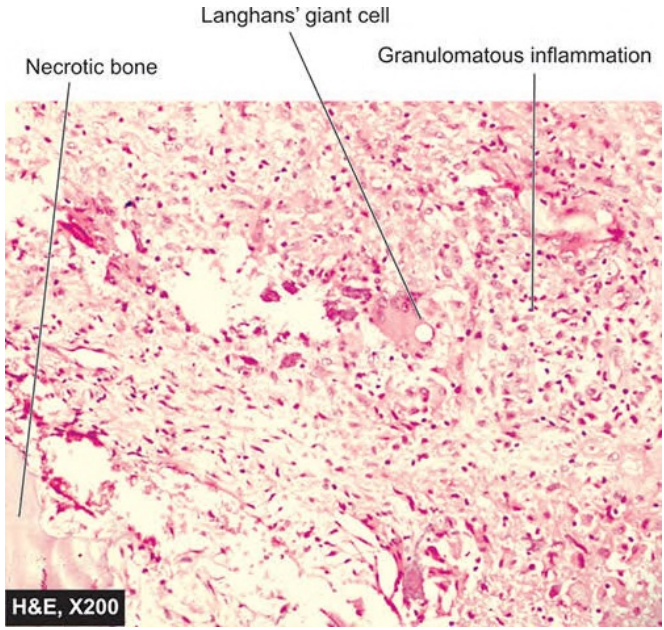
* BASAL CELL CARCINOMA
-pallisading pattern nucleus
-hyperchromatic nucleus
-basophilic malignant cells
-fibrotic stromal matrix

* TUBERCULOUS OSTEOMYELITIS
-dense infiltration of leukocytes
-sequestrum
-involucrum
-tuberculous granuloma with central necrosis, epitheloid cells and giant cells

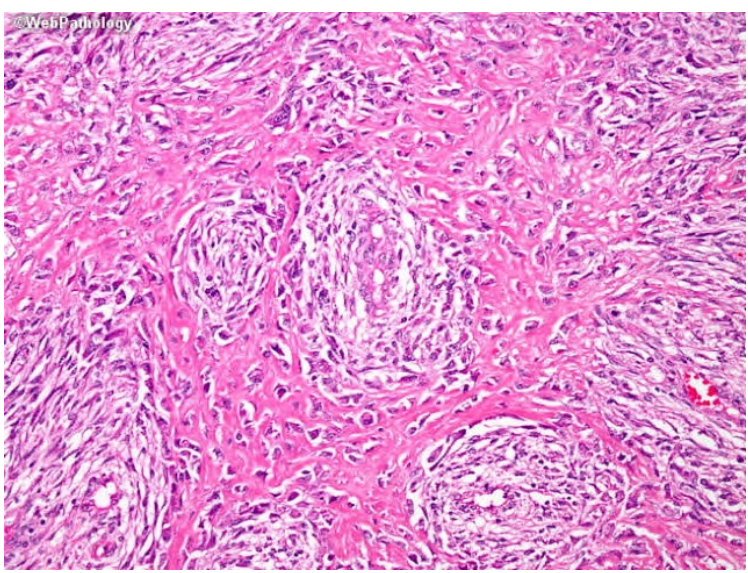
* OSTEOSARCOMA
-tumor cells with pleomorphic and hyperchromatic nuclei
-eosinophilic homogenous glossy lace like osteoid
-atypical mitoses

* OSTEOCLASTOMA
-round to oval cells with round nuclei and one/two prominent nucleoli (mononuclear cells)
-cells having abundant cytoplasm and numerous multinucleated giant cells

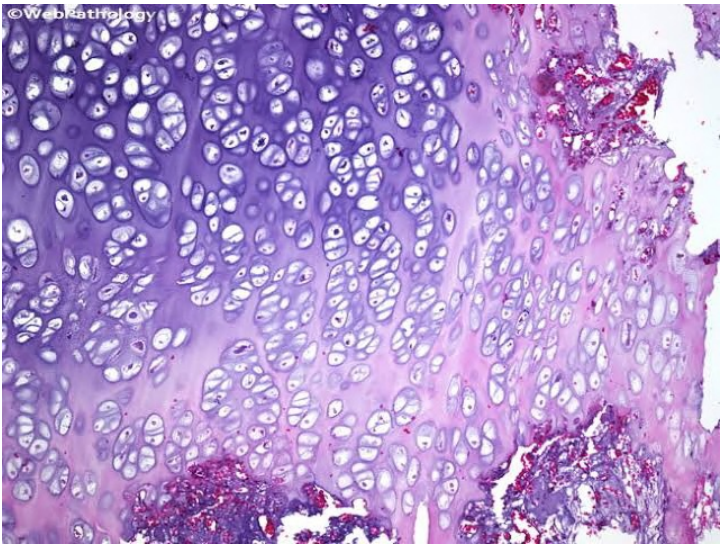
* CHONDROSARCOMA
-chondrocytes of various shapes and sizes in hyaline cartilage matrix
-nucleated cells



