GAS GANGRENE

(Clostridial myonecrosis)

Presented by Dr. Yatin Darji

GANGRENE

- -is a form of necrosis with superadded putrefaction. The type of necrosis is usually coagulative due to ischaemia.

TYPES OF GANGRENE

- **Dry**-typically in distal part,arterial,line of separation
- **Wet**- typically in moist tissue,DM and bedsore, venous
- **Gas** –special form of wet gangrene.

Difference between dry and wet gangrene

1	Site	limb	bowel
2	Mechanism	arterial	venous
3	Macroscopic	dry, shrunken	Soft , swoll. moist
4	Putrefaction	limited	marked
5	Line of demarcation	present	not clear
6	Bacteria	fail to survive	numerous

DEFINITION OF GAS GANGRENE

- This is rapid spreading infective gangrene of the muscles characterized by collection of gas in the muscle and subcutaneous tissue.

ETIOLOGY OR CAUSATIVE ORGANISM

- Main organism

  -Clostridium perfringes (cl.welchii)

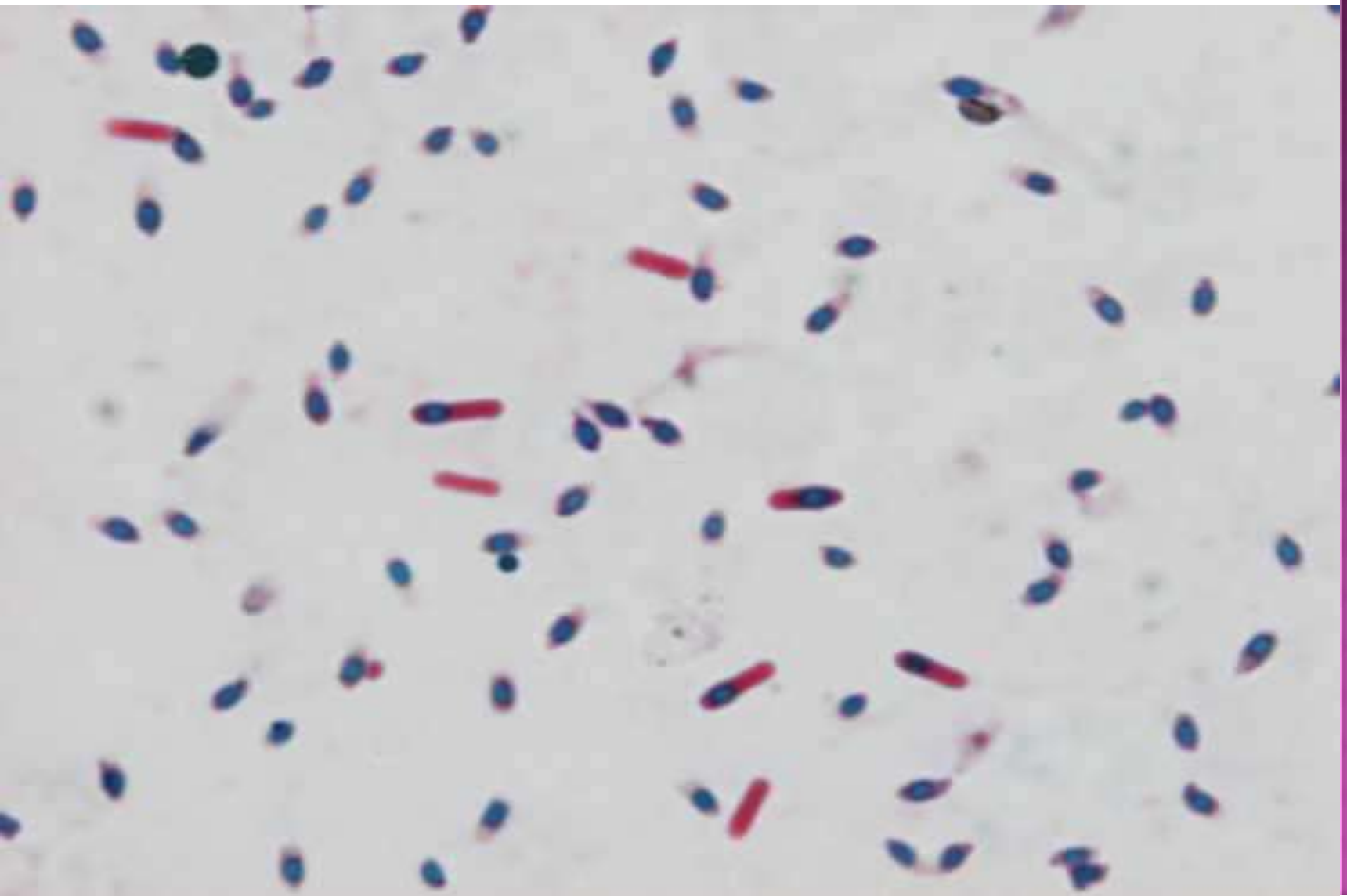
-Others are :

