Equine Infectious Anemia

(*Swamp Fever, Mountain Fever, Slow Fever, Equine Malarial Fever, Coggins Disease*)

Equine infectious anemia (EIA) is a retroviral disease of equids that is often carried asymptomatically.

Etiology:

Equine infectious anemia is caused by equine infectious anemia virus (EIAV), a ***Lentivirus*** in the family **Retroviridae** (subfamily Orthoretrovirinae).

Epidemiology:

- EIA has been found nearly worldwide, absent from few countries including Iceland & Japan.
- Infection rate varies Geographic region (humid, swampy)
- Seroprevalence up to 70% on endemic farms
- Morbidity and mortality affected by: Virus strain and dose & Health of the animal

Transmission:

- Mechanical transmission
  - Mouthparts of biting insects (Horse flies, stable flies, deer flies)
- Fomites: Needles, Surgical instruments & Floats
- from a mare to her foal *(In utero):* Via milk, Venereal & Aerosol

Species Affected:

All members of Equidae affected**.** Clinical disease occurs in horses and ponies**.** Donkeys may be asymptomatic

Clinical Signs in Horses:

Clinical signs often nonspecific

- Fever, weakness, depression
- Jaundice, tachypnea, tachycardia
- Ventral pitting edema
- Petechiae, epistaxis
- Anemia (chronically infected animals)

Clinical Signs in Donkeys and Mules:

- Most recover and become carriers
  - Infections may become symptomatic again during times of stress
- Less likely to develop clinical signs
  - Can be infected (experimentally) with horse-adapted strains
- May develop clinical signs if infected with a donkey-adapted strain

Post Mortem Lesions:

- Enlarged spleen, liver, lymph nodes
- Pale mucous membranes
- Emaciation
- Edema
- Petechiae
- Usually no lesions in chronic carriers

Differential Diagnosis:

1. Equine viral arteritis
2. Purpura hemorrhagica
3. Leptospirosis
4. Babesiosis
5. Severe strongyliasis or fascioliasis
6. Phenothiazine toxicity
7. Autoimmune hemolytic anemia
8. Other causes of fever/edema/anemia

Laboratory Diagnosis:

- Serology
  - Agar gel immunodiffusion/ Coggins test (Horses may be seronegative for first 2-3 weeks post-infection
  - ELISA: Can detect antibodies earlier, More false positive occur
- RT-PCR
  - Good for foals with maternal antibodies (up to 6-8 months of age)
  - Used to confirm serological tests

➢ **IMMEDIATELY notify authorities in positive cases**

Prevention and Control:

1. Control programs
   - Most require testing:
     - Before entry of horses into the state
     - Before participation in organized activities
     - Before sale of horse
2. Lifelong carriers
   - Must be permanently isolated or euthanized
   - Transport limited
3. Vector control
4. Separate herds of susceptible animals
5. Clean and disinfect

No vaccine available

Schmallenberg Virus (SBV) Infection

Schmallenberg Virus (SBV) is a new emerging livestock disease that has been detected in a number of EU countries. The virus affects cattle, bison, sheep and goats.

The disease has mostly been recognized in small ruminants around the time of parturition, with offspring showing signs of brain damage or malformations.

Etiology: Family: *Peribunyavirida,* Genus: *Orthobunyavirus,* Species: *Schmallenberg virus*

Epidemiology & Transmission:

1. This disease is vector borne i.e. it is spread from animal to midge to animal. .
2. Midges can carry (mechanically & biologically) massive quantities of virus which they inoculate into sheep and cattle when feeding.
3. Environmental temperature influences the speed at which midges develop.
4. Wind – influences geographical spread of midges on a daily basis
5. Availability of host (cattle, sheep, other species) – Density of animals in a geographical area and the species mix.
6. In animals – the virus is known to persist over long periods in certain tissues in infected animals including the lymph nodes, spleen and testes

Pathogenesis:

- After an animal becomes infected by a virus-vector midge, a viremia develops which lasts 2-5 days.
- After an incubation period of 1 to 6 days, the animals may or may not develop clinical signs with recovery over a 2-7 day period.
- These virus-induced acute lesions lead to progress the vacuolation to **porencephaly** and **extensive tissue destruction**.
- M**uscular hypoplasia** observed in SBV-infected lambs is mostly secondary to **central nervous system damage**.

Symptoms: Manifestation of clinical signs varies by species:

Adult cattle - Probably often inapparent, but some acute signs during the vector-active season:

- Fever
- Impaired general condition
- Anorexia
- Reduced milk yield (by up to 50 per cent)
- Diarrhea
- Recovery within a few days for the individuals, two to three weeks at the herd scale

Malformed animals and stillbirths (calves, lambs, kids)

- **Arthrogryposis (abnormal joints)**
- **Hydrocephaly (build up of fluid in skull)**
- **Brachygnathia inferior (overshot jaw)**
- **Ankylosis (stiff joints)**
- **Torticollis (twisted neck)**
- **Scoliosis (deformed spine)**

Diagnosis: Diagnosis can be based on:

- Clinical signs - Deformities are fairly distinctive for this disease though they do not provide a definitive diagnosis
- Viral antigen can be detected by PCR
- Serology - An ELISA test for antibodies is available

Differential Diagnosis in calves:

1. Bovine virus diarrhea virus (BDVv) - present at birth.
2. Intracranial hemorrhage as a consequence of dystocia - present at birth.
3. Hypoxia as a consequence of dystocia - present at birth.
4. Bacterial meningitis - appears at 3-7 day-old

Differential Diagnosis in lambs:

1. Congenital swayback- present at birth.
2. Border disease- present at birth.
3. Toxoplasmosis - present at birth.
4. Intracranial hemorrhage as a consequence of dystocia - present at birth.
5. Hypoxia as a consequence of dystocia - present at birth.
6. Dandy-Walker syndrome - present at birth.
7. Starvation/exposure/hypothermia - occurs from 6-12 hour-old
8. Septicemia - appears at 1-3 day-old
9. Bacterial meningitis - appears at 3-7 day-old

Prevention: There is no treatment available for Schmallenberg infection

- Little can be done to control vector borne diseases.
- Control of midge populations during the vetor-active season may decrease the transmission.
- It is important that strict hygiene measures are carried out during assisted lambings and calvings.
- Embryotomy (dissection and removal of a fetus that cannot be delivered naturally) should only be carried out on dead fetuses by operators competent to carry out the procedure.