Update on infectious bovine rhinotracheitis

Dr Maria Guelbenzu, programme manager for bovine viral diarrhoea and infectious bovine rhinotracheitis, Animal Health Ireland, reports on diagnosis and treatment of infectious bovine rhinotracheitis, as well as a new pilot eradication programme that has been established

Infectious bovine rhinotracheitis (IBR) is a highly infectious disease caused by the bovine herpesvirus type 1 (BoHV-1). BoHV-1, one of eight herpesviruses known to infect cattle, is an alphaherpesvirus that can also cause infectious pustular vulvovaginitis (IPV) and infectious pustular balanoposthitis (IPB). In Ireland, BoHV-1 is mostly involved in respiratory infections as recorded in successive All-Island Animal Disease Surveillance Reports (www.agriculture.gov.ie/rvlreport/). In fact, bovine respiratory disease is the most common cause of mortality in animals over one month of age both in the Republic of Ireland and Northern Ireland. Infection with BoHV-1 is widespread both in dairy and beef herds around the world. A study carried out in 2009 found that 75% of 500 Irish herds were seropositive, with no significant difference between dairy and beef herds (Cowley et al, 2011).
A more recent study based on the testing of 162 Irish beef herds, found a mean herd seroprevalence of 90% and within herd seroprevalence of 40% (Barrett et al, 2018).

TRANSMISSION

Infected animals excrete high quantities of virus during primary infection (Figure 1). Large quantities of virus can also be re-excreted by latently infected animals. The virus is mainly spread directly by close contact between animals. It can also be shed from the reproductive tract, including semen, resulting in venereal transmission. Aerosol transmission typically occurs over short distances, but it may also occur over distances of up to 5m. The virus is moderately resistant to environmental factors so indirect transmission within or between herds can also occur through movement or sharing of contaminated facilities, equipment or personnel.
Calves in infected herds will be protected from clinical disease by maternally derived antibody for the first months of life. It is common for dairy cattle to remain uninfected until they join the adult herd. A study on 305 Irish dairy herds found that 80% had positive bulk milk readings for BoVH-1 antibody. At the animal level, when replacement heifers from those herds were individually tested, only 5.4% were seropositive to BoHV-1 (Sayers et al, 2015).

CLINICAL SIGNS

Clinical signs of BoHV-1 infection most commonly involve the upper respiratory tract and include nasal discharge, hyperaemia of the muzzle (red nose), conjunctivitis, fever and inappetance, and on occasion, death. This may be accompanied by decreased milk yields and a range of negative reproductive outcomes depending on the stage of the reproductive cycle at which exposure occurs (failure to conceive, early embryonic death and abortion). However, it is also recognised that in herds with endemic infection the course of infection can be sub-clinical but, nevertheless, still be associated with a reduction in milk yield and negative reproductive outcomes.

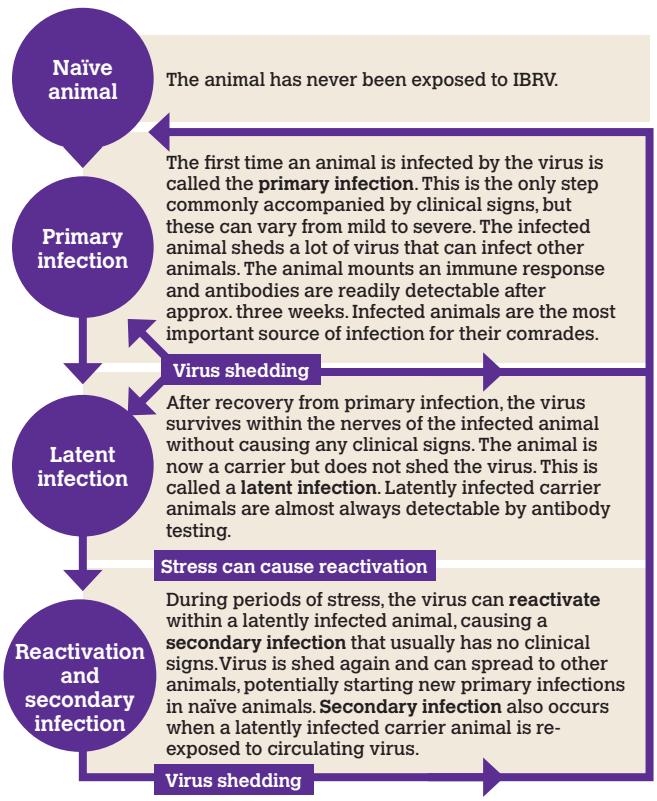

Figure 1.

Recovery, following initial infection, is associated with the development of immunity, but this does not eliminate the virus. Instead, the virus establishes lifelong latent infection in the trigeminal ganglion or pharyngeal tonsils (Ackermann and Wyler, 1984). During this period, the latent carrier is not shedding virus. However, at times of stress such as transport, calving, mixing stock etc., the virus may be reactivated and can begin to multiply and be re-excreted, generally, from the nose and eyes (Thiry et al, 1985). This leads to new infection in other susceptible cattle. This, in turn, will also become latent carriers (Figure 2).