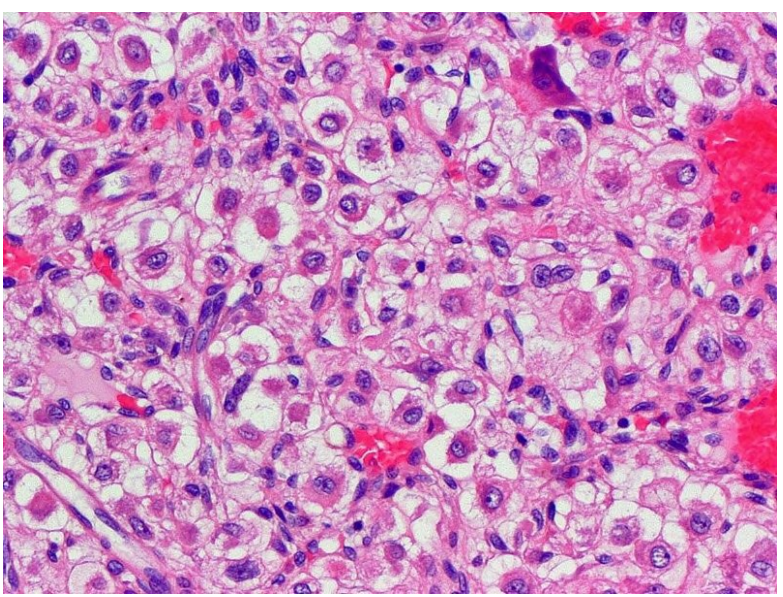
Tuberculous osteomyelitis



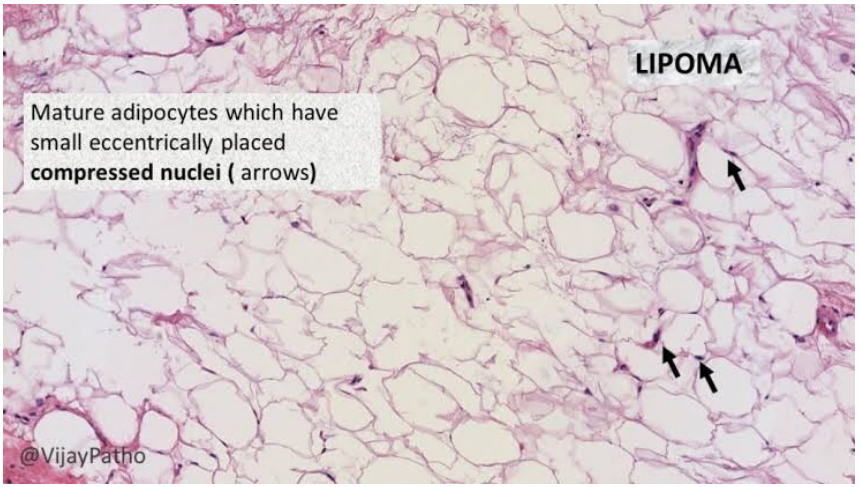
Osteosarcoma



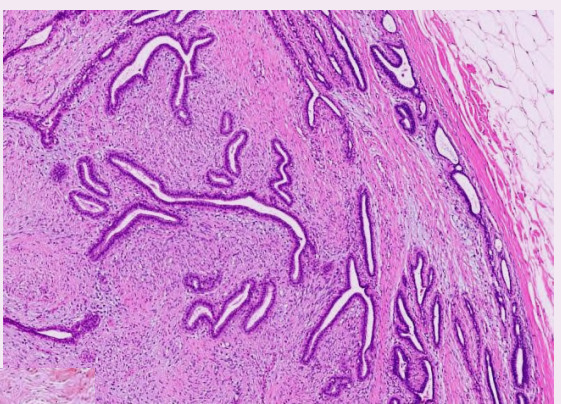
Osteochondroma

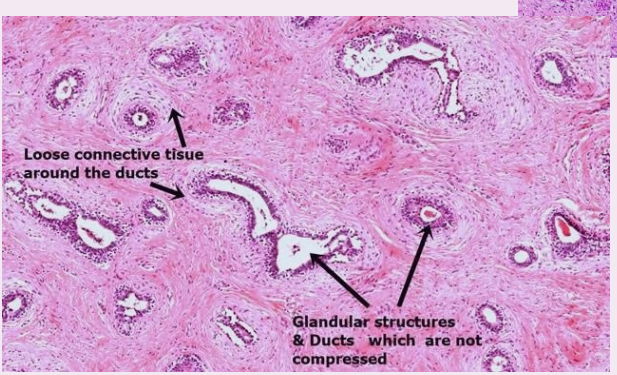


Chondrosarcoma



Fibroadenoma

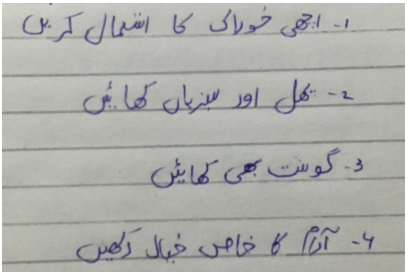




PT= 10-14 sec
APTT= 25-43 sec
Bleeding time = 2-9 min
Clotting time = 8-12 min

* Coagulation cascade generates thrombin, which converts fibrinogen in the platelet plug to fibrin
* Extrinsic pathway - Tissue thromboplastin activates Factor VII
* Intrinsic Pathway - Subendothelial collagen activates Factor XII
* Extrinsic Factor - Factor VII
* Intrinsic Factors - Factor XII, XI, IX, VIII (8,9,11,12)
* Common Factors - Factor II, V, X (2,5,10) and fibrinogen
* PT measures- extrinsic and common pathways
* PTT measures- intrinsic and common pathways

PRESCRIPTIONS PHARMA



* Iron Deficiency anemia (pregnant female)

Iron sucrose 200mg IV in 100ml 0.9% NaCl

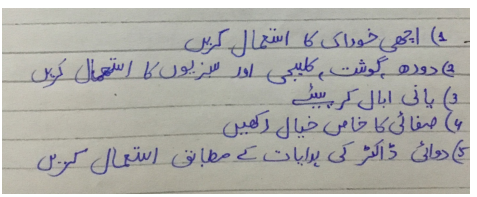
* Anemia (due to worm infestation)

FFA

Ferrous sulfate 200-300 mg OD for 3 months

Folic acid 5mg OD for 3 months

Albendazole 100mg BD for 3 days



* B12 deficiency anemia

CF

Cytamen I/M 1mg

Folic acid 5mg OD for 3 months

* Gout

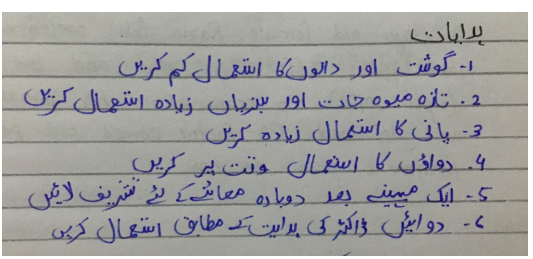
PAPI

Probenecid 500mg BD

Allopurinol 300mg OD

Prednisolone 5mg

Indomethacin 50mg BD for 1 week



* Rheumatoid arthritis

LMP F DOC

Leflumomide 20mg

Methotrexate 10mg

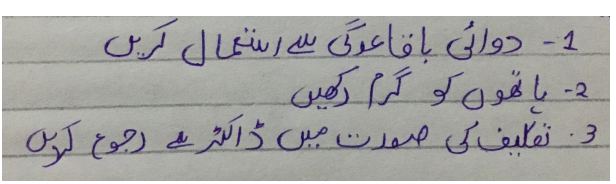
Prednisolone 5mg

Folic acid 5mg

Diclofenac 50mg

Omeprazole 40mg

Cac 1000



* **Psoriasis**

CAM CF

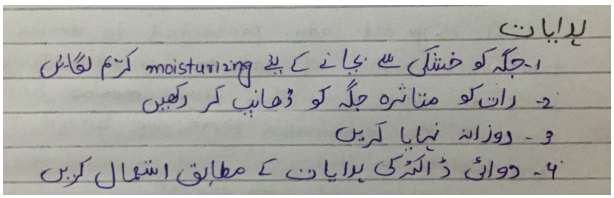
Corticosteroid cream BD

Anthraline 2mg OD

Methotrexate 10mg

Coal tar 2% QID

Folic acid 5



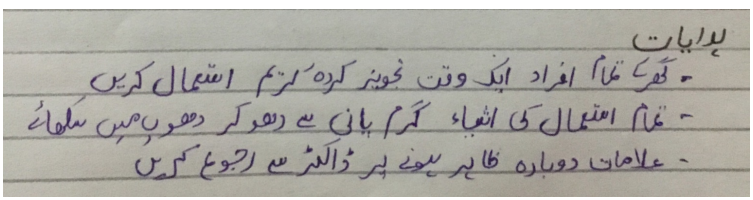
* **Scabies**

PIC

Permethrin 5%

Ivermectin 10mg

Cetrizin 6mg



* Growth factors - PDGF, TGF alpha
* Growth factor receptors- ERBB1, HER2/NEU
* Signal transducing proteins - RAS and ABL
* Nuclear transcription factor - MYC gene

* Mutation - An alteration in the nucleotide sequence of genome of an organism
* Codon - A trinucleotide sequence of DNA or RNA that corresponds to a specific amino acid
* Ankylosing Spondylitis- A type of arthritis that cause inflammation in joints and ligaments of spine. It is an autoimmune process associated with HLA-B27 gene
* Osteomyelitis- infection of bone and marrow
* Eczema - A group of different conditions that makes skin inflamed or irritated
* Classification of eczematous dermatitis

1. Atopic dermatitis
2. Allergic contact dermatitis
3. Drug induced eczematous dermatitis
4. Photoeczematous dermatitis
5. Primary irritant dermatitis

* Erythema multiforme - A skin immune reaction that an infection or drug can trigger. The main symptom is rash on body where each mark resembles a bull's eye
* Stevens Johnson Syndrome - An extensive and symptomatic febrile form of Erythema multiforme, often but not exclusively seen in children
* Tinea - fungal skin infection
* Infectious/ Septic arthritis- An inflammation of joint that is caused by bacteria, virus or fungus.
* Psoriasis - A chronic inflammatory and hyperplastic skin disease with a strong genetic predisposition and autoimmune pathogenic traits

* Osteoarthritis - A degenerative disease of synovial joints characterised by focal loss of articular hyaline cartilage with proliferation of new bone and remodeling of joint contour
* Osteomalacia - Defective mineralization of skeleton in adults. Defective calcium or phosphate deposition in osteoid matrix
* Osteoporosis- It is a systemic skeletal disease characterised by low bone mass and micro architectural deterioration of bone tissue, with a consequent increase in bone fragility
* Osteomyelitis Classification

1. Pyogenic (bacterial) osteomyelitis
2. Tuberculous osteomyelitis
3. Syphilitic osteomyelitis

* Osteomyelitis classification based on onset

1. Acute
2. Sub acute
3. Chronic

* Rheumatoid Arthritis- It is a chronic and usually progressive inflammatory disorder of unknown etiology characterised by polyarticular symmetrical joint involvement and systemic manifestations
* Reactive arthritis- characterised by a triad of arthritis, non gonococcal urethritis or cervicitis, and conjunctivitis

* Types of Autopsy

1. Medical autopsy
2. Medicolegal autopsy
3. Psychological autopsy
4. Negative/ Obscure autopsy
5. Oral autopsy
6. Mini autopsy

