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Diseases of Bovine

Part -1

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Summary:

Foot-and-Mouth Disease (FMD)
(Aphthus Fever)

Definition

Foot-and-mouth disease (FMD) is a highly contagious viral disease of many wild and domestic cloven-footed mammals and many other animals. Is clinically characterized by :
-fever -ropy salivation -vesicle formation in oral cavity , interdigital space & coronary band

Occurrence

A wide range of wild and domestic animals, especially cloven-footed mammals, are susceptible to FMD. Horses are resistant, a fact useful in differential diagnosis. The disease occurs in most countries with a large livestock population unless those countries have eradicated it and maintained their disease-free status. In countries where FMD occurs endemically and pigs are present in large numbers, swine frequently are infected. All age groups are susceptible.

Etiology

An Aphthovirus of the family Picornaviridae causes FMD. There are at least seven immunologically distinct types of virus: A, O, C, South African Territory (SAT) 1, 2, 3 and Asian 1. Among the seven types, one particular antigen (virus infection-associated antigen [VIA]) is group reactive and useful in serologic diagnosis of FMD infection.

Over 60 subtypes of virus have been identified and new subtypes continue to develop. Many differ enough antigenically to require preparation of subtype vaccines for their control. The antigenic variation of the virus and the limited cross protection among strains has made it impossible to prepare a single vaccine that protects satisfactorily against all strains. Effective disinfectants of FMD virus include sodium hydroxide, acetic acid, sodium carbonate .

Pathogenesis

Foot and mouth disease virus adheres to the mucosa of the respiratory tract, the usual site of virus entry. Macrophages are believed to transport virus to secondary sites that include epithelium, mucosa and myocardium. In secondary sites, the virus replicates, then a marked viremia develops and the virus infects epithelium at many other sites. Within a few days vesicles develop, usually at sites of mechanical stress. In swine, common vesicle sites include the snout, mouth, tongue, and especially the feet. In cattle, the FMD virus affects the mammary gland epithelium and virus is shed in milk for a prolonged period. Although unproven, similar shedding may occur in swine.

The lesions of the major vesiculating viral diseases are similar. Vesicles develop in the epidermis, and the epithelium over the vesicle soon sloughs. Enough of the stratum basale is preserved to regenerate the epidermis unless there is secondary infection of the lesions. Secondary infection occurs on the feet of some swine and leads to chronic lameness.

The FMD virus often causes severe myocardial necrosis in neonatal and young pigs. This often leads to sudden deaths from myocardial failure.

The mottled myocardial lesions sometimes are referred to as "tiger-heart" lesions and are useful in diagnosis.

Clinical signs

1- high fever (40-41 °c) , depression , anorexia vesicle formation on oral M.M→ ropy salivation
2- vesicle of 1-2 cm , on M.M of mouth , dorsal aspect of tongue , dental pad , muzzle , udder , teat , in the interdigital space & coronary band.
3- An incubation period of one to five days, the body temperature return to normal after rupture of vesicle.
4- the vesicle → rupture within 24 hr → leaving painful raw erosion → heals within 4 week (may be complicated by secondary bacterial invasions)

5-severe lameness

6-in calves , lambs → sudden death without any previous signs (due to myocardial necrosis).

Signs develop rapidly and morbidity rapidly increases. Mortality usually is less than 5% but there can be higher mortality in young animals.

Lesions

Well-developed vesicles and bullae are soon apparent. They are frequently present on the snout, behind the rim of the snout, in the nares, on the tongue and lips, and on the soft tissues of the feet, including the coronary band, the bulbs of the toes and interdigital clefts. Lesions probably are more common on the feet than in the mouth. Less often the lesions are on the vulva, the teats of lactating sows, or the scrotum of boars. Extensive lesions on the coronary band may lead to sloughing of the hoof and lameness. Foot lesions may involve one or more of the feet. Vesicles usually rupture within 24 hours and the superficial epidermis sloughs to reveal hyperemia and hemorrhage on underlying tissue. Uncomplicated lesions usually heal within two weeks. In a virulent form of FMD, young pigs, and sometimes older animals, may have extensive

mottled areas of myocardial necrosis on ventricles and in papillary muscles.

