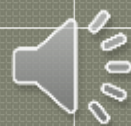


# GANGRENE



# GANGRENOUS NECROSIS

- **Gangrene** is the necrosis of tissue with superadded putrefaction (enzymatic decomposition).
- Gangrene = Necrosis + infection + putrefaction





Clean wound



Gangrenous wound





# Types of gangrene

- Dry gangrene
- Wet gangrene
- Gas gangrene



# Dry gangrene of foot





Normal bowel



Intussusception

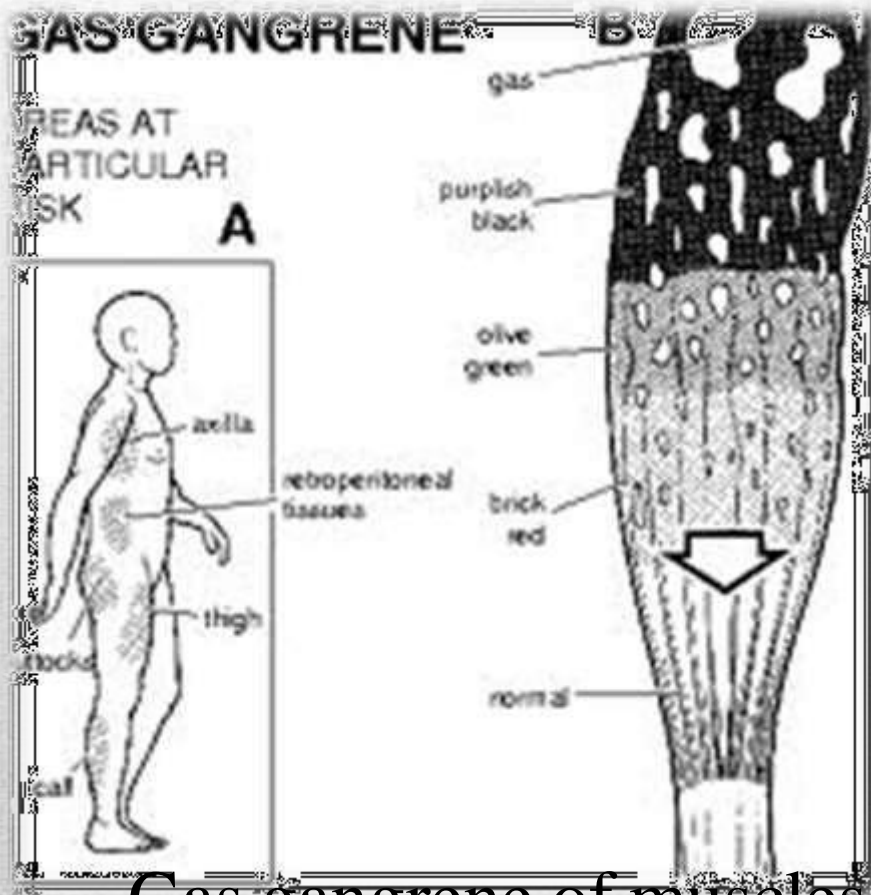


ADAM

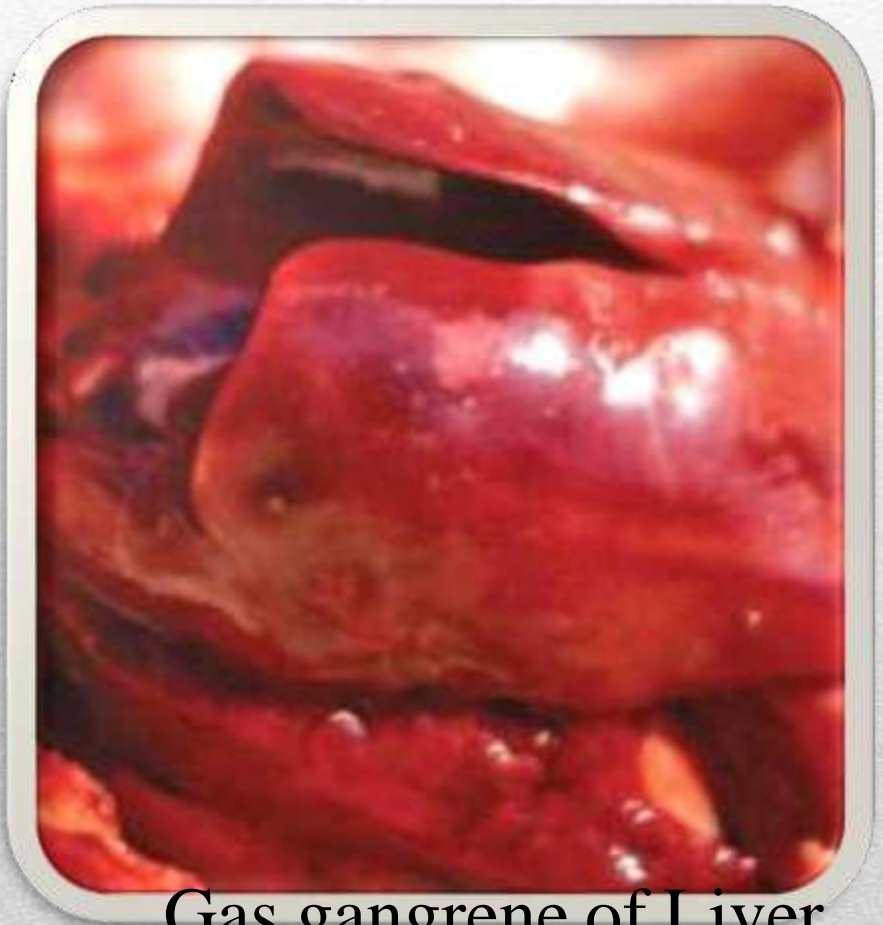


