

Eimeria-associated pathology in breeding gilts

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Summary: Fourteen breeding gilts were moved from a high-health—status multiplication facility to a dirt lot. Most exhibited diarrhea after four days and one died after seven days. The gilts, from a source herd with no history of coccidial infection, were diagnosed with *Eimeria*-induced coccidiosis and necrotic enteritis. *Eimeria* infestation is not typically pathogenic. High-health—status swine appear to be particularly vulnerable to parasitism normally of limited pathogenicity when moved from high-health—status environments to conventional production systems.

Contemporary swine production practices result in animals being produced under unprecedentedly hygienic conditions. This is especially true for breeding stock reared under intensively managed, high-health systems. However, moving these animals into conventional swine production units can result in unexpected pathology from organisms normally considered nonpathogenic or of low pathogenicity.

Case history

Fourteen gilts were purchased from a gilt multiplication facility that practiced excellent hygiene. These animals were 20 weeks old and had been reared on perforated flooring throughout their lives. Monthly herd fecal floatation evaluation had not detected any evidence of helminth or protozoal infections.

These gilts were transported on a very hot day at the end of August (40°C maximum temperature). Transport time was approximately 15 hours, beginning at 7:00 a.m. Upon arrival, the gilts were believed to be in good condition but heat stressed. The purchaser of the gilts off-loaded them into a conventional dirt lot that had previously been used for swine housing. A sprinkler system and a mud wallow were provided.

Over the next 3 days, the animals appeared to be adapting well to their new environment. On the fourth day, however, most of the gilts began to exhibit signs of diarrhea. Seven days after arrival, one animal died. Dr. Donald Altenhofen (Seneca, Kansas), the herd veterinarian, was called to inspect the group as well as to perform a postmortem.

Clinically, a profuse, watery diarrhea containing small flecks of necrotic mucosa, hemolyzed blood, and poorly digested feed was

observed. Dehydration was evident in some animals. Differential considerations included proliferative enteritis, salmonellosis, and swine dysentery. Gross lesions including superficial mucosal hemorrhage and necrosis, hemorrhagic and fluid bowel contents, and areas of congested mucosa extended throughout the ileum and jejunum. Fresh and fixed (10% formalin) tissues were collected and submitted to the Kansas State University Veterinary Diagnostic Laboratory.

The remaining animals were placed on oral sulfonamide therapy. The diarrhea stopped and the gilts rapidly returned to normal health status. All histologic sections demonstrated massive numbers of coccidia that had morphological features characteristic of *Eimeria* spp. in the mucosal layer of the small intestine. This heavy infestation was accompanied by superficial mucosal necrosis, congestion, and hemorrhage.

The diagnosis, based on histopathology, was *Eimeria*-induced coccidiosis and necrotic enteritis. An abundant growth of *Clostridium perfringens* was also recovered from the liver and was considered a secondary infection by the investigating pathologist (Dr. Mahlon Vorhies, Kansas State University Diagnostic Laboratory). No lesions were observed to suggest swine dysentery or proliferative enteritis.

Discussion

Eimeria oocysts are often found in pig feces. It has been reported in 93% of herds evaluated.¹ Nine species of *Eimeria* have been identified in feral swine in the United States, with a high percentage of individuals tested shedding more than one species of coccidia.²

In spite of the observed high incidence of *Eimeria* infestation, pathology associated with the infections seems quite rare. In fact, experimental efforts to induce pathology with massive challenge by *Eimeria* failed to result in any clinical signs.³ There is evidence, however, that under certain conditions, *Eimeria* infestations can be associated with illness and death in individual animals.

In a previous case report of pathology associated with *Eimeria*, infections resulted from a similar management circumstance to the one described in our case report.⁴ In that situation, pigs were moved from a very hygienic facility to a dirt lot that potentially could have been heavily infested with coccidia.

We speculate that several environmental conditions may have in-

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fluenced this apparent infection. The high environmental temperatures may have enhanced the infectivity of the coccidial oocysts present in the soil. The mud wallow became an initial source of a water supply as the gilts learned their new surroundings. We believe this could have resulted in a substantial intake of infective coccidial oocysts.

Also, given the source herd history with no observations of coccidial infections, it is likely that these gilts had no previous exposure to this organism and hence no immune-system recognition of *Eimeria*. It has been shown that effective immunity develops quite rapidly to *Eimeria* spp. infections as demonstrated through reduced oocyst shedding.⁵

Implications

- High-health-status swine are vulnerable to parasitism normally believed to be of limited pathogenicity, particularly when they move from high-health-status environments to conventional production systems.

- Planning the transition for pigs from indoor to outdoor housing systems is an important part of successful acclimatization.

References

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