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LAWSONIA

Lawsonia intracellularis is an obligate intracellular bacteria that was initially recognised as a disease of pigs. It is a Gram-negative curved rod. It was first reported in a foal in 1982⁽¹⁾, but not fully identified until 1996⁽²⁾. Since that date, there have been many reports in the literature, and the disease has been seen in the Netherlands⁽³⁾, Canada, the USA, the UK, Belgium, Germany, Switzerland, Brazil, and Australia. We have had confirmed cases in Ireland, but have not reported them in the literature. It should also be noted that it may be a different strain of *Lawsonia* that affects pigs from that which affects horses⁽⁴⁾.

The route of infection is not known in the horse. It is suspected that it is the faecal-oral route. In pigs, the time from infection to onset of clinical signs is 2-3 weeks, and it has been suggested that this is similar in horses⁽⁴⁾. In the Northern Hemisphere, the vast majority of infections appear to occur between August and January⁽⁵⁾. This is also the time period when many horses are weaned, and stressful events such as weaning may precipitate the disease. We have noticed that affected foals out of a group kept together are often those that had a problem earlier in life.

Clinical signs

This is a disease that is mainly seen in weaned foals, from 2-8 months of age. Unweaned foals and yearlings are occasionally affected. Adult horses can become seropositive for the disease, but rarely get clinical signs.

The most commonly recognised clinical sign is peripheral oedema. This is most often seen on the ventrum and sheath, but may also be present in the legs and throat-latch area. Other common clinical signs are diarrhoea, depression and colic. Diarrhoea is not a constant sign, and when present the faeces can vary from slightly soft ("cowpat") to fulminant diarrhoea. Since it is often a disease of stress, affected foals may have other concurrent other diseases (which are presumed to be the "stressor"). In some foals the disease may be sub-clinical, but result in growth retardation or failure to thrive.

Diagnosis

Definitive diagnosis of *Lawsonia intracellularis* infection is not always straightforward. On the farm, trans-abdominal ultrasonography, which can be performed with a scanner usually used for equine reproductive work, is helpful in approaching a diagnosis. Thickened sections of small intestine, which may be accompanied by increased peritoneal fluid, are imaged. However, this is not a sensitive test, and laboratory tests are required to support and make a diagnosis.

Protein concentrations are almost always decreased in foals with clinical *Lawsonia intracellularis* infection. Often albumin concentrations are less than 20g/L (2.0g/dL) and total protein concentrations are less than 50g/L (5.0g/dL). Other laboratory changes are only present in a proportion of affected animals. These changes can include: Increases or decreases in white cell and neutrophil counts, anaemia, haemoconcentration, hyperfibrinogenaemia, hyponatraemia, hypochloraemia and hypocalcaemia. Culture of the *Lawsonia* organism is technically difficult, and therefore culture from faeces is not a suitable diagnostic test. Polymerase chain reaction (PCR) of faeces is therefore preferred to culture. The PCR is specific for *Lawsonia*, but the organism may only be present in faeces during the early phases of the disease⁽³⁾. Therefore, there may be false negatives with the faecal PCR, especially later in the disease process.

There are two serological tests available for *Lawsonia intracellularis*. These rely on a second layer antibody technique. A preparation of *Lawsonia* is placed on a slide, and serum from the patient is added to it. A "second layer" of anti-equine IgG antibodies is used to detect patient antibody stuck to the *Lawsonia*. This second layer is either labelled with a fluorescent dye (Indirect fluorescent antibody test) or with a peroxidase (immunoperoxidase monolayer assay). These tests are not yet commercially available, and must be made in the lab with cultured *Lawsonia*. A positive serological test for *Lawsonia* only indicates exposure to the organism, and not active disease.

Examination *post mortem* usually demonstrates thickened ileum, with or without thickening of the jejunum. However, gross thickening is not always present, and the lesions may be overlooked. On histology of the ileum, hyperplasia of the crypt glands

with an increased number of mitotic figures and absence of goblet cells is seen. There are often few or no inflammatory infiltrates ⁽⁵⁾.

Treatment

The mainstay of treatment is antimicrobial therapy. The main antimicrobials used are the macrolides (erythromycin 25-30mg/kg PO BID, azithromycin 10mg/kg PO SID or clarithromycin 7.5mg/kg PO SID) or the tetracyclines (oxytetracycline 8mg/kg IV BID or doxycycline 10mg/kg PO BID) ⁽⁶⁾. Many foals also receive supportive therapy such as fluids, colloids, parenteral nutrition and anti-ulcer therapy.

There has been some work towards developing a vaccine. Administration of an avirulent live strain of *Lawsonia intracellularis* resulted in detectable antibody response ⁽⁷⁾. However, it has not yet been demonstrated that the vaccine is protective against the disease.

References

1. Duhamel GE, Wheelon EB. Intestinal adenomatosis in a foal. *Vet Pathol.* 1982;19(4):447-50.
2. Williams NM, Harrison LR, Gebhart CJ. Proliferative enteropathy in a foal caused by *Lawsonia intracellularis*-like bacterium. *J vet Diagn Invest.* 1996;8(2):254-6.
3. van den Wollenberg L, Butler CM, Houwers DJ, de Grootv MW, Panhuijzen H, van Maanen C, et al. *Lawsonia intracellularis*-associated proliferative enteritis in weanling foals in the Netherlands. *Tijdschr Diergeneeskd.* 2011;136(8):565-70.
4. Pusterla N, Gebhart C. Equine proliferative enteropathy caused by *Lawsonia intracellularis*. *Equine vet Educ.* 2009;21(8):415-9.
5. Frazer ML. *Lawsonia intracellularis* infection in horses: 2005-2007. *J Vet Intern Med.* 2008;22(5):1243-8.
6. Sampieri F, Hinchcliff KW, Toribio RE. Tetracycline therapy of *Lawsonia intracellularis* enteropathy in foals. *Equine vet J.* 2006;38(1):89-92.
7. Pusterla N, Collier J, Mapes SM, Wattanaphasak S, Gebhart C. Effects of administration of an avirulent live vaccine of *Lawsonia intracellularis* on mares and foals. *Vet Rec.* 2009;164(25):783-5.