Food and Agriculture Organization of the United Nations

Bluetongue

Agent and hosts
Epidemiology: Spreading routes and transmission
Clinical diagnosis: Clinical sings, Differential diagnosis, post-mortem lesions and findings

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Description of the disease

- Bluetongue is a non-contagious, insect-transmitted, viral disease of domestic and wild ruminants. **It is not known to affect humans**.
- **Disease characteristics** - The disease is characterised by inflammation of the mucous membranes, congestion, swelling and haemorrhages. Sever clinical disease is mainly observed in sheep, while cattle and goats do not usually show clinical signs of disease and can carry the virus for a certain period of time and transmit it to other ruminants.
- **Transmission** - Via bite of certain species of *Culicoides*, which are biological vectors. It is not transmitted by direct or indirect contact between animals in the absence of the insects (exceptions: BTV 8, BTV 26, BTV 1?)
- **Sources of virus** - Infected *Culicoides* and animals

- **Occurrence** - The virus is present in a broad band of countries extending approximately between 40°N and 35°S. The bluetongue virus has been shown by serology to be present in regions where the *Culicoides* is present (e.g. Africa, the Americas, Australia, the Middle East and some countries of southern Asia and Oceania).
- Bluetongue situation in the EU has considerably changed in recent years with incursions of new serotypes, namely of serotype 8 (in an area of the EU where outbreaks have never been reported before and which was not considered at risk of bluetongue) and also of serotype 1 of that virus on southern Europe.
- Bluetongue can cause large scale outbreaks and is an OIE listed disease.

Etiology

Classification of the causative agent

- Family *Reoviridae*, genus *Orbivirus* with 20 recognised species in the genus.
- The bluetongue virus (BTV) contain at least 27 recognised serotypes and is related to the viruses in the epizootic hemorrhagic disease (EHD) serogroup.

Resistance to physical and chemical action

- Temperature: Inactivated by 50°C/3 hours; 60°C/15 minutes.
- pH: Sensitive to pH <6.0 and >8.0.
- Chemicals/Disinfectants: Inactivated by ß-propiolactone; iodophores and phenolic compounds.
- Survival: Very stable in the presence of protein (e.g. has survived for years in blood stored at 20°C).

http://www.oie.int/fileadmin/Home/eng/Animal_Health_in_the_World/docs/pdf/Disease_cards/BLUETONGUE.pdf

Epidemiology

- Non-contagious by casual contact (except BTV 26)
- Some midges of the genus *Culicoides* transmit BTV among susceptible ruminants; these insect hosts having become infected by feeding on viraemic animals (the vertebrate host)
- ✓ replication period in the insect's salivary gland of 6–8 days
- ✓ infected midges infective for life

- Midges are the only significant natural transmitters of BTV; thus distribution and prevalence of the disease is governed by ecological factors (i.e. high rainfall, temperature, humidity and soil characteristics)
- BTV does not establish persistent infections in ruminants thus survival of the agent in the environment is associated with insect factors
- Morbidity in sheep can reach 100% with mortality between 30 and 70% in more susceptible breeds; mortality in wild deer and antelopes can reach 90% o BTV serotype 8 in Europe saw higher numbers of cattle affected however mortality remained below 1%

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Hosts

- BTV vertebrate hosts include domestic and wild ruminants: sheep, goats, cattle, buffaloes, deer, most species of African antelope and other Artiodactyla such as camels
- The roll of non-ruminant species in the disease in the wild is not known
- Variation in sheep breed susceptibility
- Cattle, goats, dromedaries, wild ruminants: generally inapparent infection

Transmission

- Biological vectors: Culicoides spp.
- Sources of virus:
  - Infected *Culicoides*
  - Blood
  - Semen

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Clinical diagnosis

Disease outcome of infection ranges from unapparent, in the vast majority of infected animals, to fatal, in a proportion of infected sheep, goats, deer and some wild ruminants. As with many diseases, severity will depend on factors related to agent, host, and environment.

Acute form (sheep and some species of deer)

- Pyrexia up to 42°C, excessive salivation, depression, dyspnoea and panting Initially clear nasal discharge becomes mucopurulent and upon drying may form a crust around the nares
- Hyperaemia and congestion of the muzzle, lips, face, eyelids and ears; leading to oedema
- Ulceration and necrosis of the mucosae of the mouth
- Tongue may become hyperaemic and oedematous; later cyanotic and protrude from the mouth
- Extension of hyperaemia to coronary band of the hoof, the groin, axilla and perineum; lameness due to coronitis or pododermatitis and myositis
- Torticolis in severe cases
- Abortion or birth of malformed lambs
- Complications of pneumonia
- Emaciation
- Either death within 8–10 days or long recovery with alopecia, sterility and growth delay

Inapparent infection

- Frequent in cattle and other species for certain serotypes

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Lesions

- Congestion, oedema, haemorrhages and ulcerations of digestive and respiratory mucosae (mouth, oesophagus, stomach, intestine, pituitary mucosa, tracheal mucosa)
- Severe bilateral broncholobular pneumonia (when complications occur); in fatal cases, lungs may show interalveolar hyperaemia, severe alveolar oedema and the bronchial tree may be filled with froth
- Thoracic cavity and pericardial sac may contain large quantities of plasma-like fluid;
- Distinctive haemorrhages found at base of pulmonary artery
- Congestion of hoof laminae and coronary band
- Hypertrophy of lymph nodes and splenomegaly

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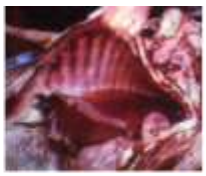
Picture 1. head oedema


Picture 2. head oedema


Picture 7. hyperemia of coronary band


Picture 8. Exudates in the thorax


Picture 3. head and tongue oedema


Picture 4. head oedema and cyanosis of tongue


Picture 9. hemorrhagic pulmonary artery


Picture 10. hemorrhagic pulmonary artery


Picture 5. cyanosis of tongue


Picture 6. erosions on mouth


Picture 11. hemorrhagic heart


Picture 12. hemorrhagic heart

Differential diagnosis

- Contagious ecthyma
- Foot and mouth disease
- Vesicular stomatitis
- Malignant catarrhal fever
- Bovine virus diarrhoea
- Infectious bovine rhinotracheitis
- Parainfluenza-3 infection
- Sheep pox
- Photosensitisation
- Pneumonia
- Polyarthritis, footrot, foot abscesses
- Plant poisonings (photosensitisation)
- Peste des petits ruminants
- Coenurosis (Oestrus ovis infestation)
- Epizootic haemorrhagic disease of deer

BT or not BT?

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Thanks for your attention