ANTHRAX

synonym: Charban, Splenic fever

etiology: It is an acute septicemic disease caused by ***Bacillus anthracis***,gram positive capsulated, spore forming rod-shaped aerobic organism.

Epidemiology:

Global occurrence and often occurs as outbreaks. Spores survive in soil for many years and disease is enzootic in certain areas. Animals become infected while grazing on grass contaminated with spores. When the pathogen is returned to the soil in animal excrement or carcasses, it can sporulate and become a long-term reservoir of infection for the animal population.

Transmission:

1. Ingestion of spores with contaminated food and water. Upon ingestion of the spores, infection may occur through the intact mucous membrane, through defects in the epithelium around erupting teeth, or through scratches from tough, fibrous food materials.
2. Inhalation of spores in man (wool – sorters disease).
3. By biting files, carnivores birds, movement of infected hides, bone meal, hair and wool.

Host risk factors

The disease occurs in all vertebrates but is most common in cattle and sheep and less frequent in goats and horses. Humans occupy an intermediate position between this group and the relatively resistant pigs, dogs, and cats. In farm animals, the disease is almost invariably fatal

Environment risk factors

Outbreaks originating from a soil-borne infection always occur after a major climate change, for example heavy rain after a prolonged drought, or dry summer months after prolonged rain, and always in warm weather when the environmental temperature is over 15°C.Other risk factors in the environment include close grazing of tough, scratchy feed in dry times, which results in abrasions of the oral mucosa, and confined grazing on heavily contaminated areas around water holes.

Pathogen risk factors

When material containing anthrax bacilli is exposed to the air, spores are formed that protract the infectivity of the environment for very long periods. The spores are resistant to most external influences including the salting of hides, normal environmental temperatures and standard disinfectants.

Disease forms:

a) **Cutaneous anthrax,** caused by spores entering the skin through small cuts and abrasions. The most common and least dangerous of all forms appear as black eschar.

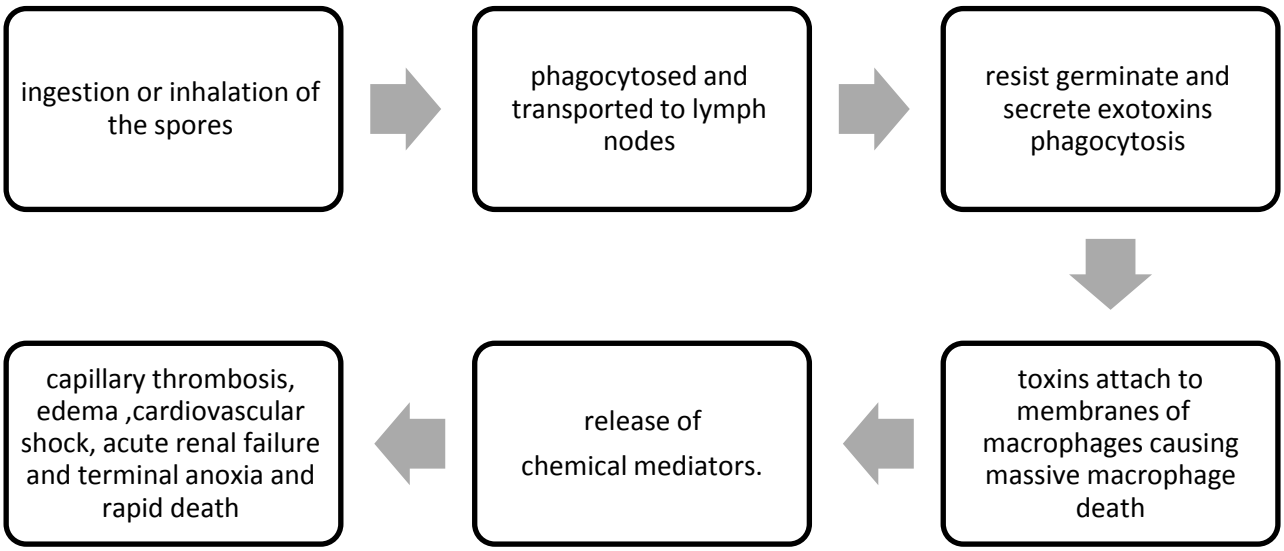
b) **pulmonary anthrax** (wool sorter's disease) associated with the inhalation of airborne spores, either from animal products or from contaminated soil.