* Types of abrasions

1. Scratches or longitudinal abrasions
2. Grazes or brush burns
3. Imprint/ pressure/ contact abrasions

* Types of ballistics

1. Internal or interior ballistics
2. External or exterior ballistics
3. Terminal or final ballistics

* Classification of stab wounds

1. Penetrating wound
2. Punctured wound
3. Perforating wound

* Maceration - It is the process of removing soft tissue from bones so as to be able to study skeletal elements
* Wound - Disruption of anatomical continuity of any of the tissues if body, internally or externally by violence or trauma
* Injury - Any harm whatever illegally caused to any person in body, mind, reputation or property
* Incised wound - It is an injury produced when a sharp edged weapon is drawn over the skin forcefully
* Stab wound - Any wound with depth as the greatest dimension, caused by sharp pointed object is called a stab wound

* Immediate Changes after death

1. Cessation of respiration
2. Cessation of circulation
3. Primary muscular flaccidity
4. Pallor of skin
5. Contact flattening
6. Immediate eye changes (vacant eye stare, bilateral fixed dilatation of pupil, absent pupillary light reflex, absent corneal reflex, cornea is hazy if eyes are open, intraocular pressure falls from 10-20 mmHg to zero in 2 hours)

* Early signs of death (within 12-24 hours)

1. Postmortem lividity
2. Rigor mortis
3. Cooling of body or algor mortis
4. Early changes in eyes

* Late signs of death (mostly after 24 hours)

1. Putrefaction
2. Mummification
3. Adipocere formation

ANEMIA HISTORY TAKING

HOPI

Common symptoms of anemia include lethargy, tachycardia, and pallor. Infants may present with irritability and poor oral intake

Changes in urine color, scleral icterus, or jaundice may indicate the presence of a hemolytic disorder.

Specific questions related to bleeding from the gastrointestinal tract, including changes in stool color, identification of blood in stools, and history of bowel symptoms, should be reviewed.

Severe or recurrent epistaxis also may result in anemia from blood loss and iron deficiency.

In adolescent girls, menstrual history should be obtained, including duration and amount of bleeding. Severe epistaxis and/or heavy menstrual bleeding should raise suspicion for an underlying bleeding disorder

The presence of pica, the intense craving for nonfood items, should be assessed given its strong association with iron deficiency. In young children, pica may manifest as craving dirt, rocks, and paper. In adolescents, craving for ice, or pagophagia, may be more common.

Past medical history

Birth History - The birth and neonatal history should include gestational age, duration of birth hospitalization, and history of jaundice (including onset and need for phototherapy) and/or anemia in the newborn period

Underlying medical conditions- Past medical history and review of symptoms should be obtained to elucidate chronic underlying infectious or inflammatory conditions that may result in anemia. Travel to/from areas of endemic infection (eg, malaria, hepatitis, tuberculosis) should be noted

Drug and toxin exposure – Current and past medications (including homeopathic or herbal supplements) should be reviewed with particular attention to oxidant drugs that can cause hemolysis, particularly in patients with underlying G6PD deficiency (eg, drugs such as fluoroquinolones, dapsone, nitrofurantoin, and sulfonylureas; foods such as fava beans; and others, as summarized in the table (table 3)). Possible environmental toxin exposure should be explored, including lead exposure and nitrates in well water.

Family history – Family history of anemia should be reviewed in depth. Family members with jaundice, gallstones, or splenomegaly should be identified. Asking if family members have undergone cholecystectomy or splenectomy may aid in the identification of additional individuals with inherited hemolytic anemias.

Dietary history – The dietary history is focused on assessing iron intake and, to a lesser degree, folate and vitamin B12 content

Developmental history – Parents/caregivers should be asked questions to determine if the child has reached age-appropriate developmental milestones. Developmental delay can be associated with iron deficiency, lead toxicity, vitamin B12/folic acid deficiency, and Fanconi anemia

REHABILITATION

- Defined as "combined and coordinated use of medical , social , educational and vocational measures for training and retraining the individual to the highest possible level of functional ability"

Areas of concern in rehabilitation :

- Medical rehabilitation
- Vocational rehabilitation
- Social rehabilitation
- Psychological rehabilitation

Types

1. Physical therapy
2. occupational therapy
3. Speech and language therapy
4. cognitive rehabilitation therapy
5. recreational therapy
6. Vocational rehabilitation
7. Pharmacotherapy
8. Respiratory therapy

Occupational therapy aims to improve an individual's ability to perform daily tasks.

NIH

Cases that may require occupational therapy include[5]:

- Autism
- Mental health conditions
- Physical disabilities
- Developmental delays
- Arthritis
- Spinal cord and brain injuries
- Amputations
- Chronic illnesses

Common Cases

Cases that may require physical therapy include[3]:

- Injuries
- Vertigo
- Stroke or nerve damage
- Joint stiffness and weakness
- Arthritis
- Other chronic illnesses

Physical therapy aims to improve body movements and relieve physical pain.

NIH

Recreational therapy improves emotional and physical well-being of individuals.

NIH

Cases that may require recreational therapy include[11]:

- Disabilities, injuries and illnesses
- Mental health disorders and addictions

Cases that may require speech and language therapy include[7]:

- Dyslexia
- Fluency problems
- Dysphagia
- Down syndrome
- Cleft palate
- Neck, throat or head cancer
- Autism
- Hearing impairments
- Chronic hoarseness
- Parkinson's disease
- Multiple sclerosis
- Huntington's disease
- Aphasia
- Oral swallowing or feeding issues

Speech and language therapy is the treatment of speech, language and swallowing disorders.

NIH

Cognitive rehabilitation is the treatment of cognitive disabilities.

NIH

Cases that may require cognitive rehabilitation include[9]:

- Strokes
- Traumatic brain injuries
- Neurodegenerative diseases

Cases that may require respiratory therapy include[18]:

- Chronic obstructive pulmonary disease
- Lung development with premature infants
- Cystic fibrosis
- Asthma
- Pneumonia
- Acute bronchitis
- Lung cancer

Respiratory therapy is the treatment and management of lung and breathing problems.

BLS

Pharmacotherapy uses medication to improve mental and physical well-being.

NIH

Cases that may require pharmacotherapy include[16]:

- Depression
- Substance abuse
- Dementia
- Insomnia

Cases that may require vocational rehabilitation include[13]:

- A serious medical event or injury
- Disability barriers (physical, mental and emotional)

Vocational rehabilitation aids injured and disabled individuals with returning to and maintaining employment.

NIH

Injuries in road traffic accidents

1. Brain and head injuries - traumatic brain injury
2. Neck injuries - disc injury or cervical dislocation
3. Spinal cord injuries
4. Back injuries - sprains, strains, fractured vertebrae, herniated disc
5. Facial injuries - caused by colliding with dashboard, steering wheel, airbag, side window, windscreen, car screens, shattered glass
6. Internal injuries - injuries to bowels, spleen, liver, kidney, lungs, heart, aorta, fractured ribs which can puncture lungs
7. Psychological injuries - post traumatic stress disorder, emotional distress, depression, persistent driving anxiety

Bloodborne Pathogen Diseases

Some examples of bloodborne pathogens:

- Malaria
- Syphilis
- Brucellosis
- Leptospirosis
- Arboviral infections
- Relapsing fever
- Creutzfeld-Jakob Disease
- Viral Hemorrhagic Fever

Main bloodborne pathogens and diseases of concern	
Hepatitis B Virus (HBV)	**– Hepatitis B**
Hepatitis C Virus (HCV)	**– Hepatitis C**
Human Immunodeficiency Virus (HIV)	**– AIDS**

Neoplasia definition:

- **Neoplasm : According to British Oncologist Willis-**

"A neoplasm is an abnormal mass of tissue, the growth of which exceeds and is uncoordinated with that of normal tissues and persist in the same excessive manner after cessation of stimuli which evoke the change."

- **Oncogenes** are defined as mutated genes causing the transformation of normal cells into cancer cells.
- Proto oncogenes are normal genes, which involved in cell growth, differentiation and proliferation.
- Proto oncogene, when altered by mutation becomes an oncogene.

  Proto-oncogene ⟹ Mutation ⟹ Oncogene
- The resulted protein encoded by oncogene are known as oncoprotein.

