

Inflammation (lec2)

- **Types of inflammation:**

- 1) Acute:**

- **Nonsuppurative inflammation:**

- 1- Catarrhal (مخاطي) inflammation (Common cold):**

Ex: inflammation of nose, larynx, trachea (**upper respiratory tract**).
stomach, appendix and gall bladder (**GIT**)

- 2- Fibrinous inflammation:**

Ex:

- Inflammation of serous cavities (التجاويف المائية) as pericardium, pleura and peritoneum (غشاء القلب و غشاء الرئتين و الغشا البريتوني)

- Inflammation of alveoli of the lung in acute lobar pneumonia (التهاب الرئة)

- 3- Membranous inflammation:**

Examples: Diphtheria and bacillary dysentery (الذسونتاريا بسبب البكتيريا العصوية)

- 4- Allergic inflammation:**

Examples: Eczema, urticarial (اللاتنين بيكونو في الجلد), and allergic rhinitis (rhinitis = of nose)

- 5- Necrotizing - hemorrhagic inflammation:**

Examples: Plague (الطاعون) and herpes simplex encephalitis

- **Suppurative inflammation:**

- 1- Localized suppurative inflammation** e.g.: abscess, boil and carbuncle

- 2- Diffuse suppurative inflammation** e.g.: cellulitis (appendicitis)

- 2) Chronic:**

- 1- chronic specific inflammation: granulomas**

- 2- chronic nonspecific inflammation**

❖ **Definitions:**

1- **Catarrhal inflammation:** It is a **mild** (خفيف زي دور البرد) acute inflammation affecting the mucous membrane results in exudates **rich with mucous** ده الي بيميزها

2- **Fibrinous inflammation:** It is acute inflammation with exudate **rich in fibrin, commonly occurs in serous cavities.**

3- **Membranous inflammation:** It is a **severe** (عنيف) type of inflammation affecting mucous membrane and **characterized by formation of pseudomembrane** (exudate has small amount of mucous)

4- **Allergic inflammation:** it is acute inflammation **caused by antigen-antibody reaction.** It is **characterized by excessive edema fluid, much eosinophils and necrosis (histamine** بيطلع معاها)

5- **Necrotizing - hemorrhagic inflammation:** it is a **severe** form of acute inflammation due to high virulent bacteria, virus and fungi with **marked necrosis and hemorrhage** (capillary breakdown الدم بيطلع بسبب تكسر الاوعية)

• **Pathogenesis of fibrinous inflammation:**

1-The flat endothelial cells show swelling or necrosis.

2- In the submucosa there are dilated blood vessels, neutrophils, and exudate

3- The exudate comes out to the surface between visceral and parietal layers (of the serous membrane) It is **rich in fibrinogen** which is deposited as irregular fibrin network.

4- The serous membrane looks **opaque, thick and irregular**

5- If the exudate is formed mainly of fibrin it is called **dry fibrinous inflammation** (بنسميه كده لو معظمه فيبرين)

6- Fibrinous exudate can lead to fibrous scar between serous membranes (**bread and butter appearance**) بيتكون نسيج ليفي في النص زي الزبدة بين خبزتين



- **Pathogenesis of membranous inflammation (steps):**

- 1- The bacteria settle in the mucous membrane producing **powerful exotoxin which causes necrosis of the mucosa**
- 2- The submucosa shows dilated blood vessels, neutrophils and exudate.
- 3- The exudate **comes out to the surface**. It is rich in fibrinogen and mixed with the necrotic tissue **forming a paste** (معجون) which spreads on the surface forming a **false or pseudomembrane**
- 4- the false membrane **is formed of:** (necrotic tissue, fibrin dead and living bacteria, few neutrophils, and RBC's) ممكن يسألنا بيتكون من أيه
- 5- it is dirty grayish in color and if it is removed, it leaves a bleeding surface with superficial ulcers

➤ **Suppuration**

Definition: suppuration means liquefactive (ذوبان) necrosis of tissue with pus formation

➤ **Suppurative inflammation:**

Definition: it is a type of inflammation caused by organisms such as **staphylococci and streptococci** (عشان اقوية فبيموتوا الخلايا) with **formation of pus**. It has two types localized as abscess and boil and diffuse as cellulitis.

