



Rochester Veterinary Practice 72 Lowry Street, Rochester, Vic, 3561, Ph: (03) 54 84 22 55, email: admin@rochyvet.com.au

Bovine Viral Diarrhoea Virus (BVDV)/ Pestivirus

Overview

As the name suggest, Bovine viral diarrhoea virus (BVDV) or Pestivirus is a viral disease of cattle. The viral infection can impact the dairy herd in the form of reduced reproductive performance (abortions, embryonic loss and persistently infected calves (PI)), reduced milk production (mastitis and increased somatic cell counts) and impacts on calf health and performance.

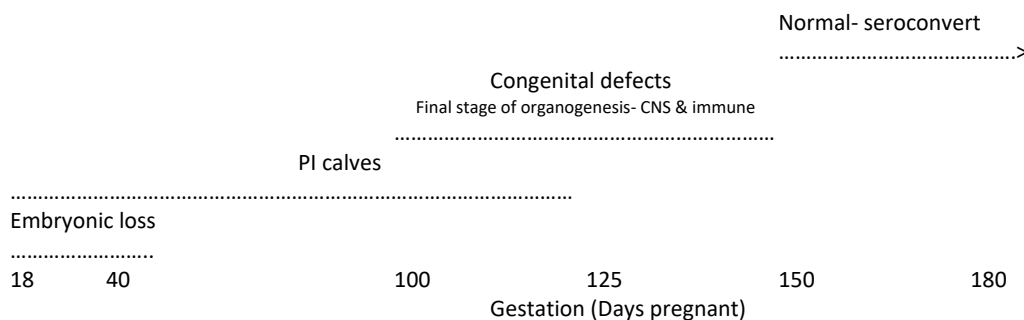
Infected cattle shed the virus in all secretions and excretions from the body. It is most commonly transmitted from persistently infected (PI) animals to other cattle, causing a transient infection. However, transiently infected animals can spread the virus to other animals that are naïve to the virus but are only infections for a couple days.

Transient infections in non-pregnant cows, heifers, bulls and young stock generally goes unnoticed, however some animals may develop diarrhoea and have reduced milk production (lactating cows) for a short period (days to a week). These animals recover from the viral infection and will be immune to reinfection for an extended period of time.

The virus is a major concern for pregnant animals. Depending on the stage of pregnancy a cow or heifer gets the virus, it may:

1. Experience early embryonic loss (approximately 18-40days in gestation)
2. Produce a calf with birth defects (approximately 95-150days in gestation)- brain defects (calf that cannot stand or wobbly on its feet), eye defects and cataracts
3. Produce a Persistently infected (PI) calf (approximately up to 125days in gestation)- calf remains persistently infected for life because the calf’s body recognises the virus as self and will shed the virus and infect other cattle
4. A normal calf (Approximately 150 days and greater gestation)- The calf has be able to mount an immune response to the virus and clear the virus (this will not be a PI calf).

It should be noted the mother recovers from the viral infection.



Therefore, the disease may present in some dairy herds as:

1. Reproductive failure (low percentage of animals in-calf, high number of late calvers)

2. Calves with birth defects
3. A number of PI calves in that calving group

As persistently infected calves are immunosuppressed, they likely breakdown with the cytopathic form of the disease (mucosal disease) and die or die from other infections (respiratory disease etc) before adulthood. Approximately 50% die within the first 12 months of life and the remaining 50% in the next 12 months of age. However, some animals can survive and go on to become breeding animals (bulls or milking cows). These animals that survive will always produce PI offspring (Only 10% of all PI animals are from a PI mother).

Economic Impact of BVDV in Dairy Herds

Infected herds experience some ongoing financial losses from BVDV due to the impact on reproductive performance, calf health and cow immunity, compared to herds remaining uninfected. Despite this negative effect on productivity, it is difficult to identify the physical or financial losses from BVDV. This is partly because infection of animals outside the vulnerable stage of their reproductive cycle typically causes few obvious signs. The impact of BVDV on a small proportion of animals within a herd is easily lost in the background “noise” caused by many other factors that result in variations in milk production, reproductive performance, disease levels and overall profitability.

The reduction in profit due to BVDV in seasonal and split calving herds on average over the long term is small and much smaller than long term losses from mastitis, reduced fertility and suboptimal nutrition in most herds.

BVDV can occasionally produce severe outbreaks, with many fetuses becoming infected and many PI calves born over a short period. This happens when the virus enters a group at a time when most females are immunologically naïve and at the vulnerable stage of the reproductive cycle.

Economic modelling has shown that over the long-term, control of BVDV in seasonal and split calving dairy herds returns minimal extra profit on average. This is because extra returns arising from controlling BVDV usually only offset the extra costs of the control program.

