

PATHOLOGY

Dr: Eman MS Muhammad

DEFINITIONS & TERMINOLOGIES

⦿ *What is Pathology?*

Pathology is the science concerned with study of diseases.

⦿ **Pathology** is derived from two **Greek** words- pathos means **suffering**, and logos means **study**.

⦿ **Pathology** is the branch of medical science that studies the **causes**, **nature** and **effects** of diseases or any **deviation** from healthy or normal condition.

- ◎ **Pathology** is thus , the science of studying **structural** and **functional** changes in disease.
- ◎ **Pathology** is the study of **diagnosis** of diseases through examination of organs, tissues, body fluids and/or whole dead bodies (**autopsy**).
- ◎ **Disease** is loss of ease (comfort).
- ◎ **Patient** is the person affected by disease.

- ⦿ **Medical pathology** is divided into two main branches, **anatomical pathology** and **clinical pathology**.
- ⦿ **Anatomical pathology** is concerned with the **diagnosis** of disease based on the gross, microscopic, and molecular examination of organs, tissues, and whole dead bodies (autopsy).
- ⦿ **Anatomical pathology** is itself divided into subspecialties, the main ones being **surgical pathology**, **cytopathology** and **forensic pathology**.

- ◎ **Clinical pathology** is concerned with the diagnosis of disease based on the **laboratory analysis of body fluids** such as blood and urine, using the tools of chemistry, microbiology and hematology.
- ◎ **Clinical pathology** is itself divided in subspecialties, the main ones being clinical chemistry, clinical hematology/blood banking and clinical microbiology.

- **Curriculum of Pathology:**
- **General pathology** seeks to understand the **cell injury**, and **adaptations to cell injury**, as well as **cell death**.
- Areas of study include inflammation, the body's means of **responding to** and **repairing of** injury, wound **healing**, diseases of the immune system (**immunopathology**).
- Study also includes tissue response to **microbial** infection, **granulomatous** and **parasitic** diseases, hemodynamic disorders or circulatory disturbances, and neoplasia.

- ◎ **Special pathology or systemic pathology** is concerned with studying diseases of different organs in body systems as diseases of the cardiovascular (CVS), diseases of the upper respiratory system & lung, diseases of gastrointestinal tract (GIT), diseases of hepatobiliary system & pancreas, diseases of genitourinary tract (GU); kidney, urinary passages & male genital system, diseases of the female genital tract (FGS), diseases of the breast,

- diseases of the endocrine organs, diseases of bone, joints & soft tissue, diseases of the central nervous system (CNS); brain, spinal cord & diseases of peripheral nervous system, diseases of the skin (dermatopathology), and diseases of the head & neck.

- ◎ **Pathologists** are physicians who **diagnose** and characterize disease in living patients by examining biopsies or body fluids.
- ◎ The **anatomical pathologist** reports to doctors; he/she does not usually see patients.
- ◎ The vast majority of cancer diagnoses are made or confirmed by the pathologist.
- ◎ Pathologists may also conduct autopsies to investigate causes of death.

- **Definition:**
- Each disease has a definition.
- **Etiology:**
- “**Etiology**” is the science that deals with the **causes, origin** of disease, factors which produce or predispose to certain disease or disorder.
- Today in medicine one hears, or reads that “**the etiology is unknown**”.
- It means that we don’t know the cause yet.

- ◎ **Precipitating factors** are factors associated with the definitive onset of disease, illness, accident, behavioral response, or course of disease.
- ◎ Usually one factor is more important or more obviously recognizable than others.
- ◎ If several are involved, one may often be regarded as “**necessary**”.
- ◎ Examples include exposure to specific disease; amount or level of infectious organism, drugs or noxious agents etc.

- **Pathogenesis** of a disease is the **mechanism** by which the etiological factors causes the disease.
- The term can also be used to describe the **development** of the disease, (acute, chronic, and recurrent) and the **chain of events** leading to that disease.
- The word comes from the Greek *pathos*, “disease”, and *genesis*, “creation”.
- Types of pathogenesis include microbial infection, inflammation, malignancy, immunological disorders, tissue breakdown and neoplasia.

- ◎ **Pathological features:** These includes:
 - **Gross pathology:** refers to **macroscopic** manifestations of the disease in the organs, tissues, and body cavities.
- ◎ It is defined by the **naked eye** examination, e.g. change in size, shape, color, consistency...etc.
- ◎ The term is commonly used by pathologists to refer to diagnostically useful findings made during **gross** examination of surgical specimen or processing of autopsy.