➤ **Abscess**

Definition: it is an acute **localized**, suppurative inflammation caused by **staphylococci** which produce **coagulate enzyme** الانزيم ده هو سبب انه localized عشان بيرسب الfibrin

Sites: the most common sites of abscess are subcutaneous tissue الجلد, breast, lung and brain

- **Pathogenesis of an abscess (steps):**

- 1-The staphylococci are introduced to the tissues, multiplied, and producing **toxin** leads to **central necrosis of tissues**
- 2- The peripheral zone is called **pyogenic membrane** (ده النسيج الحي الي بيحاوط بالخراج) in which there are dilated blood vessels, neutrophils and fibrin network (due to coagulate enzyme) leading to **localization of inflammation in this area.** (دي ال function)
- 3- Many **neutrophils are killed and transformed into pus cells** which will release proteolytic enzymes starting to liquefy the necrotic tissue forming **slough.** (ده عبارة عن صديد بس لسه في اجزاء من الخلايا مش ذائبة) Later on liquefaction is **completed** with formation of the fluid pus.
- 4- The abscess increases in size
- 5- Pus accumulates under tension causing **throbbing pain**

#Helper_Team

(ببزيدي مع كل مرة الدم بيتضخ للمنطقة بسبب الضغط الي بيحصل على اوعية النسيج الحي الي بيحاوط بالخراج)

6- **Pus should be evacuated** (نفضي الصديد منه), followed by healing of the abscess by granulation tissue (fibrosis) and fibrosis.

7- **If pus is not evacuated**, the abscess becomes chronic.

Causes of abscess evacuation: ليه بنفسي الخراج

- 1- Relief pain and pressure الالم بيكون كبير مش بيستحمله المريض
- 2- Elimination of bacteria
- 3- Remove pus and necrotic tissues to help the healing process by fibrosis.
- 4- Prevent complications.

• **Complications of abscess:**

- Chronic abscess with pathological calcification.
- Chronic ulcers
- Lymphangitis (التهاب الاوعية اللمفاوية) and lymphadenitis (التهاب العقد)
- Septicemia (strong bacteremia) and pyemia (صديد في الدم)
- Fistula (قناة صديدية) and sinus (جيب صيدي)

• **Components of pus**

- 1- Liquefied necrotic tissue.
- 2- Living and dead bacteria.
- 3- Pus cells (dead neutrophil).
- 4- Fluid part of inflammatory exudates.

➤ **Boil or Furuncle:**

Definition: (it is a deep folliculitis: inflammation of hair follicle)

It is most commonly caused by **staphylococcus aureus** resulting in a painful swollen area on the skin caused by accumulation of pus and necrotic tissue

➤ **Carbuncle:**

Definition and characters:

This is a large suppurative lesion which develops usually in diabetic patients due to low resistant to infection (العدوى بتحب السكر).

The commonest site is the back of the neck, scalp, and buttocks because **the subcutaneous tissue in this area is tough and is divided into compartments** by fibrous septa. The lesion is made of multiple cavities which communicate with each other and open through multiple points in the skin. (بنتواصل مع بعضها و بتخرج صديد عن)

(طريق فتحات على الجلد)

➤ **Ulcer:**

#Helper_Team

Definition: it is discontinuation (انقطاع) of surface epithelium.

➤ Sinus:

Definition: it is a tract of septic granulation tissue which connects a cavity to the outside and has a blind end (مسدود اجيب)

Example: suppurative osteomyelitis (التهاب في العظم و يظهر على الجلد عن طريق الجيب الصددي)

➤ Fistula:

Definition: it is a tract of septic granulation tissue which connects two cavities together or a cavity to the outside and has a free ends (مفتوحة اقناة).

Types of fistula: congenital, inflammatory and malignant

كل الي فاتو دول localized suppurative و الي جي diffuse suppurative عشان البكتيريا strepto مش staphylo

➤ Cellulitis:

Definition: diffuse suppurative inflammation is caused by **streptococci** which produce:

- 1- Streptokinase which liquefies fibrin.
- 2- Hyaluronidase which liquefies the fibrous tissue

These enzymes allow the streptococci to spread very rapidly in the infected tissue. (الانزيمات دي هي سبب انها diffuse)

Sites of cellulitis:

- a. Dennis and subcutaneous tissue of legs.
- b. Lax subcutaneous tissue: as in the orbit, scrotum (كيس الصفن) and pelvis (الحوض)
- c. Mucous membrane: as the **appendix (Acute suppurative appendicitis)**.

Cellulitis differs from abscess in:

- Extensive necrosis.
- Pus forms slowly and may contain many red cells (عشان بتنتشر فبتكسر) (الاوعية)
- Rapid spread

• **Fate of inflammation (termination):** نهاية الالتهاب

1- Resolution: (العلاج) reversal of inflammatory changes and return of the tissue to normal:

2- Suppuration and pus formation.

3- Chronicity:

- Chronic inflammatory cell infiltrate
- fibrosis

4- Spread of inflammation.