BVD: some lessons learned but more to do

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Research indicates that a lack of understanding may be hampering the battle against bovine viral diarrhoea, and highlights the key role of the veterinary practitioner as a source of reliable information for clients

A recent Europe-wide study[1] among vets and farmers aimed to explore attitudes to bovine viral diarrhoea and generated some interesting and sometimes contradictory results. Given that regional data showing seroprevalence is fairly consistent throughout Europe (Table 1), the disconnect between understanding bovine viral diarrhoea (BVD) and how to control it between farmers and vets really highlights the importance of the veterinary practitioner working with their client to educate and inform.

Table 1: European seroprevalence data 2013.

Ireland:	**98%**
UK:	**90-95%**
Germany:	**60%**
France:	**60%**
Italy:	**62%**
Spain:	**80%**

The study showed that most vets (90 per cent) believe cattle should be vaccinated against BVD, yet use at farm level is highly variable, ranging from 10 per cent in Belgium to 36 per cent in the UK, with an EU average of 25 per cent.

It is estimated that approximately 40 per cent of dairy herds and 10 per cent of beef herds currently vaccinate against BVD virus using one of the two vaccines (Bovidec and Bovilis BVD) currently licensed for use in Ireland (www.animalhealthireland.ie/page.php?id=121).

Naturally, vaccination levels will vary in countries where either an established or new eradication programme is running, according to the guidelines of that programme. That said, many experts agree that surveillance coupled with persistently infected (PI) animal removal (in accordance with guidelines), supported by vaccination, offers a belt and braces approach, particularly when considering protecting stock. As immunity wanes, the role of vaccination needs careful consideration and suitable prominence both at national and individual farm level. There are many factors that affect this decision, ranging from risk of introduction to level of herd immunity, farm objectives and calving pattern.

KEY SIGNS OF BVD

According to the vets interviewed, abortion, diarrhoea and infertility are the most common clinical signs of infection. However, there was a wide range within this from country to country, with vets in France stating that mucosal disease is the most evident clinical sign while UK vets rated infertility most highly, Italian vets diarrhoea and Spanish vets abortion.

There were similar differences of opinion among the farmers that were questioned, although a wider range of signs of infection was mentioned. In general terms, abortion, diarrhoea and infertility were again the most commonly stated signs but additional observations such as malformations (France), respiratory signs (France, Germany, UK, Italy and Spain), early embryonic death (Germany, Belgium and Netherlands) and decreased milk production (Netherlands) were also frequently mentioned (Figure 1). Perhaps this goes to show that farmers are less sure and, while they appreciate the complexity of the disease, their understanding tends to be limited to their own or close neighbours' experience of an outbreak. Discussion groups are also very influential, with many producers enjoying sharing opinions and experiences in this format. Appreciating the level of confusion and misunderstanding in many farming sectors should act as a 'door opener' to the veterinary profession, which is possibly sometimes guilty of assuming a higher level of understanding than there really is. The theory of tag and cull is all very well, but the reality of eradicating this complex virus requires more in-depth and specific veterinary intervention. Getting time with clients to enter into a BVD control discussion is essential in order to support their herd health planning and BVD control.

It is most certainly the case that herds affected by BVD can show very different symptoms, and there is often a delay between virus exposure and the clinical effects. There is a common misconception that no PIs showing up on tissue testing means no BVD or risk of BVD; the reality isn't quite so straightforward. Obviously, this can further increase farmer belief that BVD is a complex disease. Without doubt, while the virus is relatively straightforward, its transmission is complex. But take a step back, and control and eradication is made up of four key pillars, which should form the basis of relatively straightforward vet-to-farmer discussions:

- Testing/surveillance
- PI removal
- Vaccination to protect stock
- Prevention of introduction of disease.

It can also prove useful to run through the list of small signals that could indicate the presence of BVD in a herd, especially in the reproductive system. Often, these are easier for the producer to put into the context of their own herd, so perhaps an opener for BVD discussions.

Table 2: Key BVD-related indicators.

Calf effects and losses due to:
· Abortions and premature births
· Stillbirths
· Birth of weak or dummy calves
· Congenital birth defects, especially hindbrain and eye-related
· Birth of small calves with poor growth rates
· Increased levels of calf diarrhoea and pneumonia associated with immunosuppression and secondary infections.

Accurate pregnancy diagnosis and re-scanning later in pregnancy can determine the level of resorptions or unseen abortion. For the seasonal calving dairy producer, the failure to deliver a live and viable calf in the right window can be catastrophic for the business. Rumbling poor fertility for these herds is unsustainable and should always be investigated. In the case of late abortions, where the foetus is seen, it can be useful to ask the farmer to note any identifiable deformities, as these can be a supporting clue that BVD is implicated. Ideally, following careful consideration of the risks and consequences, every farmer should have a conversation with their vet about preventing possible problems rather than waiting for the something to happen.

Most commonly, if BVD is the causal problem, these identifiable deformities may be:

- Misshapen head or neck area
- Malformed limbs
- Lesions on the skin
- Small body size
- Microphthalmia – 'small eye'; affects one or both eyes
- Blindness due to cataracts (cloudy lenses in the eye), non-functioning or detached retinas affecting one or both eyes.