**Wet gangrene of appendix**





Gas gangrene of muscles



Gas gangrene of Liver



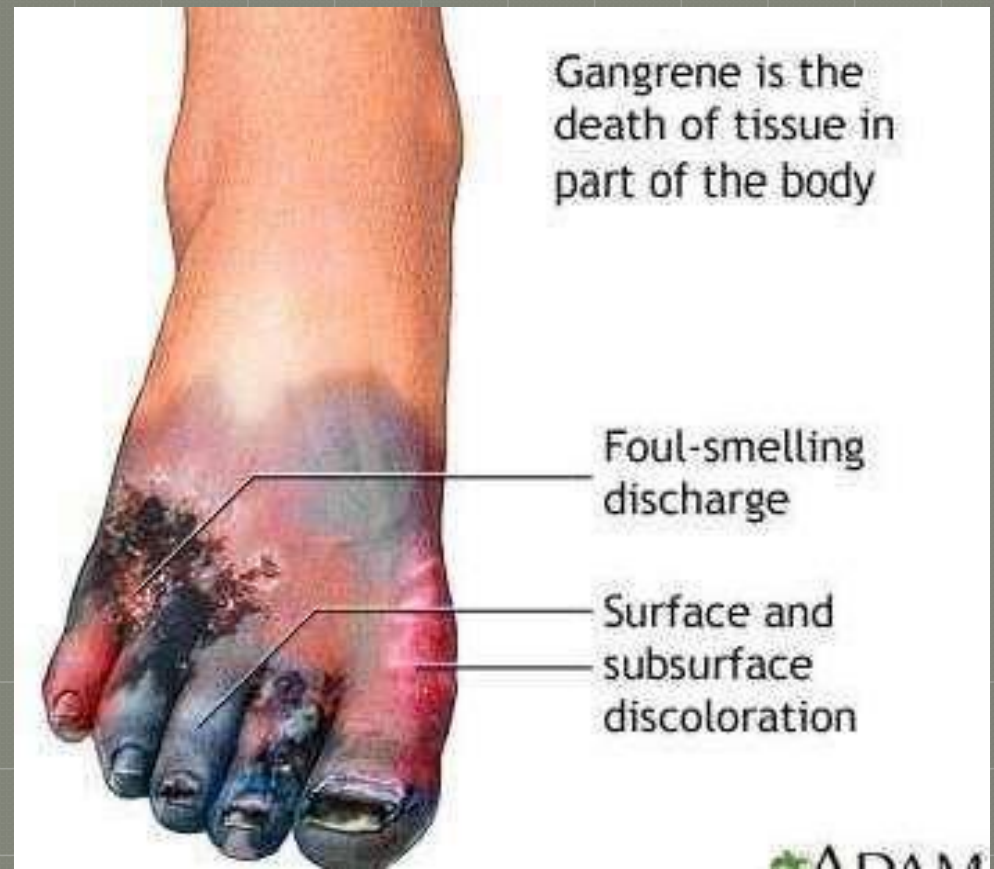
- A form of necrosis of tissue with superadded putrefaction.
  - Here the necrosis undergoes liquefaction by the action of putrefactive bacteria.
- 
- It may be caused either **ischemic** or **inflammatory**
  - **Gangrenous or necrotising inflammation:** primarily inflammation by virulent bacteria resulting in massive tissue necrosis.





