

GENERAL PATHOLOGY

L-12 GANGRENOUS NECROSIS

DR. M. TARIQ JAVED

Professor
Department of Pathology,
Faculty of Veterinary Science,
University of Agriculture, Faisalabad, Pakistan.

Web: <https://sites.gocities.ws/mtjaved>

1

■ GANGRENOUS NECROSIS

- Gangrene word derives from the Latin word "gangraena" and from the Greek gangraina, which means "putrefaction of tissues"
- Gangrene is a serious and potentially life-threatening condition that arises when a considerable mass of body tissue dies
- This may occur after an injury or infection, or in people suffering from any chronic health problem affecting blood circulation
- The prime cause of gangrene is reduced blood supply to the affected tissues, which results in cell death
- Diabetes and long-term smoking increase the risk for gangrene

2

- It refers to necrosis with superadded putrefaction
- Putrefaction is the lysis of dead tissue (part of a live body, or a dead body) by bacterial enzymes, producing nasty smell.
- a specific clinical presentation of necrosis, features of coagulative and/or liquefactive necrosis;
 - if it is predominantly coagulative, it is dry gangrene (black)
 - if it is predominantly liquefactive, it is wet gangrene
- The champions are the clostridiums from the GIT.
- The blackening that occurs is due to formation of **iron sulphide** -- iron is derived from the lysed erythrocytes (Hb).

3

Causes

- Severe hypoxia
- Tourniquets, compression.
 - Tail gangrene in buffaloes.
- Feet gangrene occur in diabetes
- Foul smell, black color is caused by the gangrene organisms (mainly *Clostridium perfringens*)
- Clostridium which are anaerobic and produce hydrolytic enzymes and toxins that destroy connective tissue and cells.

4

Dry Gangrene

- is of coagulative form and occurs in exposed tissues having less blood or fluid and from where the fluid either evaporates or is absorbed or drained by lymphatics
- It can occur due to freezing (vasoconstriction) or vasoconstriction in ergot poisoning or can occur due to tight bandages
- A line of demarcation between dead/gangrenous (dark or black) and live tissue can be seen grossly
- The necrotic tissue/area become cool, shriveled, leather like and dark black resembling mummified flesh

5

Wet Gangrene

- is a mixture of both coagulative and liquefactive form of necrosis, where the action of saprophytes (bacterial enzyme) is important.
- It is black in colour; may contains gas bubbles and has much oedema and haemorrhage in and around the lesion.
- The area thus is soft, swollen and pulpy in consistency and is likely to have a putrefactive odor.
- Wet gangrene occurs in inner organs where from water cannot be evaporated.

6

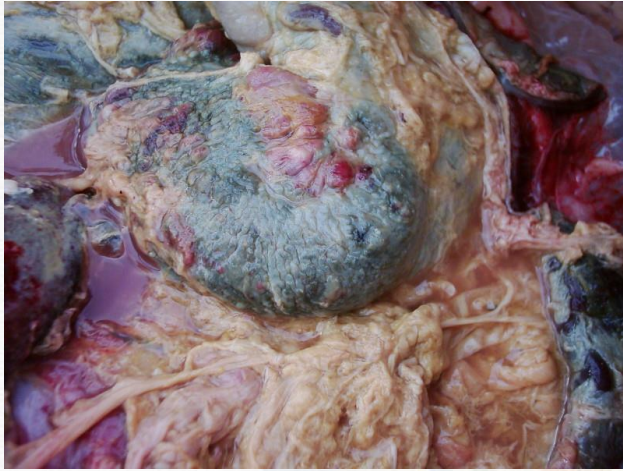
- The intestinal gangrene is associated with twist or torsion of the intestine resulting in the blockage of blood supply.
- In the lung, it can occur in cases of aspiration pneumonia.
- In the gangrenous area, highly toxic substances are produced from the decomposition of the proteins which are then absorbed in the circulation which may result in very serious consequences.

7

Gas Gangrene

- Bubbles form from infection like Clostridium organism
- Death can occur.
- A gas composed of:
 - Hydrogen 5.9%
 - CO₂ 3.4%
 - Nitrogen 74.5%
 - Oxygen 16.1%
- Progression to toxemia and shock is often very rapid.