- Cl. septicum
- Cl.oedemateins
- Cl.histolyticum
- Cl. novyi

CLOSTRIDIUM PERFRINGES (CL.WELCHII)

- Anaerobic
- Gram positive bacilli
- Non- motile
- Central or subterminal spore
- Found in soil as well as in normal flora
- Produce exotoxin
- Calcium increase its multiplication

GRAM STAIN FOR CL.WELCHII



EXOTOXINS

- Alpha toxin (α- toxin) lecithinase -hemolytic
- Collagenase –proteinase
- Hyluronidase–break down hyaluronic acid
- Theta toxin-hemolytic weaker than alpha
- Leucocidin -kills leukocyte

PREDISPOSING FACTORS

1. Hemorrhage and blood clot
2. Contamination with soil
3. Laceration and crush injury
4. Presence of other infection mostly by aerobic organism
5. Circulatory obstruction
6. exudation or inadequate drainage in muscle fibers
7. Diabetes and other occlusive disease

TYPES OF CLOSTRIDIA.

- Sacchrolytic (cl.welchii) — Proteolytic
- Grows on sarcolemma — liberation of protienase
- stop the growth
- Breakdown muscle glycogen — formation of amino acids
- CO_2+H+lactic acid — NH_3+H_2S+Noxius gases
- Neutralize the acid

PATHOGENESIS

Incubation period is

1-7 days

Spores germinate

vegetative cells multiply

Carbohydrates Fermentation

Gas production In tissues

Distension of tissues

Interfering Blood supply Ischemia/ gangrene

Toxemia and death

Anaerobic environment

PATHOLOGY

- Rapidly spreading edema of the subcutaneous tissue and muscle with accumulation of gases

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- the collagen fibers becomes swollen, fragmented and are ultimately broken down

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- Blood vessels are damaged with destruction of endothelial damage

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- Muscles gradually loses its striation and nuclei and passes through various stages of degeneration

CONTINUE…

- Its loses contractility and normal color with crepitation due to presence of gases
- Gas bubbles spread along with long axis of muscle sheath
- Ultimately the muscle become soft , friable and green to black color
- The gas becomes foited

If septicemia occurs , gas may be produced in other organ , notably the liver which known as **foamy liver**

TYPES OF GANGRENE

- **1)Clostridial cellulitis** -healthy muscle are not involved, main organism are cl.sporogens and cl.tertium which are non toxic
- No edema and discoloration
- IP-3 to5 days
- Spread is slow and no emergency for mx.
- **2)single muscle type** -one muscle involved
- **3)group type** -only one group like extensors of thigh,etc
- **4)Massive type** -whole muscle mass of one limb
- **5)fulminating type** -rapidly spreading and associated with toxemia

CLINICAL FEATURES

- **General**
- Anxious
- Anemic
- Temp.-slight rise
- BP-decreased
- Vomiting

Local

-Pain

- Swelling and
- Gross edema
- Stitches may give way
- Profuse discharge

-Crepitus

-Discoloration of muscles

INVESTIGATION

- 1.Direct microscopic examination
- 2).Culture –nagler's reaction
- 3).X-RAY - gas shadow can be seen


