



Bovine Virus Diarrhoea - Mucosal Disease (BVD-MD)

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Bovine Virus Diarrhoea (BVD) and Mucosal Disease (MD) are caused by a pestivirus. There are a number of different strains of pestivirus. Some of these viruses are aggressive (virulent), others are mild, but the mild strains are still an important factor in the development of MD.

The virus is widespread in cattle herds worldwide and locally. Herds become infected by contact with infected animals, especially with so-called carrier animals. Artificial insemination and embryo transfer can spread pestivirus. Although cattle are the primary hosts, pigs, sheep, alpacas and wild ruminants such as deer may also carry the virus.

Pestivirus infection can cause diarrhoea, fever, abortion and reduced fertility. Calves may be born weak and stunted calves. They may also be born with brain and eye abnormalities. Lesions (wounds) on nose and mouth (which can look similar to healing foot-and-mouth disease lesions) as seen in Figure 1 are typical signs of infection

What happens if a herd becomes infected?

If otherwise healthy, non-pregnant cattle become infected with any strain of the virus for the first time, they may develop a fever, general depression and diarrhoea. Many of animals do not become ill following infection, however if mating or artificial insemination (AI) takes place, the cow is not likely to get in calf.

This type of infection is usually, but not always, mild and self-limiting. This is the typical picture of **BVD**. Affected animals get rid of the pestivirus and build up strong immunity against a repeat infection with most strains of the virus.

If a pregnant cow becomes infected, the cow herself is affected in the same way as a non-pregnant animal. The unborn calf (foetus) is aborted or survives with or without permanent damage, depending on the age of the unborn calf at the time of infection.

A viral infection of a calf still in the womb may escape the normal resistance of a healthy immune system. If infection occurs in the first half of pregnancy, the immune system is too immature to recognise the virus as an invader. The unborn calf does not recognise the difference between itself and a germ such as a pestivirus.



Figure 1. Calf displaying ulceration of muzzle and gums (A typical sign of BVD infection)

The virus is able to sneak under the guard of the developing immune system which does not fight the virus. Because of this, the virus can multiply and exist in the animal undisturbed.

Such a persistently infected (PI) animal shedding large amounts of virus is called a **carrier**.

After birth, these (PI) calves exposed to the virus during the first half of pregnancy can show the following:

- no signs of disease, weakness, poor development
- deformities of one or both eyes, such as white structures inside the eye, abnormal eye movement etc.
- Brain or skeletal deformities which might make it impossible for the calf to stand, drink and behave normally.

If a calf is exposed to BVD-MD virus during mid to late pregnancy, the immune system of the unborn calf is generally able to fight off the virus.

The calf is likely to develop good immunity and be born healthy and strong.



Figure 2. Ulceration of gum due to BVD infection.

What is a carrier or persistently infected animal?

Carriers are cattle that have been infected during early foetal life (approximately the first half of pregnancy). They may not show symptoms for years. The fact that carriers tolerate the virus in their body has several important consequences:

- they shed large amounts of pestivirus, infecting other animals,
- they pass the virus onto their unborn calves, creating more carriers,
- they do not form antibodies against pestivirus (blood tests looking for antibodies will not identify these animals as infected). It is necessary therefore to look for virus to identify these persistently infected cattle.
- should carriers become infected with a second, more aggressive strain of pestivirus, their immune system is not able to fight it and this additional infection leads to **Mucosal Disease** (MD) which is generally fatal.

What is Mucosal Disease?

Mucosal Disease results when pestivirus carriers are infected with a second, more aggressive strain of pestivirus. Most carriers develop MD within the first two years after birth. The infection takes a dramatic and eventually fatal course including:

- severe diarrhoea and high fever
- lesions on nose, mucosa of mouth and sometimes on the feet
- emaciation, death

There is no specific treatment for MD.

Cases of MD are far less common than the usually mild first-time BVD infections.

How is BVD-MD diagnosed?

Any of the aforementioned signs of illness may indicate a possible BVD infection. A recent introduction of pestivirus into a herd is more likely to infect cattle resulting in such signs, compared to ongoing presence of virus in a herd.

Blood testing for antibodies against pestivirus helps to determine whether the virus has ever affected the herd. If a recent infection is suspected, a second blood test can be run a few weeks later. By comparing the level of antibodies in the two blood samples, it is possible to

determine if the immune system of the animals has recently been challenged by pestivirus.

Carriers do not show up in this test because their immune system does not produce antibodies against the virus. Carriers can be identified by tests for the presence of the virus itself.

How do I reduce or manage infection in my herd?

Carrier calves are the main source of infection for other cattle. These persistently infected calves may be infected on the property or introduced from outside herds.

It is important that cattle are exposed to pestivirus before pregnancy or not at all. This can be achieved by removing all carriers from the herd, exposing heifer calves to carrier animals well before they become pregnant or vaccination against pestivirus. The heifers develop immunity and protect any future offspring. Mixing carriers with calves can be impractical in some farm operations and there is a great risk of transmitting other diseases such as Johne's disease.

A Pestivirus vaccine for Australian cattle has been recently made available. It consists of several inactivated strains of the BVD-MD virus.

Vaccination can provide an important method of disease control in the management of BVD-MD infection.

There are also many tests to assist in identifying the level of BVD-MD infection in a cattle herd.

A blood test can identify antibodies to the virus indicating a prior (temporary) infection. It is also possible to test for the presence of the virus in carrier animals.

A bulk milk test is currently available overseas to detect BVD-MD infection in dairy herds

Special care should be taken to ensure that female carriers are not involved in an embryo transfer program and male carriers are not used for natural service or artificial insemination.

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