Diagnosis

Diagnosis cannot be made reliably on the basis of clinical signs and lesions since they are similar in all the vesicular viral diseases of swine. The state veterinary office should be contacted immediately if an outbreak is suspected. Differential diagnosis of vesicular viral diseases should only be completed in specifically-designated laboratories having specific arrangement to safely handle exotic disease organisms. Plans must be made for collecting and mailing specimens. The Foreign Animal Disease Diagnostic Laboratory (FADDL), Plum Island, NY, often does the diagnostic work. 4

Diagnostic techniques used include serologic tests to identify FMD virus infection-associated antigen (VIA), complement fixation (CF) and enzyme-linked immunosorbent assay (ELISA) tests to detect FMD viral antigen, virus isolation (VI) and neutralization (VN), electron microscope (EM), and animal inoculation studies. Polymerase chain reaction (PCR) tests have been developed and are frequently utilized. FMD must be differentiated from all other vesicular viral diseases and from other diseases that cause erosive/ulcerative lesions in the oral cavity. Positive diagnoses usually require less time than negative diagnoses. An ELISA is available that can differentiate antibody titers from infected versus vaccinated animals but is not yet officially recognized by many countries.

Differential Diagnosis

 a-from disease cause vesicular lesion as :

-vesicular stomatitis → affect horse while FMD not affect horse

 b-from mucosal disease complex as :

- Mucosal disease (MD)
- Rinder pest (RP)
- Malignant cattarral fever (MCV)
- Infectious bovine rhinotracheitis (IBR)

 c-from herps complex as :

- Bovine papular stomatitis
- Cow pox
- bovine mammalitis

 d- from disease cause lameness as:

- foot rot
- bovine emphemeral fever. 5

Rinderpest (Cattle plaque)

Rinderpest is an acute, highly contagious with high mortality up to 100%, viral disease of cattle, domesticated buffalo and some species of wildlife. The classical form of rinderpest is one of the most lethal diseases of cattle, and can have a terrible effect on naïve herds . clinically Characterized by erosive stomatitis & diarrhea with high mortality & high morbidity rates.

Etiology

Rinderpest results from infection by rinderpest virus, a member of the genus Morbillivirus of the family Paramyxoviridae.

Incubation Period

The incubation period for rinderpest ranges from 3 to 5 days. The virulence and dose of virus and the route of exposure affect the incubation period

((morbidity and mortality rates up to 100%. During the early stage of the outbreak))

Clinical signs

1- per acute form → high fever , dullness & depression , death within 2-3 days (before mucosal erosions).

2- acute (classical) form →

a- sudden fever , lacrimation , serous nasal discharge +

congestion and mucosal erosions

b- after 2-5 days → raised pin point gray (white) necrotic foci on M.M of mouth → ↑in size & number → coalesce → caseous plagues → detached → leaving raw red erosions , the lesion appear on ventral aspect of tongue , dental pad & lips.

C-profuse salivation 6

D-purulent occular & nasal discharge
E-profuse watery diarrhea (appear 2-3 days of ↓ of fever)
((death after 6-12 days after onset of fever)).

Post Mortem Lesions

In the classical form of rinderpest, the carcass is often dehydrated and emaciated, and shows evidence of diarrhea and mucopurulent nasal discharges.

The eyes may be sunken. Depending on the stage of the disease and strain of the virus, congestion, pinhead or larger gray necrotic foci, or extensive necrosis and erosions may be seen in the oral cavity.

Necrotic areas are sharply demarcated from healthy mucosa. In some cases, the necrotic lesions extend to the soft palate, pharynx and upper esophagus.

Necrotic plaques are occasionally found on rumen. erosions and hemorrhages may be seen in the omasum. Severe congestion, petechiation and edema may be found in the abomasum, particularly in the pyloric region.

White necrotic foci may be seen in Peyer‟s patches; necrosis, erosions and sloughing can be seen in the adjacent areas.

The small intestine is otherwise unaffected. In the large intestine, blood and blood clots may be found in the lumen, and edema, erosions and congestion may be seen in the walls, particularly in the upper colon.

The ileocecal valve, cecal tonsil and crests of the longitudinal folds of the cecal, colonic and rectal mucosae can be greatly congested in animals that die acutely, and may be darkened in more chronic cases, a lesion known „zebra striping“.