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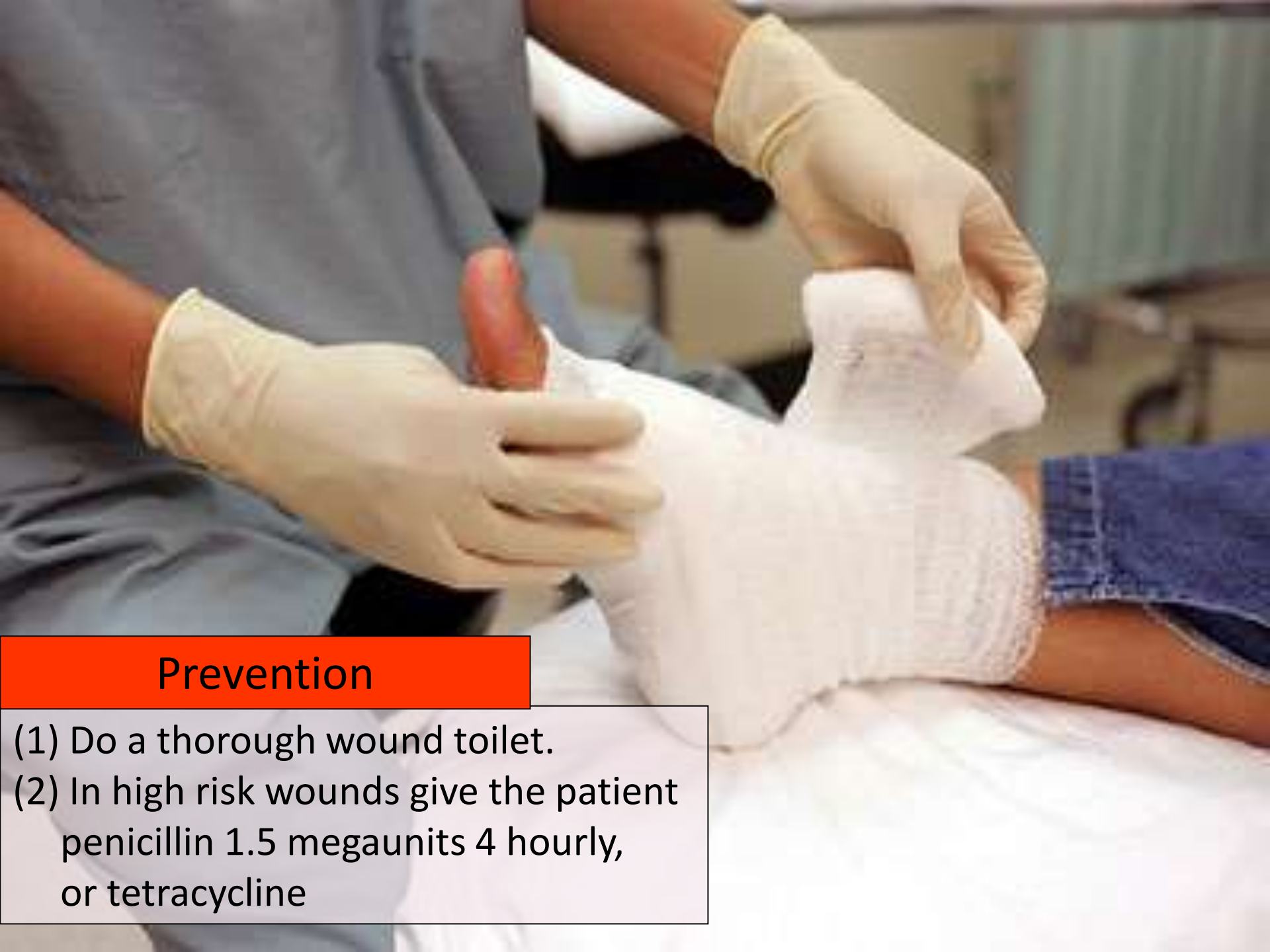
MANAGEMENT

- Prophylaxis
- Treatment of established case



Prevention

(1) Do a thorough wound toilet.
(2) In high risk wounds give the patient penicillin 1.5 megaunits 4 hourly, or tetracycline

PROPHYLAXIS

- **1.wound excision or debridement**-all devitalized tissue and foreign body should be removed
- **2.high dose of penicillin-** 2 grams 4 hrly
- **3.passive immunization-** AGS(Polyvalent serum or antitoxin) IM 22,500I.U.should be administered every 4 to 6 hourly
- **4.active immunization-**not popular APT,two doses of toxoid at an interval of 2 to 6 weeks and booster dose should be after 3 to 9 months

TREATMENT OF ESTABLISHED CASE

- 1)Surgery
- 2)Supportive treatment

SURGERY

- **General :**

- Multiple longitudinal incisions for decompression and drainage
- Excision of devitalized tissue should be carried out