8

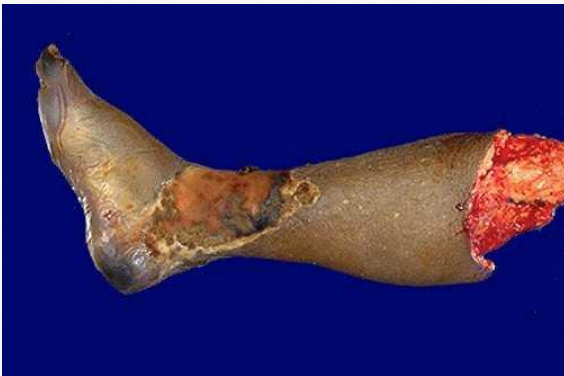


9



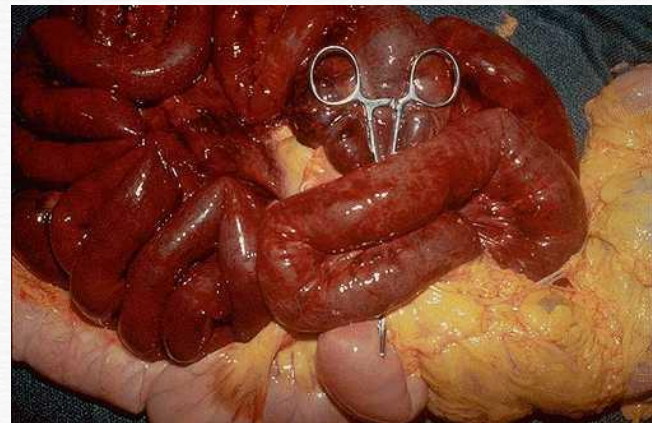
10

Gangrene - Amputated Diabetic foot



11

Gangrene Intestine - Thrombosis.



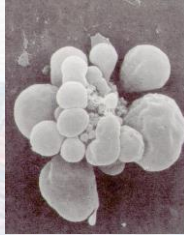
12

Apoptosis

- 'Programmed' cell death
- Crucial role in tissue homeostasis – cell proliferation.
- Occur in single cell or group of cells

Occur in

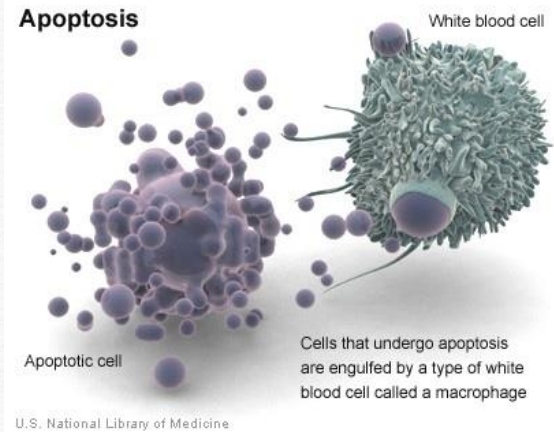
- Embryogenesis
- Cells undergo normal turnover
- Involution of uterus
- Atrophy
- Regression of Hyperplasia
- Neoplasia / Cancer
- Certain drugs, toxins, mild hyperthermia and irradiation
- Cells with DNA damage
- Cells of immune system
- Virus Infected cells etc.



13

Immune cells also assist in apoptosis

Apoptosis



Pathological Apoptosis

- Cell death produced by injurious stimuli.
 - Radiation, anticancer drugs that damage DNA, heat, hypoxia (if mild), ER stress induced by unfolded proteins
- Cell injury in some viral diseases
- Pathologic atrophy in parenchymal organs
- after duct obstruction
- Cell death in tumors
- Can be seen with or precede oncotic necrosis

15

Dys-regulated Apoptosis (too little or too much)

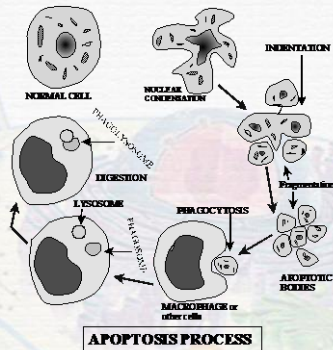
May be important in a wide range of diseases

- Disorders associated with defective apoptosis and increased cell survival
 - **Cancers:** Tumors with p53 mutations common. Also hormone-dependent tumors (mammary, prostate, ovary)
 - **Autoimmune disease** may arise from failure to eliminate auto reactive lymphocytes after encounter with self antigens.
- Disorders associated with increased apoptosis and excessive cell death. Excess loss of normal or protective cells.
 - Neurodegenerative diseases with loss of specific neurons
 - Ischemic injury of myocardial infarcts and stroke
 - Death of virally infected cells

16

CELLS THOSE ARE INDUCED TO COMMIT SUICIDE

- ❑ Shrink
- ❑ Mitochondria break down
- ❑ Develop blisters on the surface
- ❑ DNA and nucleoproteins degrade
- ❑ Break into small membrane-wrapped fragments.
- ❑ The **phosphatidylserine** (PTS) exposed on outer surface of plasma membrane
- ❑ Phagocytic cells like macrophages and dendritic cells identify PTS and engulf the fragments.
- ❑ Phagocytic cells secrete cytokines that inhibit inflammation



17

QUESTIONS ???



18