



Michigan Emergency Veterinary Network

*Frontline Guardians of
Michigan's Animal Health*

Michigan Department of Agriculture
College of Veterinary Medicine, MSU
Michigan Veterinary Medical Association
Michigan Department of Community Health
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Foot and Mouth Disease (FMD, Aftosa)

OIE List A Disease

USDA Agent of High Consequence

State of Michigan Reportable Disease

Importance

FMD is a highly contagious viral disease of cloven-hoofed animals that can rapidly spread throughout an area. A quick response is vitally important in containing an outbreak of FMD. State and Federal veterinarians should be immediately informed of any suspected vesicular disease. Severe economic loss and international trade embargoes can result from an outbreak of FMD.

Etiology

The FMD virus is in the family Picornaviridae, genus Aphthovirus. There are 7 distinct serotypes and over 60 subtypes. The virus is fairly hardy. It can survive regular pasteurization procedures, but is inactivated with ultra high pasteurization. The virus can also survive freezing in tissues and drying when in organic material, such as serum. It can remain active for days to weeks on organic rich material in moist, cool conditions. It is inactivated on dry surfaces and by sunlight. FMD virus can survive for 24 hours in the human respiratory tract.

Species affected

FMD primarily infects cloven-hoofed animals, including cattle, pigs, sheep, goats, cervids, and water buffalo. Other susceptible species include hedgehogs, armadillos, nutrias, elephants, capybaras, rats, and mice.

Geographic distribution

The FMD virus is distributed worldwide, and is endemic in Asia, Africa, Middle East, and parts of South America. The United States has been free from FMD since 1929. North America,

Central America, Australia, New Zealand, Chile and parts of Europe are also considered to be free of the disease.

Transmission

Transmission occurs through respiratory aerosols, and direct and indirect contact with infected animals.

Aerosol transmission has occurred from bulk milk trucks and the human respiratory tract. Feeding of infected animal products can transmit the virus by direct contact. Indirect transmission of the disease can result from exposure to contaminated objects such as boots, hands or clothing. The disease can also be transmitted by artificial insemination, contaminated biological and hormone preparations.

Sheep and goats are considered maintenance hosts; they have mild disease and the diagnosis may be delayed allowing time for spread of the virus. Pigs are considered amplifying hosts because of the higher concentration of virus particles in aerosols when compared to other species. Consequently, in pigs the disease spreads rapidly. Cattle are considered indicators of the disease because they are generally the first species to show signs of infection; their lesions are more severe and progress more rapidly.

Cattle can carry the FMD virus in their pharyngeal tissues for long periods – they can be healthy carriers for 6 to 24 months. Sheep can be carriers for 4-6 months. Pigs are not carriers.

Incubation period

The incubation period is 3-5 days for animals in contact with clinically infected animals, and 1-3

days for pigs fed contaminated feed. The peak time of shedding of virus and transmission usually occurs when vesicles rupture.

Clinical signs

Consider FMD in animals with concurrent salivation and lameness with vesicular lesions. The vesicles progress to erosions, and are seen in the mouth, nares, muzzle, feet, and teats. Other clinical signs are fever, depression, anorexia, excessive salivation, serous nasal discharge, decreased milk production, lameness, and reluctance to move.

Post mortem lesions

Single or multiple vesicles from 2 mm to 10 cm are seen on the mouth, nares, muzzle, feet, and teats. The vesicles may be in any stage of development. Ruptured vesicles leave a red eroded area that is then covered with gray fibrinous tissue. Coronary band lesions are similar, the skin and hoof separate and a line of coronitis appear on the hoof. Pigs may lose a hoof. There may be gray or yellow streaking of the myocardium secondary to necrosis called "Tiger heart".

Morbidity and mortality

Morbidity can be 100% in susceptible populations, however mortality is generally less than 1%. Mortality is increased in younger animals and with more severe strains

Diagnoses

The diagnosis of FMD should be suspected in any animal with vesicles in the mouth, especially if the animal is lame. Suspect animals should be immediately quarantined and state or federal authorities notified. Diagnosis of the index case is made by virus isolation. Subsequent cases can be diagnosed by ELISA or complement fixation.

Differential diagnosis

An index of suspicion must be maintained with any vesicular disease. Differential diagnosis includes vesicular stomatitis, swine vesicular disease, vesicular exanthema of swine, foot rot, chemical and thermal burns, blister beetle toxin and trauma. In cattle, oral lesions in the later stages may resemble rinderpest, IBR, BVD, malignant catarrhal fever and blue tongue.

In sheep, later oral lesions can resemble blue tongue, contagious ecthyma, lip and leg ulceration.

Laboratory tests

FMD can be diagnosed by virus isolation, ELISA, or complement fixation. Virus isolation and identification must be done on the initial case; subsequently antigen and nucleic acid detection can be used to diagnose additional cases.

Samples to collect

Notify authorities prior to collecting and shipping samples.

Vesicular fluid, epithelial covering of vesicles, esophageal-pharyngeal fluid, blood, and serum can be used.

Biosecurity

Notify authorities if FMD is suspected. Quarantine premise. A quick response is essential for containment of the outbreak. Strict biosecurity protocols should be followed for individuals entering a premise suspected or known of having FMD. Because the virus can remain viable and reside in the human respiratory tract for 24 hours, humans exposed to FMD should not visit clean livestock facilities within 2 days of exposure. State of Michigan standard is 5 days.

Public health

FMD rarely infects humans and the disease is not considered a public health problem.

Bioterrorism potential

The FMD virus can be easily spread among livestock, and an outbreak could occur by feeding pigs infected meat. As evidenced by the outbreak in the UK, the disease can cause high morbidity and significant economic, social and political upheaval.

Other information

When suspicion of FMD is reported to state or federal authorities, a specially trained foreign animal disease diagnostician is sent to the suspect farm as soon as possible (within a few hours).

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