- **According to types of gangrene:**

- **In case of single muscle t**ype –affected muscle is completely excised

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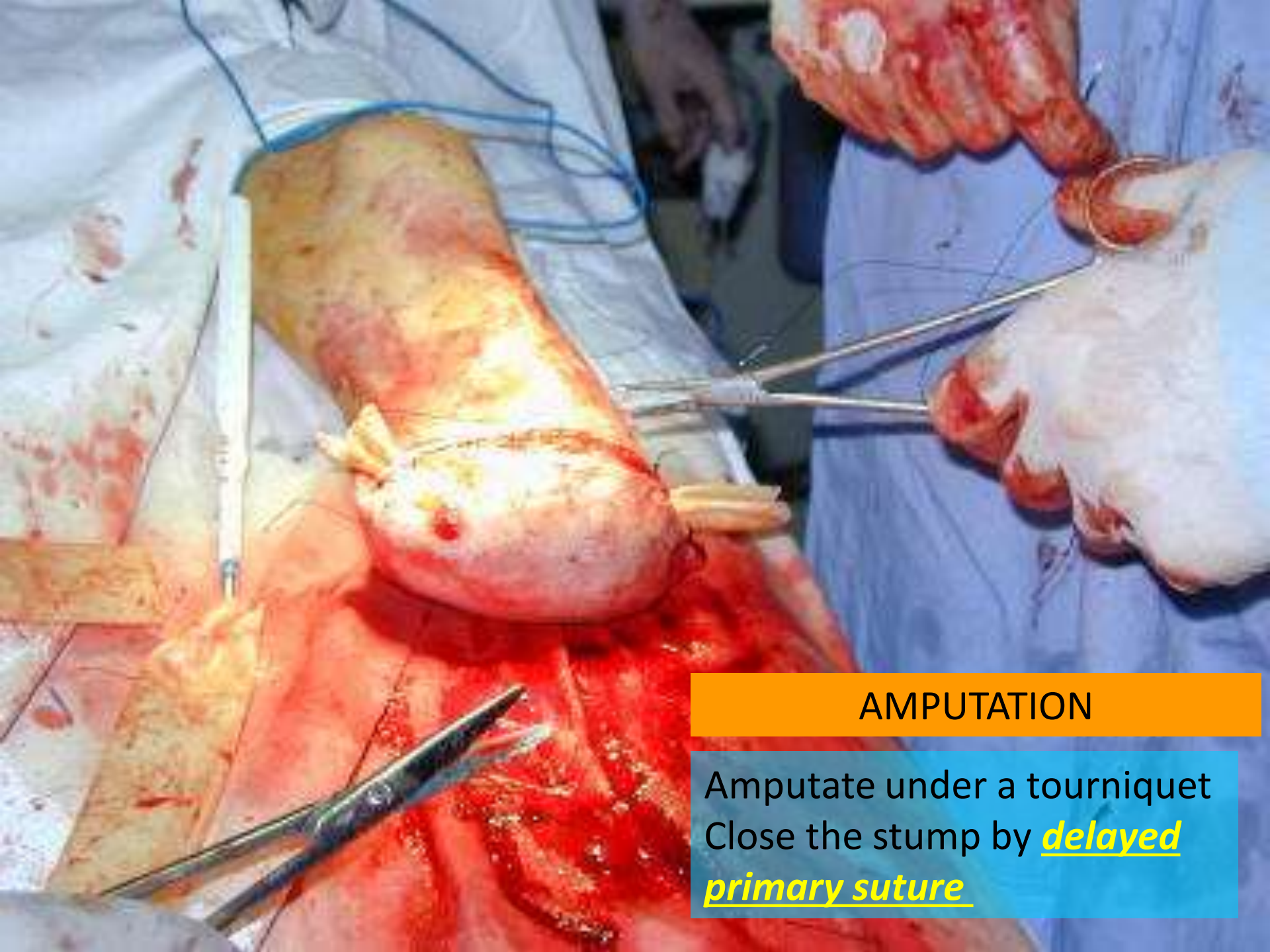
- **In case of group type** –all the affected portion of muscles are removed
- **In case of massive type** –if not treated early then **amputation** should be carried out.
- **Cautions:**
- Tourniquet should be avoided
- Amputation -should be without closure of stump for better drainage
- Amputation should be well proximal to affected muscles



AMPUTATION

Amputate under a tourniquet
Close the stump by ***delayed primary suture***

SUPPORTIVE TREATMENT:

- 1.high doses of penicillin10 lac,unit every 4 hour
- 2.blood transfusion
- 3.AGS
- 4.Hyperbaric Oxygen- availability is limited

COMPLICATIONS

- Disfiguring or disabling permanent tissue damage
- Jaundice with liver damage
- Kidney failure
- Sepsis
- Shock
- Stupor
- Delirium
- Coma
- Death

Thank You! – Any Questions?