Ileitis Diagnosis

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The diagnosis of ileitis should be based on performance records, clinical signs, gross lesions and laboratory results. Ileitis affects specific age groups, when performance records and clinical signs must be carefully evaluated. As previously mentioned, the detection of ileitis problems may start in the late nursery stage in farms or regions with restrictions on the use of preventive or growth promoter antimicrobials, such as the European Union countries. However, in other regions, *L. intracellularis* problems will start to entail a concern in the growing-finishing phase, even affecting gilts and second parity sows.

As a result, ileitis is not a disease that affects suckling or weaned pigs of up to 60 days of age.

POST MORTEM EVALUATION

In herds with increased mortality rates and/or evident clinical signs, the post-mortem evaluation is an important tool to try to understand the problem. So, necropsy of dead pigs or clinically affected euthanised animals will provide relevant information and, sometimes, close the case. For instance, animals with the haemorrhagic (acute) form of the disease will have evident gross lesions during the postmortem evaluation.

These lesions are characterized by intense creasing and hyperaemia of the serosa of the affected areas of the small and sometimes large intestines, oedema and congestion of the mesentery, a thickened intestinal wall due to the evident folding of the mucosa, and blood clots in the lumen *(Figure 1)*.

In herds with the chronic form, where greenish pasty diarrhoea and lack of uniformity among pen-mates are frequently observed, the post-mortem evaluation of these sick pigs will demonstrate lesions characterized by an irregular patchy sub-serosal oedema, mainly at the mesentery insertion area. The mucosa of the affected intestinal segment is thickened and has deep folds and patches of pseudomembrane covering the mucosa *(Figure 2) (Ward & Winkelman, 1990)*.

With the progression of the lesions, the mucosa is destroyed, this resulting in necrosis. The subclinically affected animals or the animals with mild clinical signs may have mild or undetectable gross lesions. In these cases, the submission of samples to a laboratory is recommended.

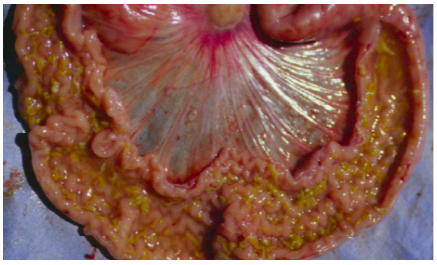

Figure 1. Gilt. Porcine hemorrhagic enteropathy. Creasing and hyperaemia of the small intestine serosa, thickening of the mucosa and blood clots in the lumen.

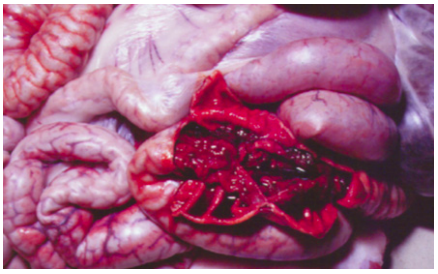

Figure 2. Finishing pig. Porcine proliferative enteropathy. Evident folding of the mucosa due to proliferation with fibrin pseudomembrane.

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Always submit fresh and formalin-fixed intestinal fragments to the laboratory to allow the testing for other enteropathogens.

Histology: At the laboratory, formalin-fixed intestinal samples will be processed and will allow the detection of typical histological lesions of ileitis in at least 50% of the positive cases. Specific *L. intracellularis* antibodies for immunohistochemical staining will increase the sensitivity to almost 90% of the cases (Guedes et al., 2002). Laboratories that do not have *L. intracellularis* antibodies may use specific probes and run fluorescent in situ hybridization stainings (FISH) with similar results (Boye et al., 1998).

PCR: Fresh intestinal samples or faeces may be used for the detection of DNA of *L. intracellularis* with the PCR technique. PCR in faeces is less sensitive than in the intestinal mucosa, but has the advantage of being collected from live pigs. To overcome the sensitivity limitation of the PCR in faeces, it is important to collect at least 10 to 15 faecal samples from clinically suspicious pigs. There are different PCR techniques for *L. intracellularis*, varying from a single amplification using a pair of primers (Jones et al., 1993) to qPCR (Burrough et al., 2015; Pedersen et al., 2012). qPCR is more sensitive and allows the quantification of the faecal shedding. However, so far, there is no specific cut-off point that would determine the moment to intervene on the herd based on qPCR results.

Serology: Detection of serum IgG is a useful tool to evaluate previous exposure to *L. intracellularis*. Optimization and validation studies of serologic tests for PE have been carried out in the past, creating new opportunities for a better understanding of the immune response induced by the *L. intracellularis* infection (Knittel et al., 1998; Guedes et al., 2003; Jacobson et al., 2011). Indirect immunofluorescent antibody assay (IFA) (Knittel et al., 1998), immunoperoxidase monolayer assay (IPMA) (Guedes et al., 2003) and ELISA (Jacobson et al., 2011) have shown good sensitivity and specificity in controlled experimental infection studies. Cross-reactivity of these serologic tests against convalescent serum from pigs infected with several Campylobacter species, Salmonella choleraesuis, S. typhimurium, Escherichia coli K88, Brachyspira hyodysenteriae, B. pilosicoli, and even porcine respiratory and reproductive syndrome were negative (Guedes et al., 2003). The onset of detection of serum IgG occurs in the second week post-infection, and the duration varies from three to 12 weeks after the initial detection, depending on the form (acute or chronic) and the severity of the disease. Gilts, after a natural outbreak of the acute form of ileitis, and five-week-old pigs infected with high doses of pathogenic *L. intracellularis*, have detectable serum IgG levels up to 12 weeks after their first detection. Conversely, seropositivity in growing-finishing pigs in field conditions usually lasts for only two to three weeks and is mainly detected in 18- to 26-week-old pigs (Guedes et al., 2003). However, age at seroconversion in growing-finishing pigs may vary depending on the feed medication program, pig flow and type of flooring. Despite the fact that we were unable to statistically associate the severity of the gross lesions in future cases and serum titres in pigs three weeks after their experimental infection (Guedes et al., 2002), we believe that the level of infection correlates with serum titres. As mentioned above, gilts following an outbreak of the acute form of PE and pigs infected with high doses of *L. intracellularis* may have serum antibodies for up to 12 weeks, while subclinically infected growing-finishing pigs in the field are seropositive for only two to three weeks. As the serum IgG titre decays gradually after its peak, the higher the serum titres the longer the duration of the detection of serum IgG. Serology, as an indirect diagnostic test, can be used to understand the kinetics of infection in the herd and estimate the best moment to medicate or vaccinate. Detection of anti-*L. intracellularis* IgG in oral fluids is becoming a reality and will be discussed.

There are several ways to diagnose ileitis, but the establishment of the time for intervention and understanding the subclinical impact of the disease in a herd are still two important limitations for the control of the disease.

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