By Hania Klobukowska

A virulent virus

Malignant catarrhal fever is a deadly disease of cattle – here's how to recognise and diagnose it.

Malignant catarrhal fever (MCF) is a multisystemic disease of cattle and other ungulates caused by several closely related ruminant gammaherpesviruses, of which the most important in New Zealand is sheep-associated ovine herpesvirus-2 (OvHV-2). It is mainly known as a disease of cattle; however, deer, water buffalo and a variety of zoological ungulates can also be affected.

Aetiology of MCF

Domestic sheep are considered the natural host species of OvHV-2. Lambs become infected after two months of age through natural flock exposure, and most sheep have established infections by one year of age (Li et al., 2000). Infection with and the secretion of the virus in sheep occurs through aerosol transmission.

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The virus is transmitted from sheep to cattle and other susceptible species via direct contact or the aerosolised transmission of infected nasal secretions. Adolescent sheep (six to nine months of age) secrete higher viral loads than adults do (Li et al., 2000) and pose the greatest threat to susceptible species.

The disease in cattle generally has low morbidity and high mortality rates, and most cases are seen in young animals (12 to 24 months of age). The usual presentation is that of affected individual animals; herd outbreaks that involve a small proportion of animals are exceptions rather than the rule.

Although the virus is transmissible from sheep to cattle and other susceptible species, it is not considered contagious once end-stage hosts are infected.

Clinical symptoms

Most MCF cases in cattle run a peracute to acute course, with chronic presentations less common. The multisystemic nature of the disease means that affected animals can exhibit a constellation of lesions; however, the 'head and eye' form is the most common and well known. Oculonasal and oral lesions are present in most cases of acute MCF, and other symptoms include fever, haemorrhagic enteritis, lymphadenopathy, neurological disease and skin lesions. Most cattle die quickly from the disease; reports are rare of cattle surviving for extended periods of time (O-Toole et al., 1995).

MCF in deer tends to be more peracute and often presents as sudden death, with or without preceding haemorrhagic enteritis.

Pathology and lesions

OvHV-2 infects T-lymphocytes (Simon et al., 2003) and is characterised by a marked T-lymphocyte hyperplasia. Characteristic histopathological changes include a widespread arteritis-phlebitis of medium-sized vessels, lymphoid proliferation including the production of atypical large lymphoblastoid cells, and ulcerative lesions affecting the mucosa of the digestive, urinary and respiratory tracts (Uzal et al., 2016). Gross lesions may affect several body systems and include: a characteristic blueing of the cornea; oculonasal discharges; erosive, ulcerative and haemorrhagic lesions throughout the gastrointestinal, respiratory and urinary tracts; and lymphadenopathy.

Lesions in deer tend to focus on the gastrointestinal system, where haemorrhagic enteritis and typhlocolitis may be prominent findings (Uzal et al., 2016).

Diagnosis

A diagnosis of MCF is based on the clinical picture, histology and viral detection via polymerase chain reaction (PCR). PCR on whole blood (EDTA) is useful in suspected live cases. When a dead animal is presented, histology can generally be diagnostic provided that a full range of well-preserved tissues is submitted for examination (with a particular focus on the gastrointestinal tract, central nervous system and renal system). One of the most consistent histologic lesions of the disease is meningoencephalitis, so brain removal is always strongly recommended. Heart blood for PCRs from dead animals may also be used to detect the virus.

Differential diagnoses of MCF include mucosal disease, photosensitisation and severe presentations of infectious bovine rhinotracheitis, as well as diseases exotic to New Zealand including foot-and-mouth disease, vesicular stomatitis, bluetongue and epizootic haemorrhagic disease. Before the successful worldwide eradication, rinderpest was also considered a differential. VS

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