Acute Inflammation Part 3
Sequale of acute inflammation

1. Resolution

- The complete restoration of normal condition of the tissue i.e. structural and functional normalcy after acute inflammation.

- Occurs
  - injury is limited or short-lived
  - no or minimal tissue damage
  - injured tissue is capable of regenerating
• Factors aiding the resolution
  – minimal cell death and tissue damage
  – complete elimination of causative agent
  – local conditions favoring the removal of debris and fluid
• Before resolution the acute inflammatory response has to be terminated.

• This involves
  • neutralization, decay, or enzymatic degradation of the various chemical mediators
  • normalization of vascular permeability
  • cessation of leukocyte emigration, with subsequent death (by apoptosis) of extravasated neutrophils.
Basic steps involves in complete resolution

- Solution of fibrin by enzymes (polymorphs and fibrinolysins)
- Removal of excess fluid by blood vessels and lymphatics
- Removal of debris by phagocytic cells
- Reduction of blood flow and restoration of normal flow

The best example for complete resolution is resolution of pneumococcal lobar pneumonia.
Lobar Pneumonia

Normal lung  Vascular congestion and stasis  Leukocyte infiltrate

A  B  C

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Infection or Injury → Acute inflammation

Resolution → Return to homeostasis

Scar

Chronic inflammation

- Atherosclerosis
- Asthma
- Multiple sclerosis
- Rheumatoid arthritis
- Inflammatory bowel disease
- Obesity
- Cancer
2. **Suppuration**

- Suppuration is the formation of pus, a mixture of living, dying and dead neutrophils and bacteria, cellular debris and sometimes globules of lipid.

- The causative stimulus must be fairly persistent and is virtually always an infective agent, usually pyogenic bacteria (i.e., *Staphylococcus aureus*, *Streptococcus pyogenes*, *Neisseria* species or coliform organisms).

- Once pus begins to accumulate in a tissue, it become surrounded by a 'pyogenic membrane' consisting of emerging capillaries, neutrophils and occasional fibroblasts.
• Such a collection of pus is called an abscess, and bacteria within the abscess cavity are relatively inaccessible to antibodies and to antibiotic drugs (thus, for example, acute osteomyelitis, an abscess in the bone marrow cavity, is notoriously difficult to treat).
Abscess formation:

• "A localized collection of pus (suppurative inflammation) appearing in an acute or chronic infection, and associated with tissue destruction, and swelling."
• Site: skin, subcutaneous tissue, internal organs like brain, lung, liver, kidney,.......  
• Pathogenesis: the necrotic tissue is surrounded by pyogenic membrane, which is formed by fibrin and help in localize the infection.
Evolution of an abscess

- Bacteria causes tissue damage and necrosis
- Bacteria multiply.
- The polymorphs packed in the central zone and the periphery shows hyperemia and oedema.
- Pus forms in the centre and demarcation of abscess by pyogenic membrane. Pyogenic membrane consists of newly formed capillaries, polymorphs and fibroblasts.
• Pus is usually liberated through an epithelial surface and rest of the tissue is healed with a scar.
• Pus is discharged into a blood vessels multiple abscess and septicemia occurs.
• Pus may solidify, calcify and later form a calcific nodule
• With a partial discharge of pus chronic sinus occurs.
• With the discharge in to two epithelial surfaces fistula occurs.
Organization and fibrosis

- Organisation of tissues is their replacement by granulation tissue.
- Organization occurs during acute inflammatory process with
  - when there is an excessive exudation
  - large amounts of fibrin are formed, which cannot be removed completely by fibrinolytic enzymes from the plasma or from neutrophil polymorphs
  - when there is an excessive necrosis (tissue damage)
  - when the local conditions are unfavorable in removing debris
- in certain types of tissue (e.g., pleura)
- Progression to chronic inflammation
- Process
  - new capillaries grow into the inert material (inflammatory exudate)
  - macrophages migrate into the zone
  - fibroblasts proliferate
  - fibrosis
3. Chronic inflammation

- If inflammatory the agent is not removed, progress to the chronic stage.
- In addition to organisation of the tissue just described, the character of the cellular exudate changes, with lymphocytes, plasma cells, and macrophages (sometimes including multinucleate giant cells) replacing the neutrophil polymorphs.
Thank you!!