Contraindications of corticosteroids

M-Mellitus(Diabetes Mellitus)

O-Osteoporosis

T-Tuberculosis

H-Herpes simplex keratitis

E-Epilepsy

R-Renal failure

P-Peptic ulcer

P-Psychosis

F-Fungal & viral infection

C-Congestive Heart Failure

Characteristics of Animal cells:

(i) Goat RBCs:

They are similar to human RBCs but smaller in size. Having a diameter of 4.4 μm.

(ii) Camel RBCs:

They are oval in shape and nucleated.

(iii) Chicken RBCs:

Oval in shape and nucleated.

(iv) Birds and Fish RBCs:

Oval, Nucleated and convex.

CLASSIFICATION OF FIREARMS :

Depending on the bore or inner surface of the barrel :

1.Rifled firearms/ Guns.

2.Smooth bored firearms/ Shotguns.

BULLET & PELLET

Bullet :

This is the projectile from a rifled firearm.

Pellet :

This is the projectile from a smooth bored firearm / shot gun.

RIFLING

Definition :

Grooving on the inner surface of the barrel of a firearm is called Rifling.

There are spiral grooves and elevated portions along the length of the barrel. The spiral grooves out longitudinally in the inner surface of the barrel.

Rifling may be clockwise / ante-clockwise.

Its number varies from 2-20. (most commonly 6)

MEDICOLEGAL IMPORTANCE OF RIFLING :

1. It gives the bullet a spinning effect and it spins around its long axis.
2. It gives the bullet a greater power of penetration.
3. It prevents the unsteady movement of the bullet when it travels in the air.
4. It maintains the straight accuracy.
5. It helps to identify the firearm weapon.

CHOKING

Definition :

Narrowing of the barrel of a shot gun at distal 7-10 cm is called Choking.

Classification :

1.Full Choke.

2.Three quarter choke.

3.Half choke

4.Quarter choke.

5.Improved cylinder.

IMPORTANCE OF CHOKING

1. It lessens the rate of spread of shot after it leaves the muzzle.
2. It increases the explosive force and velocity.
3. Thus by choking the effective range and penetration capacity of the pellets is increased.

PRIMER/ PRIMING MIXTURE

Definition :

This is the percussion cap at the base of the cartridge containing a small amount of sensitive, detonating composition.

Composition :

1.Potassium Chlorate.

2.Antimony Sulphide.

3.Mercury Fulminate.

GUN POWDER

Definition :

This is a mixture of explosive substances which propels the bullet forward by the enormous pressure created as a result of expansion of gases by its explosion.

Classification :

1.Black Powder.

2.Smokeless Powder.

3.Semi-smokeless Powder.

COMPOSITION OF GUN POWDER

Black Powder:

1.Potassium Nitrate- 75%

2.Charcoal- 15% Sulphur- 10%

3.Sulphur- 10%

Smokeless Powder:

1.Nitrocellulose (Gun Cotton)

Or

2. Nritrocellulose + Nirtoglycerine (Double Base)

Semi Smokeless Powder:

1.Black Powder-80%

2. Smokeless Powder-20%

CHARACTERISTICS OF SHOTGUN WOUNDS

A. Contact shot:

1.Single, round or oval.

2.Size – equal to the bore of the weapon.

3.Unburnt powder may go into the wound and cause haemorrhage.

4.The margin of the wound will be contused.

5.Muzzle impression is seen, if the contact is tight.

SHOT GUN WOUNDS

CHARACTERISTICS OF SHOTGUN WOUNDS: CONT:

B. Close range (up to 1 meter)

•Within a distance of about 30 cm, tissues surrounding the wound are singed by flame, blackened by smoke(carbon sut) and tattooed by unburnt/ partially burnt gun powder granules.

•Tissues within and around the wound may be cherry red in color due to absorption of CO.

CHARACTERISTICS OF SHOTGUN WOUNDS : CONT :

C. Long Range :

At a distance of 4 meters, shots spread widely and enter the body as individual pellets and produce separate opening in an area of 10-15 cm in diameter. They are present usually up to 5 meters.

The spread of pellets from a fully choked bore is as follows :

•10 meters → 25 cm

•15 meters → 35 cm

•20 meters → 45 cm.

•30 meters → 75 cm.

DIFFERENCES BETWEEN THE ENTRY AND EXIT WOUNDS

Traits	Entry wound	Exit Wound
1. Size	Smaller when near, larger when distant	Larger when near, smaller when distant.
2. Margin.	Inverted	Everted.
3. Singeing, burning, blackening & Tattooing	Present	Absent
4. Abrasion, bruise & Grease collar	Present	Absent
5. Haemorrhage	Less	More
6. Protrusion of fat	Absent	Present

DIFFERENCES BETWEEN THE ENTRY AND EXIT WOUNDS

Traits	Entry Wound	Exit Wound
7. Tissues within and around the wound	May be cherry red due to CO	No colour change
8. Foreign fabrics of clothes	Enters into the wound	Nothing such
9. Metallic ring shadow on X-ray	Present	Absent
10. Muzzle impression	Present in case of contact shot	Absent
11. Bursting Effect	Present in case of contact shot	Absent

DIFFERENCE BETWEEN SUICIDAL AND HOMICIDAL GUN SHOT WOUND

Traits	Suicidal	Homicidal
1. Site of entry wound	Head or Heart	Any Where
2. Shot distance	Contact or close shot	Any range
3. Direction	Upwards, forwards or backwards	Usually upward
4. Number of wounds	Usually one	One to many
5. Hand Pressing trigger	Gun powder residue present	Absent

DIFFERENCE BETWEEN SICIDAL AND HOMOCIDAL GUN SHOT WOUND

Traits	Suicidal	Homicidal
6. Position of the weapon	Found the scene	Not found the scene
7. Scene of crime	Usually one house	Any place
8. Sex of the victim	Usually male	Any sex
9. Motive	Insanity Incurable illness Financial loss Unbearable mental pressure	Gang fudes, Enmity, Revenge, Robbery.

RICOCHET BULLET & YAWNING BULLET

Richochet Bullet:

This is the bullet which before striking the object aimed at, strikes intervening object first and then after ricocheting and re-bouncing from this hits the object.

Yawning Bullet:

This is the bullet that travels in an irregular fashion instead of travelling nose on is called Yawning Bullet

TUMBLING BULLET & INCENDIARY BULLET

Tumbling Bullet :

This is the bullet which rotates end to end during its motion is called Tumbling Bullet.

Incendiary Bullet :

This is the bullet which contains phosphorus, so that it catches fire on hitting the target is called Incendiary Bullet

EXPRESS BULLET & TANDEM BULLET

Express Bullet or Hollow Point:

This is the bullet with a hole in the point is called Hollow point or expressed bullet.

Tandem Bullet/ Piggyback Bullet:

Due to defect in the weapon or due to faulty ammunition or if the firearm is unused for several years --- When such a weapon is fired, the bullet may fail to come out from the muzzle. When it is fired again the second bullet may go off carrying the lodged bullet with it and both the bullets may enter the body through the same entrance wound.

This is called Tandem Bullet or Piggyback Bullet.

SOUVENIR BULLET & EXHIBIT BULLET

Souvenir Bullet:

This is the bullet which is present in the body for a long period of time. There will be no fresh bleeding in the surrounding area. A dense fibrous tissue capsule usually surrounds it.

Lead poisoning may occur due to absorption of Lead.

Exhibit Bullet or Crime Bullet:

The bullet found in the body after postmortem examination is sent to the Police Station and then to the Court for further trail of the case is called Exhibit Bullet or Crime Bullet.

TEST BULLET, DUM DUM BULLET & FRANGIBLE BULLET

Test Bullet:

The exhibit bullet is compared under a comparison microscope with one fired bullet from the suspected weapon is called Test Bullet.

Dum dum Bullet:

Dum dum bullets are hollow at their nose. These bullets split when they strike the body, causing disproportionately greater damage to the affected part.

Frangible Bullet:

These bullets are made of mostly by Lead or Iron and are designed to fragment upon impact.

RUBBER BULLET

Rubber Bullet/ Plastic Bullet/ Baton Round:

Rubber Bullet is a solid cylinder of Polyvinylchloride (PVC) , 38 mm in diameter, 10 cm long and weighs 135 gm. They cause abrasion and bruise. They do not cause punctured wounds except when fired from under 20 meters range. They are used by the Police for riot control.