How to determine your herds BVDV status

Outlined below are possible ways to determine the BVDV status of the different classes of stock on the farm. The results of the initial screening will dictate the process moving forward (either

Screening the milking herd:

Performing a bulk milk antibody test on the milking herd. This test can provide an estimation on proportion of the herd that has been exposed to the virus and the likelihood of a PI being in the herd. Examples include:

- An S/P ratio result of <0.25%- the herd is considered naïve to the virus
- An S/P ratio result of >0.25 and < 1.0 – a high proportion of the herd have been exposed to the virus
- An S/P ratio result of >1.0 - a high proportion of the herd have been exposed to the virus and 40% of herds with this result have a PI present in the herd*

*A Bulk milk tank PCR test can be used to determine if a PI is in the herd.

Screening replacement heifers (greater than 8 months of age)

Blood samples can be taken to assess the level of exposure in the heifer group. Generally 12 random samples are required. Proportion of heifers exposed will determine if further investigation is required (look for a PI) or whether vaccination is required. For example:

- If 90% of the heifers are positive for exposure, it is recommended to ear notch the group to find a PI animal.
- If >50 and <90% exposed, it is recommend to re-bleed the heifers in 1 months' time to see if exposure level increase or remains the same.
- If <50% are exposed, vaccination of the heifer group is recommended.

Screening replacement heifers (less than 8 months of age)

Blood samples for antibodies are unreliable for heifers less than 8 months of age due to the mothers antibodies circulating in the blood stream of the calf from colostrum.

These animals could be ear notched- a small sample of ear tissue is taken and a tested for the presence of the virus in that calf. This test will determine if the calf if a PI animal or not.

Screening bulls

All bulls should be ear notched.

BVDV Management programs

Aimed at detecting persistently infected (PI) animals, culling them and introducing biosecurity measures

Management options include:

1. Do nothing

- Infection will remain in herd and continual losses will be experienced

2. Use PI animals as vaccinators (NOT RECOMMENDED)

- Incurs the risk not all animals will be 'vaccinated'
- Welfare concern for the PI animal

3. Attempt eradication ('test and cull')

- Search for PI and eliminate them from the herd
 - o Options:
 - Collect blood from all animals and test
 - Ear notch all animals
 - Bulk milk test PCR- looking for presence of PI--- if positive--- pool blood samples of lowest 15% producers (groups of 20 animals) --- if a group is positive--- ear notch a group--find the PI in the herd—Bulk milk test again to ensure all PI's removed--- All non-lactating animal will need to be tested (Bulls, dry cows, heifers and calves)

4. Implement a vaccination program

- An effective way of gaining immunity against the disease in the herd- Approximately 80% effective--- further vaccination is needed to maintain immunity
 - o Options:

- Vaccinate all breeding stock prior to joining- double vaccination (can be given 6 months apart) prior to joining in first year, then annually thereafter
- Vaccinate whole herd well before mating start- double vaccination in first year then annually
- Vaccinate only maiden heifers each year only

5. Implement an eradication program with a vaccination program ('test and cull' and vaccinate)

- Options:

- Whole herd screening
 - Ear notching all calves, all replacement heifers, all bulls and all non-pregnant animals
 - If animal is pregnant keep separate and test calf when born--- then if calf is negative--- dam is negative
 - Vaccinate all negative animals
- Begin control at the level of heifers
 - All heifers are PI tested (Ear notched) and vaccinated twice prior to joining
 - Ear notch all heifers and at the same time vaccinate--- any PI removed --- 2nd vaccination given 1 month later
 - Following year the next lot of heifers are managed in the same manner and the last year heifers receive a booster vaccination at a couple weeks prior to calving or a month before joining
 - Bulls should be tested in quarantine for 6 weeks prior to mating
 - In a number of years --- a completely vaccinated adult-PI free herd will be achieved- virus free assuming good biosecurity practices are in place

Risks of reintroduction

By eliminating the virus from your herd, you will eventually create a naïve herd. Therefore the herd will be at risk if the virus were to be re-introduced by over the fence contact with infected stock, contact at cattle shows and newly purchased stock that are infected. Vaccination based control programs will reduce the herds risk to re-infection.

References:

Dairy Australia, 2020, BVDV control guidelines for farmers. Accessed from:

<https://www.dairyaustralia.com.au/resource-repository/2020/07/09/bvdv-control-guidelines-for-farmers#.YG1b7egzbD4>

Dairy Australia, 2018, BVDV in Australian dairy herds. Accessed from:

<https://www.dairyaustralia.com.au/resource-repository/2020/07/09/bvdv-in-australian-dairy-herds#.YG1cLugzbD4>

Bergman E, n.d, Simple herd level BVDV eradication for dairy. Accessed from <http://swansvet.com/bvdv/resources/BVDV%20Dairy%20Booklet.pdf>

Shephard R, 2018, Modelling the impact of BVDV in Australian dairy farms, Dairy Australia.