Glanders

Dr. Ravi Sikrodia
Assistant Professor
College of Veterinary Science And A.H., Mhow

Glanders

Droes, Farcy, Equine nasal phthisis, Maliasmus

- **Fatal, contagious and zoonotic disease of solipeds (horses, mules and donkeys) caused by *Burkholderia mallei***
- **Occurs in acute or chronic form**
- **Nodular lesions in the lungs and other organs**
- **Ulcerative lesions in the skin and mucous membranes of the nasal cavity and respiratory passage**
- **Typically progressive course and poses a significant human health risk.**

In India

- **1899: Glanders and Farcy act came in to force against the disease**

ETIOLOGY

- **Family: *Burkholderiaceae***
- ***Organism- Burkholderia mallei* (1992)**
- **Short, straight or slightly curved rod (2-5 µ long and 0.3-0.8 µ wide)**
- **Gram –ve, non motile, non-sporulating and an obligately aerobic bacteria**

- **Disease of Solipeds**
- **All age groups are susceptible**
- **Horses – Chronic form**
- **Donkeys – Acute form**
- **Mules intermediate in susceptibility**
- **Humans – occupational disease of Vets. and other Animal workers**

Transmisson

- ✓ **Organism in skin exudates and respiratory secretion**
- ✓ **Infection is acquired directly or indirectly from excretions and discharges only**
- ✓ **Chronic - horses - organisms are confined to the lesions and discharges**
- ✓ **Acute - Donkeys - organisms are distributed in most of the tissues and may be excreted in faeces, urine, saliva and tears**
- ✓ **Although the disease in horses is respiratory form, the route of infection is probably oral**

- **Mostly spread - ingestion of contaminated feed and water.**

- **Spread - inhalation of nasal droplets can also occur.**

- **Rarely, the cutaneous form - contamination of skin abrasions by direct contact, or from harness or grooming tools**

- **Glanders may appear immediately or become latent**
- **Incubation period varies from a few days to many months but 2 to 6 weeks is typical**

Pathogenesis

Entry through GIT & Integument include mucous membranes

Mucosa to lymph nodes & hematogenously to the internal organs

Spreads through blood to cause nasal, cutaneous and nodular lesions.

Nodule formation by mononuclear cells and fibroblasts

Caseation and calcification

Cutaneous entry

Move along the lymphatic tracts

Lymphangitis and then spilling in the blood to seed various organs

Other visceral organs may become the sites of typical nodules

Cont…

Organism enter nasal mucosa and localizes

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Nodule formation on mucosa and turbinates

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Rupture and ulcers formed , excreting the organisms

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Heals leaving behind typical star shaped scar

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Terminal signs are mainly bronchopneumonia

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Death due to anoxic anoxia

Clinical Presentation

Two forms:

1. **Acute disease (Septicemic)**
2. **Chronic disease**
   - **Pulmonary form**
   - **Nasal form**
   - **Cutaneous form**

Acute disease (Septicemic)

- High fever,
- Cough,
- Dyspnoea,
- Thick nasal discharge
- Rapidly spreading ulcers on the nasal mucosa
- Nodules on the skin of lower limbs or abdomen
- Sub maxillary lymph nodes- swollen and painful
- Lymphatic vessels on the face become thickened
- Death in 1 to 2 weeks due to septicemia

Chronic disease

Three forms:

1. **Pulmonary form**
2. **Nasal form**
3. **Cutaneous form**

} **Usually occur together**

- **In most outbreaks, these forms are not clearly distinct and may occur simultaneously**

- **Slowly progressive and often fatal**

Pulmonary form

- **Lesions in the lungs develop along with nasal and cutaneous lesions**
- **Chronic and diffuse pneumonia with severe coughing, dyspnoea and epistaxis**
- **In male animals, glanderous orchitis is a common feature**

Nasal form:

- Nodules and ulcers on mucosa and turbinates
- Commence as nodules of about 1 cm.
- Ulcerate and heal as star shaped scars
- Septum may even be perforated.
- Also involve Pharynx and Larynx
- Enlarged, suppurated regional LN

