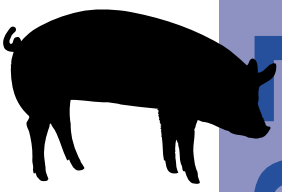


RESEARCH INSIGHT

Characteristics, diagnostics and control of a growing swine disease challenge

The fundamentals of ileitis

Porcine proliferative enteropathy (PPE) – commonly referred to as "ileitis" – is an enteric disease that affects pigs throughout the world. First diagnosed in the 1930s, the disease currently is on the rise in the United States, and is one of the most common causes of diarrhea in grow-finish pigs.

Results of a National Animal Health Monitoring Service (NAHMS) report indicate that 96 percent of U.S. swine herds and 28 percent of pigs are seropositive for ileitis. The combined impact of the clinical and subclinical forms of the disease is estimated to cost between $2 and $22 per affected pig, depending on the severity and duration of the disease. The best overall estimate of the annual cost to the U.S. pork industry is around $98 million.

H. Neil Becker, DVM, technical services consultant for the Pork Strategic Business Unit of Pharmacia Animal Health, provides the following summary of research conducted to investigate the nature of ileitis; the best diagnostic tools to identify it; and prevention and control strategies.

Disease definition and characteristics

PPE typically is subdivided into two disease forms – acute hemorrhagic, called Porcine Hemorrhagic Enteropathy (PHE); and chronic, non-hemorrhagic, called Porcine Intestinal Adenomatosis (PIA).

Transmission of the bacterium that causes ileitis, *Lawsonia intracellularis*, is via the oral-fecal route. Infected pigs can shed infective doses of the bacteria in feces for at least 10 weeks post-infection, although shedding patterns for the disease still are not completely understood. Recent research also shows that the bacteria can survive in biologically significant numbers in the environment for at least two weeks at 41 to 59 degrees Fahrenheit.

Vertical transmission (from sows to piglets) is suspected but has not been proven. Because the signs of natural infections usually start to be seen around eight weeks of age, it is believed that maternal immunity may protect younger pigs.

Data collected by the Iowa State University Veterinary Diagnostic Laboratory indicates that approximately 30 percent of all enteric disease in grow-finish pigs can be attributed to ileitis. The disease's greatest frequency appears to be in finisher pigs weighing 140 and 240 lbs.

Table 1. Differentiation Between PHE and PIA

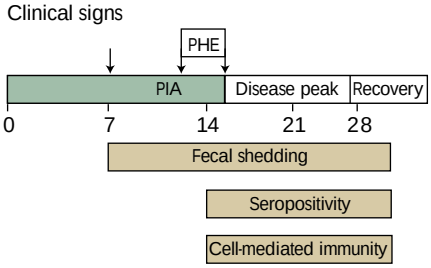
DISEASE FORM	PHE (ACUTE HEMORRHAGIC)	PIA (CHRONIC NECROTIC)
Clinical Signs	Bloody diarrhea	Intermittent soft feces ("wet cement")
Lesion Progression	(1) Hemorrhagic (2) Increasing proliferation	(3) Proliferative (4) Necrotic
Age	Young adults 4-20 months	Grower-finisher 6-20 weeks

and/or 14 to 24 weeks in age. Clinical cases appear to break after dramatic weather shifts, with 75 percent of cases diagnosed between May and September.

Although clinical signs of ileitis vary greatly, intestinal lesions are a hallmark. Lesion development and regression sometimes can take place with virtually no outward signs, but it likely impacts feed conversion. Common clinical signs in acute ileitis outbreaks (PHE) are bloody diarrhea; weakness and depression; and death loss of up to 5 or 6 percent. The chronic form (PIA) is less obvious, but may produce uneven, slow-growing, poorly performing pigs; and mild diarrhea that looks like wet cement. Table 1 provides additional differentiation between the two forms of the disease.

In experimentally infected pigs, diarrhea begins to occur one to two weeks post-infection, with maximum intestinal lesion development at approximately 14 to 28 days after inoculation (see Figure 1). Although still under investigation, the incubation between exposure and disease expression in naturally occurring ileitis appears to be somewhat longer, around 14 to 21 days.

Figure 1. Course of PPE in Experimentally Infected Pigs



Source: Connie Gebhart, PhD, Department of Veterinary Pathobiology, University of Minnesota

RESEARCH INSIGHT

Unlike other enteric diseases, ileitis appears to be a growing challenge for modern operations with relatively high health status.

Risk factors frequently reported by swine practitioners dealing with ileitis outbreaks include:

(1) Pigs commingled or moved within 30 days
(2) Sows in loose-housing groups
(3) Weather stress: hot weather or sudden weather changes
(4) Substandard environmental hygiene
(5) "Topping off" pens for market (the equivalent of commingling)
(6) Periods of gilt acclimation shortly after placement in the breeding herd

Interaction with other diseases

Ileitis is further complicated by the fact that it often occurs as a mixed enteric infection. In such cases, it usually appears in concert with *E. coli*, *Campylobacter* spp., *Salmonella* spp. and *Brachyspira pilosicoli*.

Furthermore, ileitis often is present in swine herds with other disease challenges. Unlike other enteric diseases, it appears to be a growing challenge for modern operations with relatively high health status. Perhaps early exposure and maternal immunity promotes immunity development in more traditional management settings. Or other diseases may mask the effects of ileitis in herds with more disease challenges.

Diagnostics

Methods for diagnosing ileitis in live pigs and by post-mortem examination continue to be refined. Currently, the preferred protocol for post-mortem diagnosis – which is most useful in diagnosing active disease – is as follows:

(1) Gross evaluation of lesions

(2) Histopathology, to screen out the presence of other diseases

(3) Warthin-Starry silver stain of intestinal tissue OR

(4) Immunohistochemistry OR

(5) Polymerase Chain Reaction (PCR) of intestinal mucosal scrapings

Epidemiological profiling and ongoing herd disease observation are best conducted using a combination of antemortem diagnostic techniques. Here is the suggested protocol:

(1) Regularly collect fecal samples over time (i.e., every three weeks) and freeze

(2) Draw blood and conduct serology analysis according to the same, regular schedule

(3) If serology tests show positive, conduct fecal PCR on samples collected at and before the time of seropositivity, to pinpoint the time of infection and evaluate management practices

(4) Confirm with necropsies of infected animals

Proper handling of fecal samples between the farm and the lab is critical if accurate PCR results are to be achieved. Samples should be kept consistently cold – either by freezing and shipping on dry ice, or refrigerating and shipping on ice packs.

Time-point considerations also affect the outcome of both post-mortem and antemortem diagnostic tests. Accurate detection also depends on the animal's stage of disease progression at the time the diagnostic analysis is done.

Control options

Although no therapy has been discovered that can completely eliminate ileitis from a herd, antimicrobials can be effective for control. Sanitation and biosecurity measures also are helpful in limiting the spread. Current control strategies include:

(1) A combination of feed plus water and/or injectable antimicrobial therapy for acute outbreaks.

(2) Biosecurity and sanitation measures to minimize bacterial spread, including all-in/all-out management, separate boots and coveralls for individual rooms or buildings, and facilities' disinfection with quaternary ammonia or iodine-based products.

(3) "Pulse" antibiotic therapy that delivers treatment after animals are infected but before significant lesions develop. To be effective, the pulse dose must be given long enough and frequently enough to suppress the disease.

Ongoing epidemiological monitoring is recommended to confirm diagnosis and assist in determining the timing of medication.

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