TEST BULLET, DUM DUM BULLET & FRANGIBLE BULLET

Test Bullet:

The exhibit bullet is compared under a comparison microscope with one fired bullet from the suspected weapon is called Test Bullet.

Dum dum Bullet:

Dum dum bullets are hollow at their nose. These bullets split when they strike the body, causing disproportionately greater damage to the affected part.

Frangible Bullet:

These bullets are made of mostly by Lead or Iron and are designed to fragment upon impact.

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Fat Embolism Syndrome

Common Etiologies

Long bone fractures / orthopedic tauma

Injury to adipose tissue
- Burns
- Panniculitis

Bone marrow infarction
- Hemiglobinopathies (Sickle cell, thalassemia)
- Osteonecrosis

Signs and Symptoms

Acute onset dyspnea

Altered Mental Status

Fever

Petechial Rash

Anemia / Thrombocytopenia

Trauma-related	Non-trauma-related
Long-bone fractures	Severe infections
Pelvic fractures	Coronary artery bypass grafting
Chest compressions with or without rib fracture	Alcoholic (fatty) liver disease
Burns	Pancreatitis
	Renal transplantation
	Sickle-cell anemia
	Parenteral lipid infusion
	Orthopedic procedures
	Liposuction

Air Embolism

- Air embolism occurs when air is introduced into venous or arterial circulation.
- **VENOUS AIR EMBOLISM**
  - Operations on head and neck, and trauma
  - Obstetrical operations and trauma
  - Intravenous infusion of blood and fluid
  - Angiography.
- **ARTERIAL AIR EMBOLISM**
  - Cardiothoracic surgery and trauma
  - Paradoxical air embolism
  - Arteriography

Hurt - Whosoever causes pain, harm, disease, infirmity, injury to any person or impairs, disables, dismembers any organ of body or part of body of a person, without causing death is said to cause hurt

Classification of hurt

1. Itlaf i udw
2. Itlaf i salhiyyat e udw
3. Shajjah
4. Jurh - Jaifah, Ghayr Jaifah

SUSPENDED ANIMATION

Suspended animation or apparent death is a state where the heartbeat and respiration of a person become so weak that they cannot be detected by routine clinical methods. The person thus appears clinically dead but he is not since brain stem is functioning.

FEATURES :

Metabolic rate of life is so reduced that the oxygen requirement of individual cells is satisfied through dissolved oxygen in body fluid.

Definition of Child Abuse

"The physical or mental injury, sexual abuse or exploitation, negligent treatment, or maltreatment of a child under the age of 18 by a person who is responsible for the child's welfare under circumstances which indicate that the child's health or welfare is harmed or threatened."

Child Welfare Act

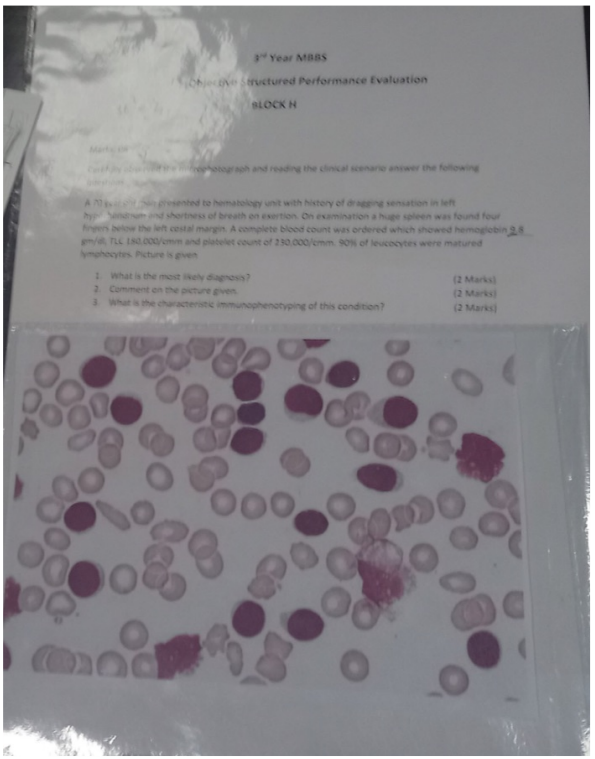
Dating of Incised wound

Fresh → Neutrophils margination / migration
12 hr → Monocytes in exudate
24 hr → Vascular buds, endothelial layer
2-3 days → Granulation tissue
4-6 days → Fibrills formation
>7 days → Scar

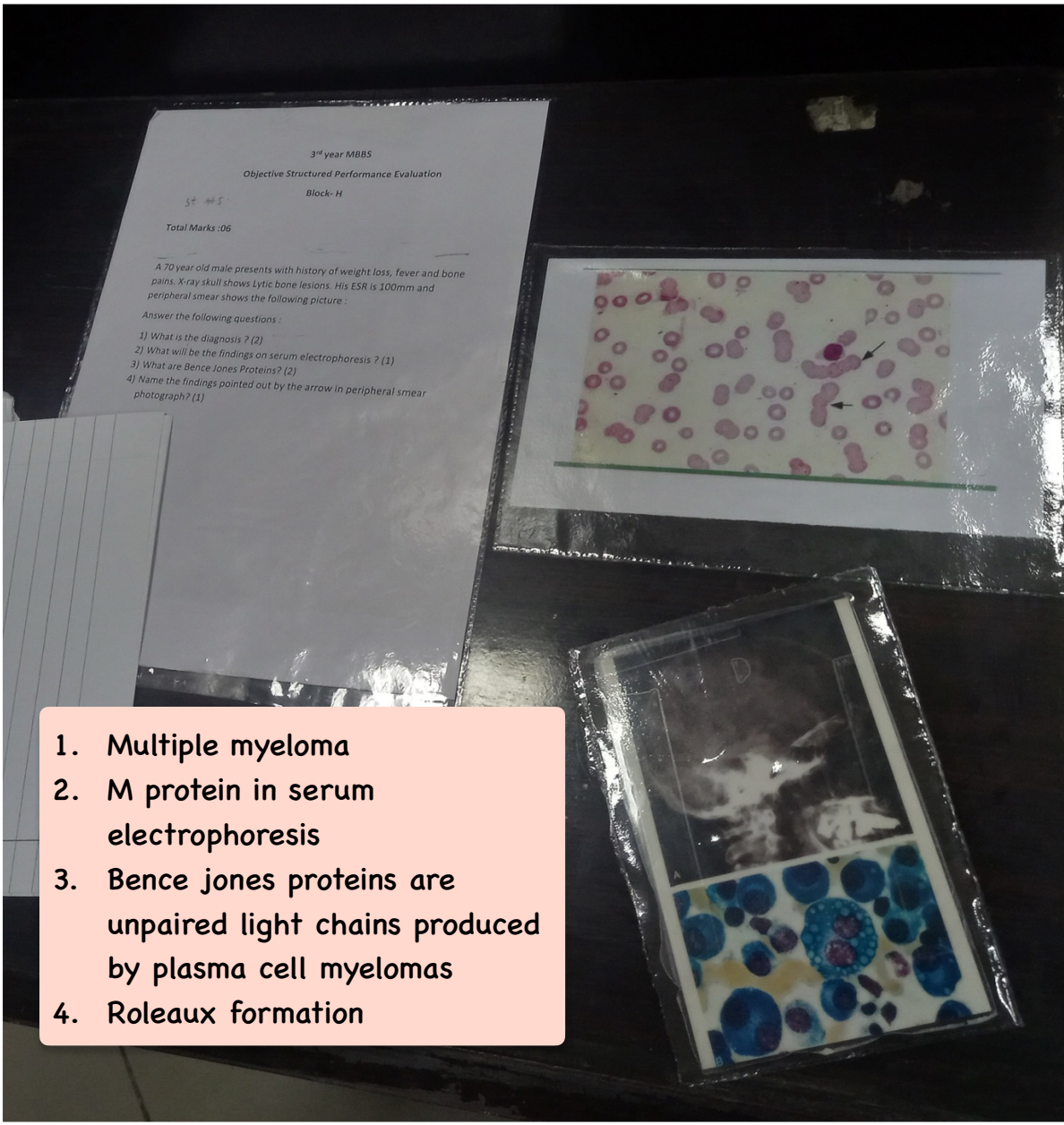
Aging of Bruise by Color

Oxy Hb	Red	Fresh
Deoxy Hb	Blue	hours to 3 days
Hemosiderin	Brown	4th day
Hemotoidin (in Parikh) Biliverdin	Greenish	5th - 6th day
Bilirubin	Yellow	7th - 12th day
	Normal	2 weeks

* Punctured wound → enters the tissues
* Penetrating wound → enters the cavity
* Perforating wound → enters and exits the cavity



1. CLL
2. Smudge cells
3. CD5 & CD20



1. Multiple myeloma
2. M protein in serum electrophoresis
3. Bence jones proteins are unpaired light chains produced by plasma cell myelomas
4. Roleaux formation

A 58 years old patient, smoker for 25 years , diabetic and hypertensive on medications works in the farm from 7 am to 5 pm since he was 18 years old . He's found to have Non-painful lesion of 4 months duration on the lateral side of nose. The lesion is round , pearly flesh colored papule with rolled(raised) borders and blood vessels over the surface.