Stock bulls are also a hugely underestimated risk in BVD transmission. Although a PI bull may be created in the same way as a PI heifer, bulls with acute, and therefore transient, infections may actually shed virus in their semen for several months post-infection. While this will not cause production of a PI calf directly, it may cause acute infection in the cow if not immune, and fertility will certainly be affected.

BVD IN A HERD

We all appreciate that BVD is particularly dangerous when infecting pregnant dams, but it is the time of the exposure that determines the outcome:

- At breeding – low conception rates and early embryonic death in the first month of gestation
- Days 42-100 of gestation – foetal death can occur
- Days 30-120 of gestation – if the foetus survives, it will result in a PI calf that becomes an ongoing source of infection to other cattle
- Days 100-150 of gestation – congenital defects/ abortion.

Vets and farmers have understood for a while that BVD causes direct damage to the embryo, resulting in early embryonic death and irregular returns. Later in pregnancy, it may cause foetal mummification and abortion. However, work has also shown that uterine inflammation and ovarian dysfunction may also contribute to cows taking a longer time to conceive, as well as failure to conceive.

More recent work suggests that this effect may be occurring much earlier than is often assumed. High antibodies consistent with BVD at 10 months of age have been associated with it taking 32 days longer time to conception when compared to heifers with low levels of BVD antibodies. There is also evidence that acute infection with BVD influences progesterone production during the oestrous cycle in cattle, with obvious consequences for oocyst survival.

THE PERSISTENTLY INFECTED CALF

It is the PI that is at the heart of BVD surviving and thriving within individual herds and the national herd as a whole. As such, it was identified by Animal Health Ireland to be the focus of the eradication programme.

PI calves tend to be born to cows that were exposed to the virus from 30 to 120 days of gestation (see above).

These animals are the most commonly recognised source of infection in a herd, capable of spreading virus to cows at all stages of pregnancy as well as calves and youngstock.

Although often assumed to be unthrifty to look at, some PIs will appear healthy, grow and manage to deliver a live calf themselves. These calves will always stay infected and, if they do get pregnant, they will always produce PIs.

Without mandatory government guidelines, control and eradication will always be a challenge. Indeed, a recent report in the *Irish Farmers Journal* stated that an alarming 30 per cent + of PIs are kept on-farm even though they have been positively identified. Enforced culling is not an element of the control programme, meaning individual farms can act as they see fit. Failure to remove the PI means BVD will remain a threat to the host herd, neighbouring herds and the national herd, and especially to stock that are naïve or unprotected against the virus.

Huge numbers of stock are traded around Europe all the time, and with different countries operating different BVD control strategies (or none at all in some cases), there is both a threat and opportunity for Irish producers. The threat comes for those unprotected herds exposed to PI animals in neighbouring farms or at sales.

Conversely, for those selling stock either in the domestic or export market, being able to confidently state an animal's BVD status will soon begin to command a premium at sales. Already there are reports from England of tagged calves making an extra £30/head.

TYPE 2 THREAT

Globally, there are two types (genotypes) of the BVD virus:

- BVD type 1 and BVD type 2. The incidence levels of both vary across the world: BVD type 2 represents up to 50 per cent of the cases in North America, whereas BVD type 1 dominates in Europe, with more than 90 per cent of cases.
- While BVD type 1 can lurk unseen in a herd for some time, BVD type 2 commonly leads to severe and devastating disease with significant levels of cattle mortality. Fortunately, BVD type 2 is not endemic in Ireland at present, although there was a European warning notice last summer that severe outbreaks had occurred as close as Belgium, the Netherlands and

Germany.

- BVD type 2 can manifest in a markedly different way, with significant virulence and frequently devastating consequences.
  It also leads to immunosuppression, meaning that other diseases are more severe and sometimes fatal.
- Frequently, a typical viral respiratory disease will be seen with fever, depression, inappetance, and ocular and nasal discharge, followed by diarrhoea several days after onset.
  Sores or ulceration in the mouth and gums may be present, along with reduced milk production in cows.
- Type 2 BVD can also lead to thrombocytopenic (bleeder) syndrome, where the virus infects blood cells and bone marrow, causing destruction of red blood cells, reduced clotting function, bleeding from wounds, lesions, and internal organs. Mortality rates are always high.

CONCLUSION

Where do we find ourselves in the battle against BVD? Progress had been made but lack of understanding coupled with no mandatory PI culling could be hampering progress. Europe-wide trade in cattle (including PIs or those positive for type 2) presents a significant threat for Irish producers who simply screen and remove PIs, resulting in naïve herds.

The responsibility lies with the vet to enter into productive conversations examining whether or not a herd is truly closed and if vaccination has a role to play.

BVD is perceived as complex by farmers, but discuss it in terms of warning or indicator signs to look for, plus fertility, and it suddenly becomes more manageable to understand.

National eradication programmes to control disease have, by their nature, to get across the one-size-fits-all general messages in the early days. As the programme makes progress, farm-specific tailored plans are needed. This gets more detailed as further programmes are added for more diseases (Johne's, IBR etc), and this is where the unique understanding by the practitioner of the farm and diseases is invaluable in assessing the risks, priorities and actions needed for each specific farm. Above all, encourage your clients to enter into discussion and have a farm-specific plan.

REFERENCE

1. GfK Kynetec