# Types of Gangrene

- 2 main forms of gangrene
- **Dry gangrene**
- **Wet Gangrene**
  - **Gas gangrene**: a kind of wet gangrene



# Dry Gangrene

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- Begins in the distal part of a limb due to ischaemia.
- The gangrene spreads slowly upwards until it reaches a point where the blood supply is adequate to keep the tissue viable.
- A ***line of separation*** is formed at this point between the gangrenous part and the viable part.



# Dry Gangrene





## Grossly

- the affected part is dry, shrunken and dark black, resembling the foot of a mummy.
- It is black due to liberation of haemoglobin from haemolysed red blood cells which is acted upon by hydrogen disulfide ( $H_2S$ ) produced by bacteria resulting in formation of black iron sulfide.
- The line of separation usually brings about complete separation with eventual falling off of the gangrenous tissue if it is not removed surgically

## Histologically

- Necrosis of the tissue.
- The line of separation consists of inflammatory granulation tissue



# Wet Gangrene

- Naturally moist tissues and organs such as the mouth, bowel, lung, cervix,
- develops rapidly due to blockage of venous, and less commonly, arterial blood flow from thrombosis or embolism.
- The affected part is stuffed with blood which favours the rapid growth of putrefactive bacteria.
- The toxic products formed by bacteria leads to septicaemia, and finally death.



# Wet Gangrene

- **Diabetic foot**
  - high sugar content in the necrosed tissue which favours growth of bacteria.
- **Bed sores**
  - bed-ridden patient due to pressure on sites like the sacrum, buttocks and heels





# ***MORPHOLOGIC FEATURES***

- ***Grossly,***
  - the affected part is soft, swollen, putrid, rotten and dark.
  - The classic example is gangrene of bowel, commonly due to strangulated hernia



# Contrasting Features of Dry and Wet Gangrene

Feature	Dry Gangrene	Wet Gangrene
<i>Site</i>	Commonly limbs	More common in bowel
<i>Mechanisms</i>	Arterial occlusion	More commonly venous obstruction, less often arterial occlusion
<i>Macroscopy</i>	Organ dry, shrunken and black	Part moist, soft, swollen, rotten and dark
<i>Putrefaction</i>	Limited due to very little blood supply	Marked due to stuffing of organ with blood
<i>Line of demarcation</i>	Present at the junction between healthy and gangrenous part	No clear line of demarcation
<i>Bacteria</i>	Bacteria fail to survive	Numerous present
<i>Prognosis</i>	Generally better due to little septicaemia	Generally poor due to profound toxæmia



# GAS GANGRENE

- Special form of wet gangrene caused by gas-forming **clostridia** (gram-positive anaerobic bacteria).
- Bacteria gain entry into the tissues through open contaminated wounds, eg. road traffic accident
- Results in myonecrosis i.e. necrosis of muscles.
- It produce various toxins which produce necrosis and oedema locally





# ***MORPHOLOGIC FEATURES***

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- **Grossly**

- the affected area is swollen, oedematous, painful and crepitant due to accumulation of gas bubbles within the tissues.
- Subsequently, the affected tissue becomes dark black and foul smelling.

- **Microscopically**

- the muscle fibres undergo coagulative necrosis with liquefaction
- Large number of gram-positive bacilli can be identified.



*Thank You*