DIAGNOSIS OF INFECTION

Occasionally, diagnosis may be possible from the clinical signs on farm but laboratory confirmation is typically required. To detect the virus, nasal swabs should be

Figure 2

collected from animals at early stage of disease, with serous nasal and ocular discharge and pyrexia. Animals with mucopurulent nasal and ocular discharge, due to secondary bacterial infection, should be avoided. Most laboratories now offer real-time polymerase chain reaction (PCR) tests which are highly sensitive and can detect small amount of virus. Serological tests for the detection of antibodies to BoHV-1 in serum and milk are a key tool for the diagnosis and control of IBR. After a primary infection, there is a rapid immune response and antibodies against BoHV-1 are generated which can be detectable after 10 days and remain detectable for years thereafter. Vaccination with

PILOT IBR PROGRAMME

A pilot IBR eradication programme has been developed by Animal Health Ireland's IBR Technical Working Group (TWG) for herds participating in Phase Three of the Teagasc/*Irish Farmers Journal* BETTER Farm Beef Programme. A total of 30 herds are involved. The pilot comprises the application of an IBR on-farm veterinary risk assessment and management plan (VIBRAMP), the sampling of the herd and provision of biosecurity and disease control advice.

The VIBRAMP consists of a questionnaire that captures details of the farm structure, animal movements, biosecurity and vaccination history, with the vet and herd owner agreeing up to three changes to improve biosecurity.

All participating veterinary practitioners have been trained on the disease, the application of the biosecurity questionnaire and the interpretation of the test results. This is a mandatory requirement for the vets to be able to participate in the programme, with this initial involvement being funded through the Targeted Advisory Service on Animal Health (TASAH) under the Rural Development Programme.

Herds are initially screened by applying a herd 'snap shot' which requires the sampling of 30 randomly selected animals over nine months-old that are used or intended for breeding. Samples are being tested at the DAFM's Blood Testing Laboratory in Cork with an IBR gE (marker) ELISA.

As described in the IBR Study Visit Report (http://animalhealthireland.ie/?page_id=5803), the 'snap shot' herd screen was used in Wallonia, southern Belgium, as a cost-effective means to obtain an initial indication of the level of infection in a given herd. This allowed many herds of previously unknown status to progress rapidly to a free status within the programme. If the result of the 'snap shot' test includes no seropositives or a single seropositive, the likely prevalence of infection within the herd is estimated to be between 0-15%. These herds have the option to test the remainder of the herd and either confirm freedom or remove seropositives and to review vaccination and biosecurity measures. If more than two seropositive results are obtained at the 'snap shot' test, the likely within herd prevalence is of >15%. For these herds it may not be economically viable to pursue freedom by removing seropositive animals, but a vaccination and biosecurity plan can be put in place to control the disease.

Results and from both the testing and the VIBRAMP will be used to evaluate the herd status, to identify risk factors associated with the presence of infection, to identify common biosecurity risks and inform the decision on further testing and vaccination. For example, testing of all animals in low prevalence herds would be justified, allowing them to move rapidly to freedom. The information generated will also be used by the IBR TWG to inform the development of options for an IBR eradication programme for Ireland.

Animal Health Ireland will host one of the veterinary mini-MBA sessions at the forthcoming CAVI 2018, Mullingar Park Hotel, October 12-14.

This mini MBA event takes place on October 13 and will very worthwhile for those who would like to learn more about IBR in the Irish suckler herds and to understand the principles behind the IBR pilot programme.

non-marker vaccines can complicate the interpretation of serological tests. However, in Ireland, only marker vaccines are available. The antibody stimulated by marker vaccines can be distinguished from the antibody that follows natural infection through use of appropriate tests. Animals/herds vaccinated with the gE-deleted or 'marker' vaccine, should be tested with the gE-ELISA test.

VACCINES

There are several IBR vaccines containing either live or inactivated virus licensed for use in Ireland, all of them 'marker' gE-deleted vaccines. IBR vaccines are very good at preventing clinical signs and reducing the amount of virus shed following infection and reactivation, but they do not prevent field viruses from causing a limited infection. When given intra-nasally, live vaccines can give rapid protection in the face of a clinical outbreak. It has also been found than inactivated vaccines can be better at reducing virus excretion after reactivation than live ones.

CONTROL

Although BoHV-1 is endemic in cattle populations across the world, six European countries (Austria, Denmark, Finland, Norway, Sweden and Switzerland) and several regions have control programmes and have achieved 'IBR-free' status. Other European countries also have national control programmes including Germany, the Netherlands, Belgium, the Czech Republic and France.

BoHV-1 status is an important issue in the international trade of both live animals and some animal products. European Union Directive 92/65/EEC specifies that artificial insemination and embryo transfer centres had to be free of BoHV-1 from January 1, 1999 for purposes of intra-community trade. Therefore, bulls going into AI stations must be seronegative to both the wild and vaccine virus.

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