Examine the slide/photomicrograph of the lesion and answer the following questions.

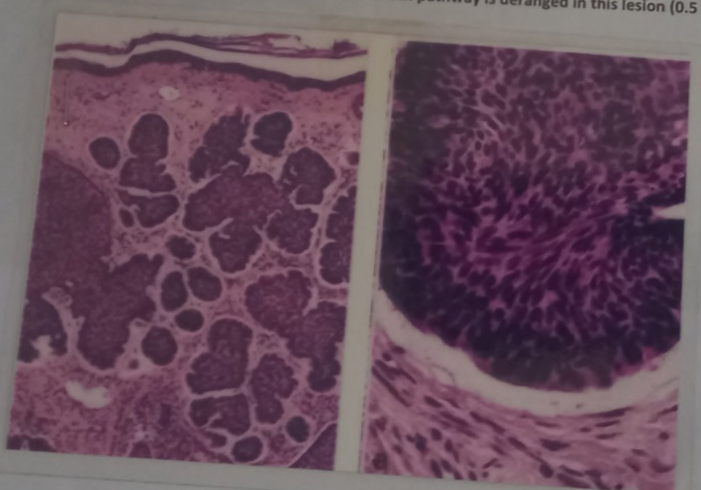
1) what is your diagnosis ? (1)

2) Give 2 morphological points of identification of this lesion (2)

3) Is this lesion benign or malignant ? (1)

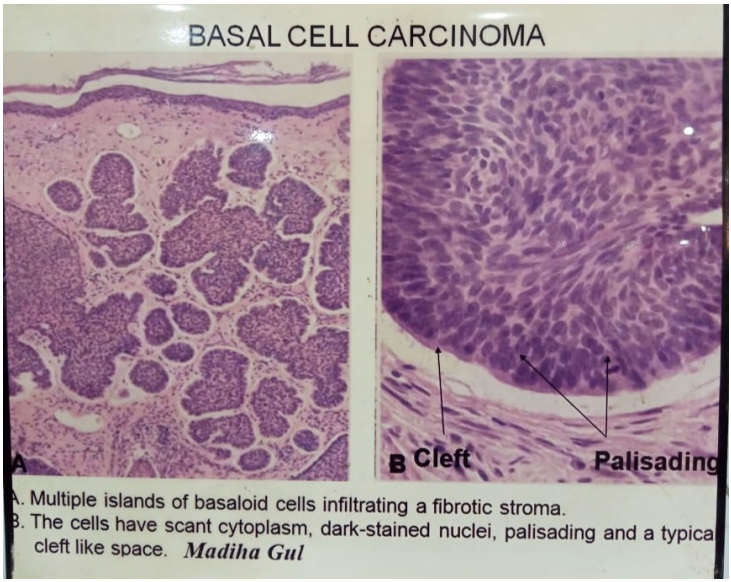
4) Does this lesion metastasize commonly ? (1)

5) what are the risk factors of this lesion? which pathway is deranged in this lesion (0.5 +0.5)

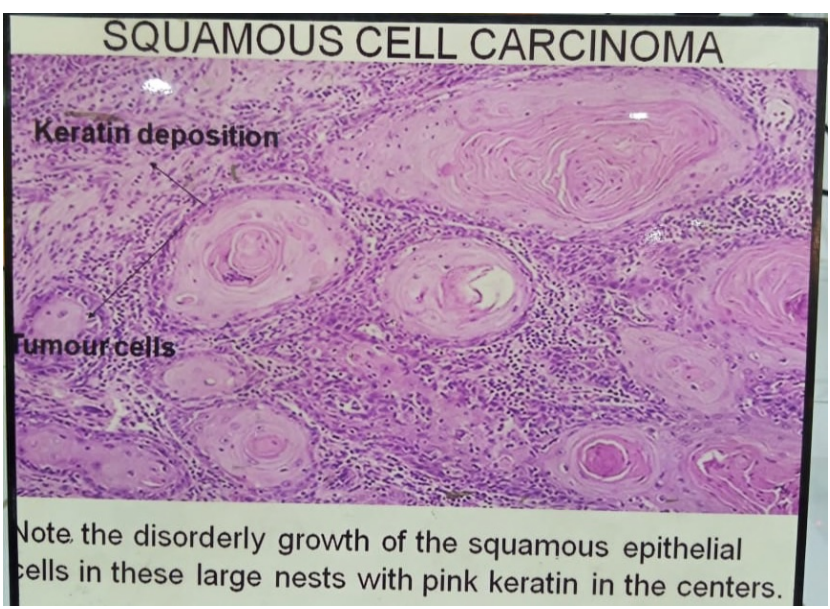


1. Basal cell carcinoma
2. Morphology: pallisading nuclei, basophilic malignant cells, hyperchromatic nucleus, fibrotic stromal matrix
3. Malignant
4. Rarely metastasize
5. Risk factors: chronic sun exposure, radiation therapy, increasing age

pathway deranged: hedgehog signaling pathway



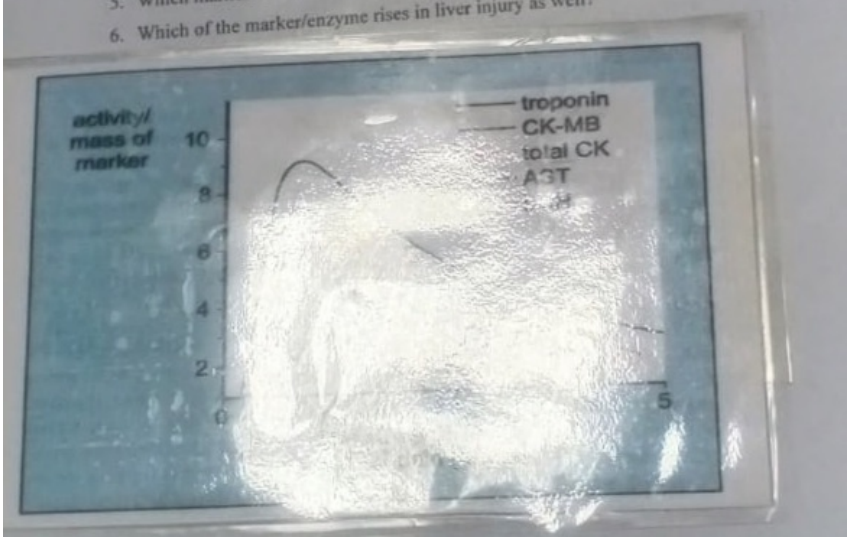
A. Multiple islands of basaloid cells infiltrating a fibrotic stroma.
B. The cells have scant cytoplasm, dark-stained nuclei, palisading and a typical cleft like space. *Madiha Gul*



