

EPIZOOTIC HAEMORRHAGIC DISEASE

AETIOLOGY

Classification of the causative agent

Virus family Reoviridae, genus *Orbivirus*, 8 or more serotypes

EHDV shows immunological cross reactivity with the bluetongue virus group

Resistance to physical and chemical action (adapted from Bluetongue virus)

Temperature:	Extremely unstable at high temperatures. Inactivated by 50°C/3 hours; 60°C/15 minutes or 121°C /15 minutes
pH:	Sensitive to pH <6.0 and >8.0
Chemicals/Disinfectants:	Non-enveloped virus and thus relatively resistant to lipid solvents like ether and chloroform. Readily inactivated by β -propiolactone, 2% w/v glutaraldehyde, acids, alkalis (2% w/v sodium hydroxide), 2-3% w/v sodium hypochlorite, iodophores and phenolic compounds
Survival:	Very stable in blood and tissue specimens at 20°C, 4°C, and \square 70°C, but not at \square 20°C. Resistant to ultraviolet and gamma irradiation due to its double-stranded RNA genome

EPIDEMIOLOGY

- EHD can infect most wild and domestic ruminants
- Historically EHD is a disease of wild ruminants, particularly white-tailed deer in North America, and rarely a clinical disease of cattle
- Recently EHD has become an emerging disease in cattle, and was added to OIE list of notifiable diseases in May 2008, following outbreaks in 4 Mediterranean countries
- Morbidity and mortality may be as high as 90% in white tailed deer; however severity varies between years and geographic locations

Hosts

- White-tailed deer mainly, with mule deer and pronghorn affected to a lesser extent
- Other wild ruminants, like black-tailed deer, red deer, wapiti, fallow deer, roe deer, elk, moose, and bighorn sheep may seroconvert
- Until recently, only rare outbreaks were reported in cattle, although infection is common and they may serve as temporary reservoir hosts. True persistent infection of ruminants does not occur
- Sheep can be infected experimentally but rarely develop clinical signs, and goats do not seem to be susceptible to infection

Transmission

- Virus is transmitted by biological vectors, usually biting midges of the genus *Culicoides*, after an external extrinsic period of 10 \square 14 days
- In temperate regions infection is most common in the late summer and autumn during peak vector population, while infection occurs throughout the year in tropical regions

- As in bluetongue infection, viraemia can be prolonged beyond 50 days, despite the presence of neutralising antibody, due to an intimate association between virus and erythrocytes. Infected deer can be viremic for up to 2 months

Sources of virus

- Blood of viraemic animals
- Infection in ruminants is not contagious – biological vectors (*Culicoides* sp.) are required
- As the virus infects endothelium, all tissues of the body may be affected

Occurrence

EHDV in cattle has been isolated throughout the world in North America, Australia, Africa, Asia, and the Mediterranean.

DIAGNOSIS

Incubation period is 2–10 days

Clinical diagnosis

The clinical signs of EHD manifest as haemorrhagic disease in deer, but domestic ruminants may be subclinically infected.

- Acute EHD in deer: Fever, weakness, inappetance, excessive salivation, facial oedema, hyperaemia of the conjunctivae and mucous membranes of the oral cavity, coronitis stomatitis, and excessive salivation
- In prolonged cases, oral ulcers on the dental pad, hard palate, and tongue may occur. Excessive bleeding occurs in fulminant disease: bloody diarrhoea, haematuria, dehydration, and death
- Acute outbreaks in cattle (similar to bluetongue): fever, anorexia, reduced milk, swollen conjunctivae, redness and scaling of the nose and lips, nasal and ocular discharge, stomatitis, salivation, lameness, swelling of the tongue, oral/nasal erosions, and dyspnoea
- Oedema, haemorrhages, erosions, and ulcerations may be seen in the mouth, on the lips, and around the coronets; the animals may be stiff and lame
- Abortions and stillbirths have also been reported in some epidemics. Some affected cattle die (up to 10%)

Lesions

EHD in deer:

- Peracute form: Severe oedema of the head, neck, tongue, conjunctiva, and lungs
- Acute form: widespread haemorrhages and oedema in the mucous membranes, skin and viscera, especially heart and gastrointestinal tract (GIT)
- Erosions may be found in the mouth, rumen and omasum, and necrosis in the hard palate, tongue, dental pads, oesophagus, larynx, rumen and abomasum
- Chronic form: growth rings on the hooves or sloughing of the hoof wall, and erosions, ulcers or scars in the rumen

The OIE will periodically update the OIE Technical Disease Cards. Please send relevant new references and proposed modifications to the OIE Scientific and Technical Department (scientific.dept@oie.int). Last updated October 2009.