The lymph nodes are usually enlarged and edematous, and the spleen may be slightly larger than normal. Petechiae and ecchymoses may be found in the gall bladder, and emphysema, congestion and secondary bronchopneumonia are sometimes present in the lung 7

Differential Diagnosis

 a-from disease cause erosive stomatitis & diarrhea as:

*Malignant catarral fever (MCV)
*Bovine viral diarrhea-Mucosal disease complex (BVD-MD)
*Infectious bovine rhinotracheitis (alimentary form) (IBR).

 b-from disease cause oral lesion without diarrhea as:

*FMD
*Bovine papular stomatitis
*Blue tongue (in sheep & goat).

 c-from peste des petits ruminants (PPR) → affect goat & sheep but cattle are resistant

*very bad prognosis due to high mortality rate 8

Malignant catarrhal fever (MCF)
Head Catarrh, Gangrenous Coryza, Catarrhal Fever, Snotsiekte

Malignant catarrhal fever is an infectious disease of ruminants

Malignant catarrhal fever (MCF) is caused by several viruses in the genus Rhadinovirus of the family Herpesviridae (subfamily Gammaherpesvirinae). The specific serotype varies depending on species and geographic distribution

Carrier species (sheep, and goats) are asymptomatic, and morbidity involving other species is generally low. In the last 30 years, outbreaks have had morbidity ranging from 30 to 40% and are usually associated with the source animal remaining on the premises. Water buffalo, farmed deer, have low mortality rates, around 1%. Mortality rates can reach 100% in animals with clinical signs, domestic cattle, with the highest incidence in those between 6 months and 4 years of age.

Transmission

- In utero
- Contact with nasal and ocular secretions
- Aerosols during close contact

Clinical Signs

Incubation period 9 to 77 days

Initial clinical signs

Depression, diarrhea, disseminated intravascular coagulation DIC, dyspnea, high fever, inappetence and Sudden death.

Some animals are subclinically infected and develop disease when they become stressed 9

MCF can take four clinical forms in cattle.

 First is the **peracute form** in which sudden death can occur.

 Second is the **head and eye form**, which is the most common in cattle. It progresses through the early signs of fever, reddened mucosa, and enlarged prescapular lymph nodes. Eventually the lesions become necrotic and death can occur.

((In the early stages of the head and eye form, this disease can cause conjunctivitis, reddened eyelids, and bilateral corneal opacity, as well as serous or thick nasal discharge, crusty muzzles and nares, open-mouthed breathing, and salivation)).
((In the later stages of the head and eye form, cattle may have areas of erosions on the buccal mucosa, and necrosis and hyperemia in the oral cavity. The skin can ulcerate, and hardened scabs form on the perineum, udder, and teats)).
((Joints and superficial lymph nodes may swell, and the horn and hoof coverings may slough in some animals. Finally, some animals exhibit nervous signs, such as incoordination, head pressing, nystagmus, and hyperesthesia)).

 Third is the **intestinal form** which has the same early signs as the head and eye form, but the animal dies of severe diarrhea before the lesions become necrotic.

 The fourth form is **mild** and only occurred in cattle that were experimentally inoculated with an attenuated virus and recovered. Deer and antelope may have minimal lesions or be less specific than cattle or bison, but many of the same signs occur.

Post Mortem Lesions

Malignant catarrhal fever is characterized by inflammation and epithelial necrosis, with lympho-proliferation, infiltration of nonlymphoid tissues by lymphoid cells, and vasculitis,

• Diffuse or focal bilateral corneal opacity is common, and corneal ulcers are sometimes present

• Erosions on the tongue and soft and hard palate

• Necrotic areas in the omasal epithelium

• Multiple erosions of intestinal epithelium

• Greatly enlarged lymph node compared to normal

• Necrotic areas in the larynx , Diptheritic membrane often present

• Urinary bladder mucosa hyperemic and edematous

• Prominent raised white foci, 1-5 mm in diameter, may be seen in some tissues, particularly the cortex of kidney. These nodules are sometimes surrounded by a thin hemorrhagic zone

Differential Diagnosis

• BVD mucosal disease

• Bluetongue

• Rinderpest

• FMD

• Vesicular stomatitis