- ◎ **Microscopic pathology or histopathology:** Refers to microscopic manifestations of the disease on the cells and tissues.
- ◎ There are cellular & extracellular changes characteristic for each disease.
- ◎ It is defined by **light microscopic** examination of stained slide tissue sections; Hematoxylin and Eosin (H&E), **special stains**; as PAS, Masson trichrome, Oil Red O, and immunohistochemistry.
- ◎ Special microscopic study: **electron** microscopy; E.M.& **immunofluorescence** microscopy.

- ◎ **Lesion:** Any **pathological** or **traumatic** discontinuity of the tissue or loss of function of a part.
- ◎ **Clinical picture:** that includes
 - **Symptoms:** Any **subjective** evidence of disease or of the patient condition, i.e. such evidence as perceived by the patient, change in patients condition indicative of some body or mental state, as pain, fever, swelling.
 - **Signs:** Clinical signs is an **objective** physical findings found by the examiner, as tenderness, high temperature, lump.

○ **Course:**

- The course of the disease is either regressive or progressive.
- **Regressive course:** the disease recover by resolution, the tissue or organ returns to its normal, or recovers by healing.
- **Morbidity** means decrease in organ function, while **mortality** means either organ failure or death.
- **Progressive course:** It is usually seen with large lesion, with increased possibility of complications.

- ◎ **Clinical significance:**
- ◎ Study of how clinical features are related to the changes occurring in a given disease.
- ◎ **Complications:** A term used to describe **additional medical problems** that develop following an illness, procedure, or treatment.

- ◎ **Prognosis:** A **forecast** to the probable outcome of an attack or disease, the prospect to recovery from a disease as indicated by the nature and symptoms of the case.
- ◎ **Fate:** The **end result** of the disease either by cure or by death of the patient.

- ⦿ **Types of referred pathological specimens:**
- ⦿ **Biopsy:** specimens may be:
- ⦿ **Punch biopsy:** like endoscopic biopsy.
- ⦿ **Core biopsy:** from liver, kidney, lung, usually under sonar guided, or C.T.
- ⦿ **Incision biopsy:** surgically obtained part of the lesion.
- ⦿ **Excision biopsy:** surgical excision of the whole lesion.
- ⦿ **Radical specimen:** as mastectomy; removal of the breast with axillary lymph nodes, and hysterectomy ; removal of the uterus with fallopian tubes and ovaries.

- ⦿ **Autopsy:**
- ⦿ Examination of tissue obtained from **dead** bodies.
- ⦿ **It is important for:**
 1. Detection of the cause of death.
 2. It has a teaching purpose.
 3. Medico legal purposes (forensic medicine).
 4. Evaluation of organ state before using it for transplant (cadaveric transplant).
 5. Research studies.

- ⦿ **Frozen section examination:**
- ⦿ Used for **rapid diagnosis** during surgery.
- ⦿ The biopsy is immediately transferred into a cryostat chamber.
- ⦿ Some special stains(Sudan III for fat) are needed for frozen section examination.
- ⦿ **Importance of frozen sections:**
- ⦿ Rapid intra-operative diagnosis, to evaluate for example whether a lump or mass is benign or malignant, removed completely or not, and if there is a good safety margin to determine the type and the extent of surgery.

- **Cytology: Body fluid** examination; examples:
- Sputum
- Discharge
- Lavage fluid
- Wash and brush cytology
- Touch imprint cytology: it is imprint of the cut surface of excised lymph node or breast.
- Fine needle aspiration cytology(FNAC), or biopsy(FNAB).
- Cervico-vaginal smear(PAP -smear).
- Bone marrow aspirate.

OVERALL AIMS OR OBJECTIVES OF THE COURSE

- By the end of this course the student should be able to:
- Gain the basic knowledge and understanding of general and systemic pathology.
- This includes diseases etiology, participating factors, pathogenesis, pathological features (gross & microscopic), fate, complications & prognosis.

- Understanding the disease process to be able to correlate the clinical manifestation with the pathological changes.
- To predict the course & outcome of the disease.
- To realize the role of histopathology & cytology in the diagnosis of diseases.

- ◎ The students should accurately and independently interpret the gross and microscopic pathology specimens through examinations of the specimens in the museum & slides in the laboratory.

Thank
You!

