



Pathology

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Inflammation

Sixth Lecture

Chronic Inflammation

Inflammation of prolonged duration (weeks, months or years).

It is characterized by the followings (Histological Features):

1. Chronic inflammatory cell infiltration (**Mononuclear** cells).
lymphocytes , macrophages and plasma cells (**Polymorphic infiltrate**).
2. Tissue damage and destruction by products of inflammatory cells.
3. Healing and Repair – involving new blood vessel proliferation (**Angiogenesis**) and Fibrosis (**Scar formation**).
4. It is more **Productive** in nature (Production of granulation tissue) (**Not Exudative**).
5. There may be foci of suppuration (**Chronic Abscess**).
6. Granuloma formation.

Chronic inflammation

It occurs as :

- A. Progression of acute inflammation into chronic inflammation.
- B. It may develop **ab intio (De novo)** (from the start) = most common.

A. Chronic inflammation following acute inflammation

(Persistence of causative agents or Infections)

1. Inadequate drainage of abscess :
E.g. bone abscess and empyema of pleura.
2. Presence of foreign body (glass, dirt, cloth and suture).
3. Repeated attacks of acute inflammation :
E.g. gall stone in Chronic Cholecystitis.

B. Chronic inflammation starting ab intio (De novo)

(It starts as chronic inflammation)

Due to:

1. **Persistent Intracellular Infections :**
E.g. Viruses, Tuberculosis, Syphilis, Parasites and Fungi.
2. **Immune-mediated Inflammatory Diseases include :**
 - a. Autoimmune Diseases :
E.g. Rheumatoid Arthritis, SLE, Psoriasis and Ulcerative Colitis
 - b. Allergic Diseases : E.g. Bronchial Asthma
3. **Prolonged exposure to Non – degradable Toxic materials :**
 - Silica → causing Silicosis in the lung.
 - Asbestos → causing Asbestosis in the lung.
 - Lipid → causing Atherosclerosis.

Morphologic Patterns of Chronic Inflammation

They are variable and include the followings:

1. **Chronic Ulcer**. E.g. Chronic Peptic Ulcer.
2. **Discharging Sinus** .E.g. TB sinus in neck & Chronic Osteomyelitis.
3. **Fistula Formation**. E.g. Perianal Fistula.
4. **Diffuse thickening of the wall** of a hollow or tubular organ (E.g. Chronic Cholecystitis).
5. **Chronic Abscess**.
6. **Stenosis and Stricture Formation** of a hollow or tubular organ.
7. **Granuloma Formation**.

Types of Cells in Chronic Inflammation

1. Lymphocytes:

- ✚ The **main cells** in chronic inflammation.
- ✚ T & B lymphocytes .They are the cells of immune system.
 - **T-lymphocytes**: responsible for cell mediated immunity.
(**Secrete Cytokines**)
 - **B-lymphocytes**: responsible for humoral immunity
i.e. production of Immunoglobulins (Anti-bodies).
- ✚ Activated **T-lymphocytes** produce cytokines (Interleukins) and (**Interferon- γ**) causes → activation of macrophages and fibroblasts.

2. Macrophages:

- Macrophages: **dominant cells** in chronic inflammation.
- Derived from circulating monocytes, are activated by IL -1 ,TNF, endotoxin and interferon and become actively phagocytic cells as :

- **Free tissue histiocytes** in pleura, peritoneum, and loose tissue.
- **Fixed tissue histiocytes** in sinusoids of liver (kupffer cells), spleen, lymph node, bone marrow (sinus histiocytes), bone (osteoclast), brain (microglia) and lung (alveolar macrophages).

Functions of macrophages :

A. Phagocytosis

B. Secretion of inflammatory chemical mediators:

- Lysosomal enzymes (proteases).
- Nitric oxide and oxygen free radicals
- Cytokines.
- Vascular permeability factor.
- Chemotactic factor.
- Endogenous pyrogen causes fever.
- Growth Factors for fibrosis (causing fibroblastic proliferation) and angiogenesis (causing blood vessel proliferation).

C. Ag-Processing.

3. **Plasma cells:** Produce Antibodies (Ab) against Antigens (Ag).

4. **Eosinophils:** Common in **parasitic infections** and **allergic conditions**. Eosinophil granules contain (secrete) **Major Basic Protein** which is **toxic** to the parasites and causes **tissue necrosis**.

5. **Mast cells:** Commonly seen in;

- Allergic reactions.
- Anaphylactic shock.