c) **gastrointestinal form** of infection is another rare but deadly condition ,is acquired through contaminated food.

Economic importance

In most developed countries vaccination of susceptible animals in enzootic areas has reduced the prevalence of the disease to negligible proportions on a national basis, but heavy losses may still occur in individual herds. Loss occurs due to mortality but also from withholding of milk in infected dairy herds and for a period following vaccination.

Pathogenesis:



Spores do not form in the living animal but form when the dead body is opened. Hence the carcass should not be opened.

Clinical signs:

1. Incubation period: 1 to 14 days. symptoms variable and may be absent with death in peracute cases.
2. Acute cases: high temperature (42°C). The respiration rapid and deep, the mucosa congested and hemorrhagic, and the heart rate much increased.
3. No food is taken and ruminal stasis is evident. Pregnant cows may abort. In milking cows the yield is very much reduced and the milk may be blood stained or deep yellow in color.
4. Local edema of the tongue and edematous lesions in the region of the throat, sternum, perineum, and flanks may occur.
5. Anorexia, depression, droopy ears, grinding of teeth and death in convulsions.
6. Dark colored blood oozes from the natural orifices just before death.
7. in horse colic due to intestinal irritation.

Clinical Pathology

Hematology and blood chemistry examinations are not conducted because of the risk for human exposure. In the living animal the organism may be detected in a stained smear of peripheral blood or local edema fluid by microscopic examination, of a clearly defined metachromatic capsule on square-ended bacilli (often in chains) in a blood smear stained with aged polychrome methylene blue.

Necropsy Findings:

1. Carcass readily undergoes purification with much gas formation.
2. The blood is dark colored and fail to coagulate.
3. Hemorrhages on the muscular subcutaneous and serous tissues.
4. In horses, dog and pigs extensive gelatinous odema over abdomen, thorax, limbs and external genetalia.
5. Spleenomegaly in cattle, which is absent in sheep, horse, dog and swine.

D.D

There are many causes of sudden death in farm animals and differentiation is often difficult. Diseases where there can be multiple deaths suggestive of anthrax include:

- Bacillary hemoglobinuria
- Hypomagnesemic tetany
- snake bite
- Lightning strike
- Peracute blackleg
- Malignant edema

Diagnosis:

- ✓ Smears form the ear vein or odema fluid were stained with Giemsa's reveal red capsule
- ✓ Blood culture or edema fluid collected with sealed container.
- ✓ Fluorescent antibody technique may be made use of on blood and tissues.

Treatment

Severely ill animals are unlikely to recover but in the early stages, particularly when fever is detected before other signs are evident, recovery can be probable if the correct treatment is provided.

Penicillin (20 000 IU/kg BW twice daily), but streptomycin (8-10g/d in two doses intramuscularly for cattle) is much more effective.

Control:

- ✓ Anthrax is a **reportable disease** when an outbreak occurs, the placing of the farm in quarantine, the destruction of discharges and dead body, and the vaccination of survivors, are part of the animal disease control program and indirectly reduce human exposure.
- ✓ Prohibition of movement of milk and meat from the farm during the quarantine period should prevent entry of the infection into the human food chain.
- ✓ Infected carcasses should not be opened but immediately burned in place or buried at least 2 m deep, together with bedding and soil contaminated by discharges. If this can not be done immediately, a liberal application of 5% formaldehyde on the carcass and its immediate surroundings will discourage scavengers.