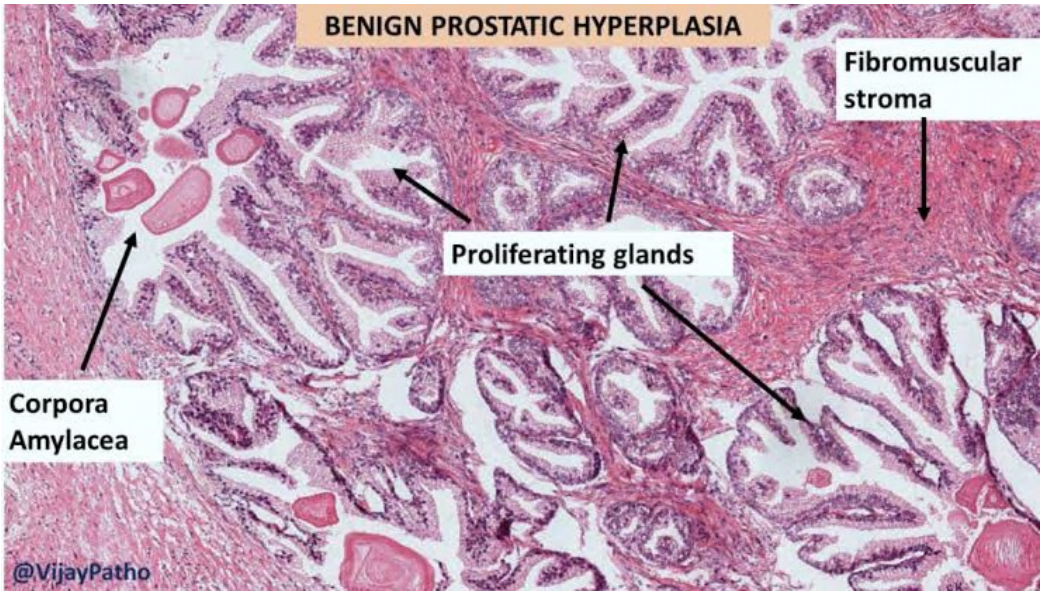
Total Marks: 6

This photograph belongs to 70 years old patient who developed sudden severe chest pain accompanied by profuse sweating and pallor three days before his death. He was taken to hospital and admitted in CCU. His cardiac markers/enzymes profile was sent to the laboratory. He was given best possible treatment but he could not survive. He had history of diabetes and chain smoking. After going through scenario and having a look at photograph answer the following questions.

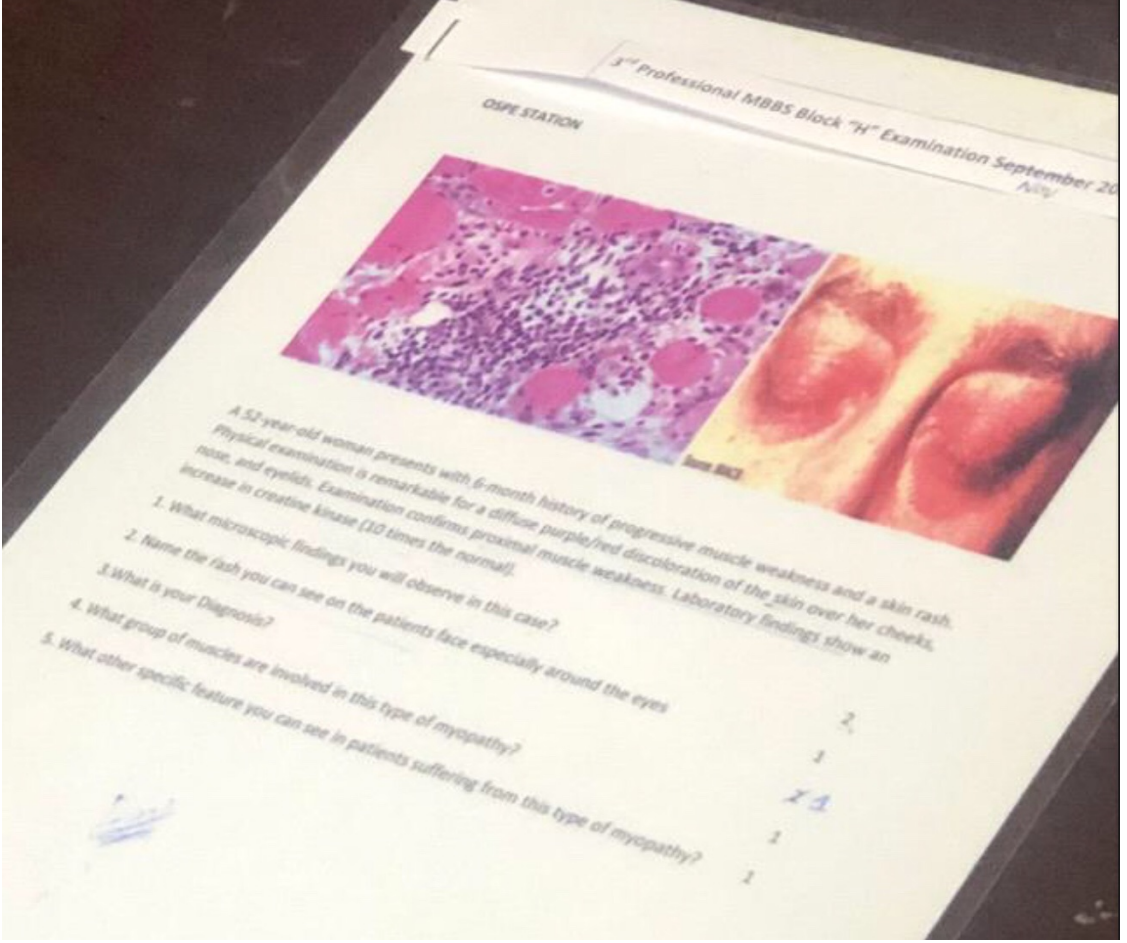
1. What is your diagnosis? 1
2. Which marker is most specific for the diagnosis of myocardial infarction (present only in cardiac tissue)? 1
3. Which marker seems least sensitive (Rising last of all)? 1
4. Which of the marker has two other variants as well (one associated with skeletal muscle and other with brain)? 1
5. Which marker shows maximum activity or levels in plasma? 1
6. Which of the marker/enzyme rises in liver injury as well? 1



1. MI
2. Troponins
3. LDH
4. CKMB - its variants are CKMM and CKBB
5. Troponins
6. AST

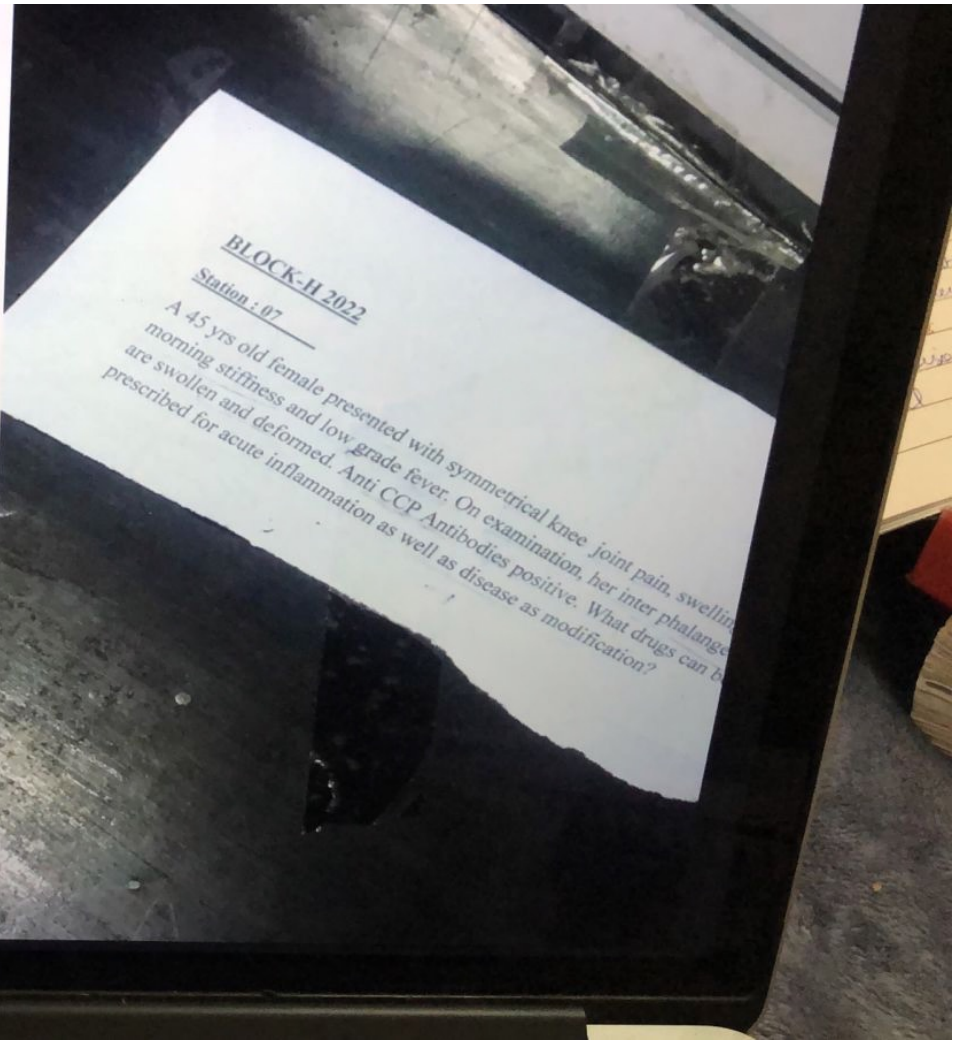


* glands with papillary projections
* branched appearance of glands
* round secretions called corpora amylacea
* increased fibromuscular stroma