Blood stained discharge from nostril

Cutaneous form or Farcy

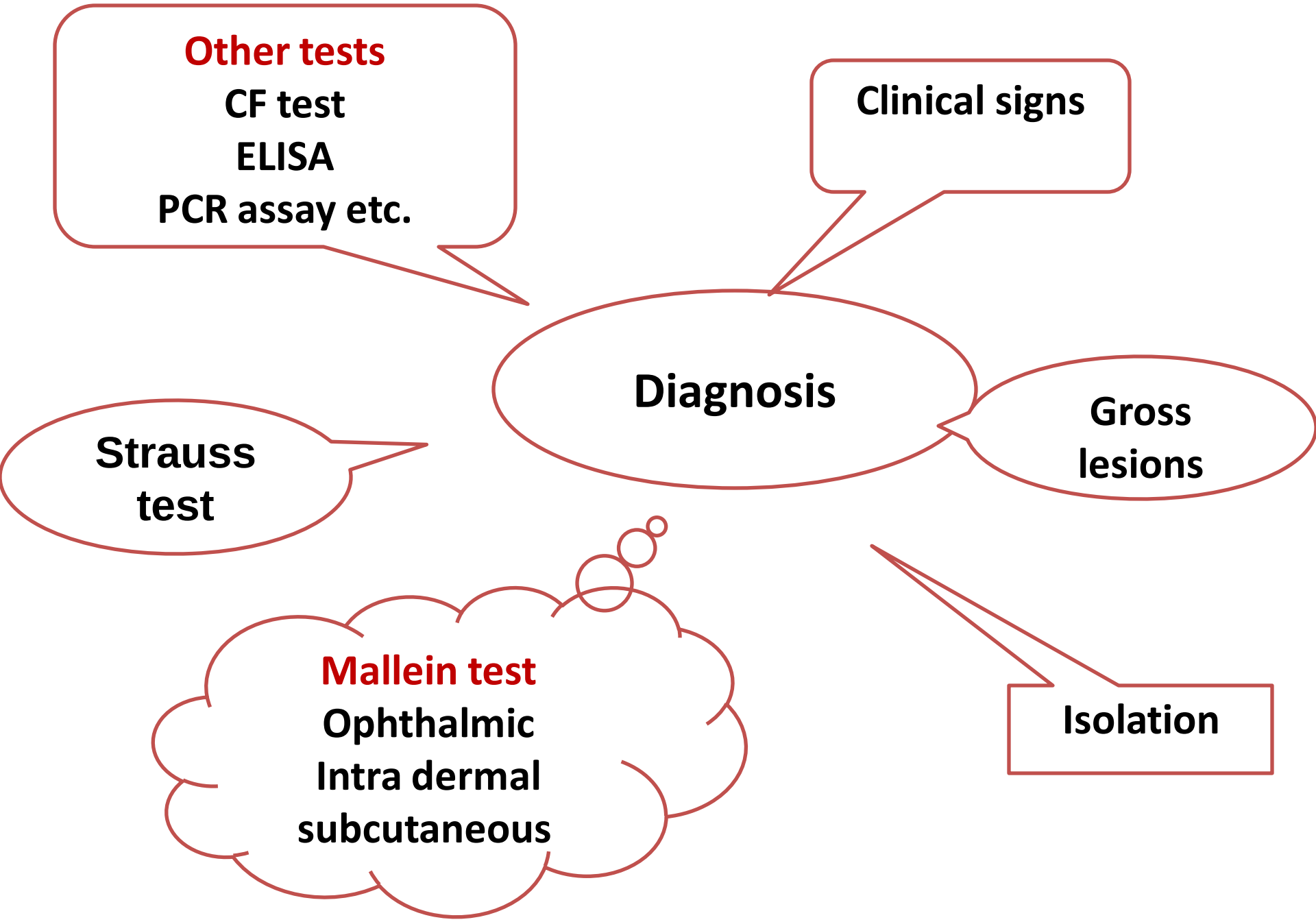
- **Subcutaneous nodules (1-2 cm) which Ulcerate and drain a honey-colored discharge (pus)**
- **Thickened fistulous lymphatics radiate from the lesions and connect one to the other**
- **Mainly Cutaneous lesions in medial aspect of the hock, but can occur any where in the body**
- **Lymphadenopathy and cording of lymphatics is common (referred as Farcy pipes)**

Subcutaneous multiple nodule

Discharge from lesion

Cutaneous nodules in the medial aspect of hock (Draining lymphatics marked by yellow colour)

Diagnosis


Other tests
CF test
ELISA
PCR assay etc.
Clinical signs
Diagnosis
Strauss test
Gross lesions
Mallein test
Ophthalmic
Intra dermal
subcutaneous
Isolation

Intra dermo- palpebral Mallein test

- **Most sensitive, reliable and specific test**
- **0.1ml of Mallein is injected I\D into the lower eyelid and read at 24 and 48 hours.**
- **Positive - marked oedematous swelling of the eyelid with purulent discharge from the inner canthus or conjunctiva along with rise in temperature**
- **Negative – usually no reaction or only a little swelling of the lower lid.**

Procedure to carry out Mallein Intra dermopalpebral test in a horse

Ophthalmic Mallein test

- A few drops of Mallein are instilled into the eye
- at the canthus.

Positive - Eyelids, and sometimes the side of

- the face, become swollen

- Little discharge from the eye

- Severe purulent conjunctivitis within 6 to 12 hr

The reaction may also occur to a lesser extent

- in the opposite eye.

