

ANTHRAX

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(Spleenic fever/wool sorter's disease/Carbuncles)

ETIOLOGY

- *Bacillus anthracis*.
- Greek word for coal, because of the ulcers with dark centres that develop on the skin of affected people.
- Characterized by septicaemia, and sudden death with the exudation of dark tarry coloured and un-clotted blood from natural orifices.
- The endospores of *B. anthracis* can survive for decades in soil.
- Alkaline, rich in calcium and nitrogen content soil is responsible for spore survival.

Host affected

- Wild and domestic herbivores (eg, cattle, sheep, goats, camels, antelopes).
- People exposed to tissue from infected animals, to contaminated animal products, or directly to *B. anthracis* spores under certain conditions.
- The disease is almost invariably fatal except in Swine.

Transmission:

- Ingestion,
- Abrasions
- Inhalation(wool sorter's disease).

Pathogenesis:

B. Anthracis endospores (abrasion, inhalation, or ingestion)

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Phagocytised by macrophages and carried to regional lymph nodes.

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Within hours, most spores germinate into vegetative form & produce s virulence factors and enter the bloodstream.

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For virulence : antiphagocytic capsule and 3 toxin components:
(Protective antigen Lethal factor, and Edema factor)

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The three exotoxin components combine to form two binary toxins,
oedema toxin and lethal toxin

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Oedema toxin is a calmodulin-dependent adenylate cyclase that alters water homeostasis causing oedema and impairs neutrophil function, rendering the host further susceptible to infection.

Lethal toxin leads to the release of reactive oxygen intermediates as well as the production of pro inflammatory cytokines, tumour necrosis factor and interleukin-1b responsible for rapid circulatory collapse.

The release of these toxins results profuse haemorrhage, tissue oedema, and a paucity of acute inflammatory reaction .

CLINICAL FINDINGS

- Depends on species affected, dose and the route.
- In cattle and sheep it is septicaemic and rapidly fatal., most animals are found dead without pre-monitory signs.
- Pyrexia with temperatures up to 42°C (108°F), depression, congested mucosae and petechiae may be observed ante-mortem.
- Animals which survive for more than one day may abort or display subcutaneous oedema and dysentery.
- **In cattle, post mortem findings:** rapid bloating, incomplete rigor mortis, widespread ecchymotic haemorrhages and oedema, dark un-clotted blood and blood-stained fluid in body cavities.
- An extremely large soft spleen is characteristic of the disease in cattle.

DIAGNOSIS :

- History of sudden death and oozing of unclotted tarry blood from natural orifices.
- Demonstration of organism through ear vein/Spleen of carcass.
- Serological tests like Ascoli's test, a precipitation test.
- Agar gel precipitation test.

TREATMENT:

- Antibiotics(Penicillin+Streptomycin e)/Oxytetracycline IM for 3-5 days
- Antipyretics.
- Antihistaminic @10-20ml IM/Cow.
- Corticosteroids(Dexamethasone @0.5-1.0mg/Kg, IV/IM

CONTROL

- Infected animal is isolated and treated separately.
- Strict quarantine measures.
- Proper disposal of carcass (Burning/Burial)
- In burial, a deep pit is dug and layered with 6-12 inches of limestone/Calcium carbonate to prevent spore formation by releasing CO_2 through reaction with putrefied carcass.
- Then carcass is placed and layered again with 6 inches of lime and pit is closed with soil.
- Vaccination: Anthrax spore vaccine
- For cattle/sheep/Goats-1ml, camel-2ml, Elephant-3ml.