Dermatomyositis

1. Perivascular mononuclear cell infiltrates with plasma cells, perfascicular and paraseptal atrophy
2. Heliotrope rash
3. Proximal muscles
4. Grutton papules



DMARDs prescription

CHOLINERGIC AGONISTS

- Direct Acting → binds to cholinergic receptors, activating them
  - Acetylcholine → M, N
  - Bethanechol → M
  - Carbachol → M, N
  - Nicotine → N
  - Pilocarpine → M
- Indirect Acting (Reversible) → Bind to acetylcholinesterase to inhibit it and prevent breakdown of Ach (for min to hours)
  - Donepezil
  - Edrophonium (8-10 min)
  - Galantamine
  - Neostigmine
  - Physostigmine
  - Pyridostigmine
  - Rivastigmine
  - Galantamine
- Indirect Acting (Irreversible) → Bind to AChE and form a permanent covalent bond
  - Echothiophate

CHOLINERGIC ANTAGONISTS

- Anti muscarinic Agents
  - Atropine
  - Scopolamine (Hyoscine)
  - Tropicamide and cyclopentolate
  - Benztropine and trihexyphenidyl
  - Oxybutynin
- Ganglionic Blockers → block transmission of sympathetic and parasympathetic ganglia in ANS
  - Nicotine → block cholinergic responses mediated by nicotinic acetylcholine receptors
- Neuromuscular Blocking Agents → Inhibit action of ACh on nicotinic receptors at NMJ
  - Cisatracurium
  - Mivacurium
  - Pancuronium
  - Rucoronium

  ] Non depolarizing (competitive) blockers

  - Succinylcholine → Depolarizing

ADRENERGIC AGONISTS

- Direct Acting → Directly act as agonist on α or β or both
  - Epinephrine ($\alpha_1 \alpha_2 \beta_1 \beta_2 \beta_3$)
  - Norepinephrine ($\alpha_1 \alpha_2 \beta_1$)
  - Isoproterenol (β)
  - Dopamine (α, β)
  - Fenoldopam
  - Dobutamine (β_1)
  - Oxymetazoline (α)
  - Phenylephrine (α_1)
  - Midodrine (α_1)
  - Clonidine (α_2)
  - Albuterol (β_2)

  etc etc
- Indirect Acting → Acts on adrenergic neuron to release norepinephrine
  - Amphetamine
  - Tyramine
  - Cocaine
- Mixed Acting
  - Ephedrine
  - Pseudoephedrine

ADRENERGIC ANTAGONISTS

- α- Adrenergic Blocking Agents (α-Blockers)
  - Phenoxybenzamine $^{\alpha_1, \alpha_2}$
  - Phentolamine $^{\alpha_1, \alpha_2}$
  - Prazosin, Terazosin, Doxazosin → selective α_1 blocker
  - Yohimbine $^{\alpha_2}$
- β- Blockers
  - Propranolol
  - Nadolol, Timolol
  - Acebutolol, Atenolol, Betaxolol, Esmolol, Metoprolol, Nebivolol
  - Acebutolol and pindolol
  - Labetalol and carvedilol

DRUGS IN Tx OF RHEUMATOID ARTHRITIS

(1) Disease Modifying Anti Rheumatic Drugs (DMARDs)

- Nonbiologics
  - Methotrexate
  - Azathioprine
  - Cyclophosphamide
  - Cyclosporine
  - Chloroquine
  - Hydroxychloroquine
  - Sulphasalazine
  - Leflunomide
  - Gold salts
  - d-penicillamine

- Biologics
  - * TNF-α Antagonists → Etanercept, Infliximab, Adalimumab
  - * IL-1 Antagonist → Anakinra
  - * T-cell modulating agent → Abatacept
  - * B-Lymphocyte depleter → Rituximab

(2) NSAIDs

- Aspirin
- Ibuprofen
- Diclofenac
- Naproxen
- Piroxicam
- Etoricoxib

(3) Glucocorticoids

- Prednisolone
- Triamcinolone
- Methylprednisolone

* Methotrexate Contraindications:
  - Liver disease
  - Pregnancy
  - Peptic ulcer

* Prolonged administration of chloroquine / hydroxychloroquine may cause corneal opacity and retinal damage

* Antihemophilic Factor → contain coagulation Factor VIII with von Willebrand factor

* Anti Fibrinolytics
  1. Epsilon amino caproic acid
  2- Tranexemic acid

* Organ bath parts

1. Outer organ bath
2. Inner organ bath
3. Thermostat
4. Aeration tube
5. Coiled glass tube

* Experiment n rabbit's eye

1. Size of pupil
2. Corneal reflex
3. Light reflex
4. Color of conjuctiva

History of presenting complaint

Use the PRISMS acronym to explore key rheumatological symptoms:

- **P**ain
- **R**ashes, skin lesions and nail changes
- **I**mmune
- **S**tiffness
- **M**alignancy
- **S**welling and sweats

- Where is the pain?"
- "Can you point to where you experience the pain?"
- Did the pain come on suddenly or gradually?"
- "When did the pain first start?"
- "How long have you been experiencing the pain?"
- How would you describe the pain?" (e.g. dull ache, burning, sharp)
- "Is the pain constant or does it come and go?"
- Does the pain spread elsewhere?"
- Are there any other symptoms that seem associated with the pain?"
- How has the pain changed over time?"
- "Is the pain worse at a particular time of day?"
- Does anything make the pain worse?"
- "Does anything make the pain better?"
- On a scale of 0-10, how severe is the pain, if 0 is no pain and 10 is the worst pain you've ever experienced?"
- Have you noticed any rashes or other changes to your skin recently?"
- Any joint stiffnes
- Have you noticed any unintentional weight loss recently?"
- "Have you experienced any night sweats recently?"
- "Have you noticed any change in your appetite?"
- "Have you felt more tired recently?"

- Have you noticed any swelling of your joints recently?"
- "Which joints have become swollen and when did that start?"
- "Is the joint swelling painful?"
- "Does the joint swelling impact your daily activities?"
- "Have you noticed any associated redness of skin overlying the swollen joints?"

Different Techniques of Organ Removal in Autopsy

03:40:00

- Virchow's Method
  - One by one removal of organs
  - **M/C method used.**
- Letulle's / En mass Method
  - En-Mass Removal or Evisceration
  - **RAPID method**
  - Also used to study anatomical relation
  - Removal of attachment of tongue and from there we remove all the thoracoabdominal organs together as single mass. Then we dissect the organs.
- Ghon's Method
  - **En–block Removal**
  - Targets only one particular area.
  - Ex: In Sexual offence - Only pelvic organ are removed.
    In Thoracic pathology / Trauma - Only thoracic organ are removed.
- Rokitansky Method
  - In-situ method
  - **Organ not removed outside the body to avoid spillage and exposure.**
  - Used for infectious diseases.
  - Example: HIV, Hepatitis patient,Covid pt.

Paeds anemia
Lethargy
Irritable
Eating normally?
Pica (sand, dirt, paper)
Urine color, stool color, blood in stool
Nose bleed
Normal delivery or c section
Preterm or normal
Hospitalization of baby after birth
Travel history (malaria, hepatitis)
Medication
Fava beans
Family history (chlecystectomy, splenectomy to rule out hemolytic anemia)
Developmental milestones