

Foot and Mouth Disease

The Virus

- Picornaviridae, *Aphthovirus*
 - 7 distinct serotypes
 - Not cross protective
- Cloven-hoofed animals
 - Two-toed
- Inactivation
 - pH below 6.5 and above 11
- Survives in milk, milk products, bone marrow, lymph glands

Morbidity/ Mortality

- Morbidity 100% in susceptible animal population
 - U.S., Canada, Mexico, others
- Mortality less than 1%
 - Higher in young animals and highly virulent virus strains
 - Animals generally destroyed to prevent spread

Transmission

- Respiratory aerosols
 - Travel long distances
 - Proper temperature and humidity
- Direct contact
 - Vesicular fluid
 - Ingestion of infected animal parts
- Indirect contact via fomites
 - Boots, hands, clothing

Clinical Signs

- Incubation period: 2 to 14 days
- Fever and vesicles
 - Feet, mouth, nares muzzle, teats
 - Progress to erosions
- Lameness,
reluctance to move,
sloughing of hooves
- Abortion
- Death in young animals

Clinical Signs: Cattle

- Oral lesions (vesicles)
 - Tongue, dental pad, gums, soft palate, nostrils, muzzle
 - Excess salivation, drooling, nasal discharge
- Lethargy, loss of body condition
- Teat lesions
 - Decreased milk production
- Hoof lesions
 - Interdigital space
 - Coronary band
 - Lameness
 - Reluctant to move

Clinical Signs: Pigs

- Hoof lesions
 - More severe than in cattle
 - ✓ Very painful
 - ✓ Coronary band, heel, interdigital space
 - Lameness
- Snout vesicles
- Oral vesicles less common

Clinical Signs: Sheep and Goats

- Mild, if any
 - Fever
 - Lameness
 - Oral lesions
- Makes diagnosis and prevention of spread difficult

Post Mortem Lesions

- Single or multiple vesicles
- Various stages of development
 - White area, 2mm-10cm
 - Fluid filled blister
 - Red erosion, fibrin coating
- Dry lesions
- Sloughed hooves
- Tiger heart

Differential Diagnosis

- Swine
 - Vesicular stomatitis
 - Swine vesicular disease
 - Vesicular exanthema of swine
- Cattle
 - Rinderpest, IBR, BVD, MCF, Bluetongue
- Sheep
 - Bluetongue, contagious ecthyma

Clinical Diagnosis

- **Vesicular diseases are clinically indistinguishable!**
- Suspect animals with salivation or lameness and vesicles
- Tranquilization may be necessary
- Laboratory testing essential

Laboratory Diagnosis

- Initial diagnosis
 - Virus isolation
 - Virus identification ELISA, RT-PCR, complement fixation
- Serology
 - ELISA and virus neutralization

Treatment

- No treatment available
- In outbreak:
 - Quarantine
 - Euthanasia
 - Disposal

Vaccination

- Killed vaccine, serotype specific
- Monitor disease outbreaks worldwide
- Stock active serotypes and strains
- Essential to isolate virus and identify the serotype to select correct vaccine
- But, vaccine may be used in an outbreak
- Vaccination issues
 - Annual re-vaccination required
 - ✓ Costly, time consuming
 - Does not protect against infection, but reduces clinical signs