Subcutaneous Mallein test

- **Interferes with subsequent serological diagnosis**
- **10 cm square skin patch in the middle of the neck is clipped and disinfected**
- **2.5 ml of diluted Mallein is injected s/c into the centre**
- **Positive - pyrexia of 104°F (40.0°C) in first 15 hours, and a firm painful swelling seen within 24 hours at the site**
- **Negative - no or minimal transient local swelling.**

Strauss reaction

- Infectious material injected **intraperitoneally** into male guinea pigs
- **Positive -** severe localized peritonitis and orchitis
- The testes become **enlarged, painful** and ultimately **necrotic**

- Strauss reaction is not specific for Glanders, and other organisms can also elicit it.

Other tests

- **Complement fixation test: Widely used with accuracy of 90 - 95%**

- **ELISA: mainly Dot ELISA, Blot (Plate and membrane) ELISA, Competitive ELISA**
- **PCR assays**
- **Counter-Immunoelectrophoresis Test**
- **Indirect Hemagglutination,**
- **Immunofluorescence**

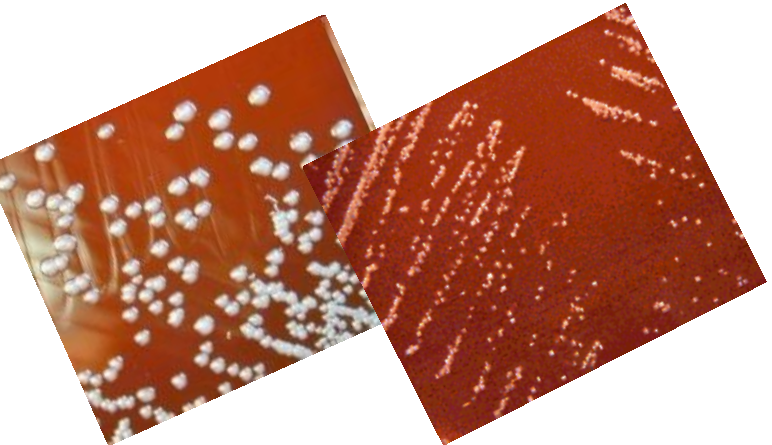
- **The most accurate and reliable tests in horses are complement fixation and ELISA.**

Isolation

- Live animal – skin lesion, blood, serum, sputum
- At necropsy – nasal exudates and tissue samples
- Loeffler's serum agar
- Sheep Blood agar
- Glycerin–potato media
- Chocolate agar
- Mc Conkey agar

1 mm, white,semitranslucent and viscid colony

clear honey-like layer by day 3; eventually it become reddish-brown or brown



Growth on Blood Agar and Glycerol Potato Agar

Prevention and control

- ✓ **Eliminate the diseased animals**
- ✓ **Carcasses are burnt or incinerated along with manure, beddings, feed residues**
- ✓ **Protective clothing during examination of animal and necropsy and use proper disinfectants**
- ✓ **Avoid common feeding and watering in endemic area**
- ✓ **Strict quarantine for 60 days**

Zoonotic aspects

Disease in Humans

- **The role of ingestion in human infection is uncertain, spread by contact**

- **Human - natural infections incubation period is 1 to14 days whereas in case of aerosolized forms in biological weapons it is 10-14 days**

- **Four forms of infection**
  - **Septicemia**
  - **Pulmonary infection**
  - **Acute localized cutaneous infection**
  - **Chronic infection**

(O.I.E., 2000)

Cont……..

- **Septicemic form –**

  Fever, chills, myalgia, pleuritic chest pain, generalized erythroderma, jaundice, photophobia, lacrimation, diarrhoea and granulomatous or necrotizing lesions.

  Death usually occurs in 7 to 10 days.

- **Pulmonary form –**

  Pneumonia, pulmonary abscesses and pleural infusions

  Incubation period of about 10-14 days.

- **Localized form –**

  Nodules, abscesses and ulcers in the mucous membranes, skin, lymphatic vessels and subcutaneous tissues.

- **Chronic form –**

  Multiple abscesses, nodules or ulcers can be seen in the skin, liver, spleen or muscles

Cont……..

- **The case fatality rate is - 95% (untreated cases)**
  - more than 50% (treated)
- **The mortality rate for localized disease is 20% (treated)**
- **The overall mortality rate is 40%**

(Rega, 2007)

CONCLUSION

- **Glanders is highly contagious disease caused by *B. Mallei* and characterised by nodular and ulcerative lesions in skin, and m.m. of nasal and respiratory mucosa.**
- **There is considerable increase in the outbreaks of glanders in major part of the world and considered as a re-emerging disease.**
- **Glanders is primarily a disease of solipeds, but other animals are also susceptible to disease including humans.**
- **Grossly the disease is characterised by ulcers, nodules, stellate scars on respiratory passage, skin and s/c tissues, whereas microscopically Pyogranulomatous lesions are prominent.**

Cont.....

- **Mallein test and CFT are prescribed test for diagnosis of disease in which Mallein is the main test for field diagnosis**
- **The disease poses a significant human health risk and is also considered to be a serious bioterrorist threat.**

Thanking you