Lawsonia intracellularis (Equine Proliferative Enteropathy)

Summary

Equine proliferative enteropathy (EPE) is an enteric disease caused by the obligate, intracellular bacterium *Lawsonia intracellularis*. EPE is typically seen in weanling and yearling horses during the fall and early winter months in North America.

Clinical Signs

Clinical signs of ventral edema, diarrhea and hypoalbuminemia combined with the time of year and age of the horse can be almost pathognomonic for EPE. Cases are most commonly seen in August through January. Young horses between two and eight months of age are most commonly represented; however, cases have been reported in adult horses.

Clinical signs may include:

- Anorexia (partial or complete)
- Rapid weight loss
- Dependent edema (typically head, legs, and prepuce)
- Rough hair coat
- Fever
- Colic
- Diarrhea
- Depression

Rare cases of EPE associated with rapid decompensation and/or death have been reported. These cases often are preceded by fever and CBC changes (see below), possibly indicating bacterial translocation across the damaged gastrointestinal mucosa.

Transmission

Unknown, although fecal-oral exposure is suspected. While the environmental reservoir for the bacteria is unknown, it is suspected that wildlife, rodents, and feral or domesticated pigs play a role.

Incubation Period	Approximately 14 days
Risk Factors	EPE is typically seen in weanling and yearling horses during the fall and early winter months in North America. Research has shown that ~5% of exposed horses will develop clinical disease and an additional ~5% will develop subclinical disease (manifest as sub-normal weight gain).
Diagnostic Sampling, Testing and Handling	A presumptive diagnosis of EPE can be made based on hypoalbuminemia coupled with clinical signs, age, and season. However, further testing should be performed to confirm the diagnosis. ● A hallmark of the proliferative enteropathies caused by *L. intracellularis* is thickening of the small intestinal wall. Abdominal ultrasound may help to identify areas of wall thickening (>5mm), however, the absence of thickening does not rule out EPE. ● **Fecal PCR** is the best antemortem diagnostic test for EPE and is widely available. Like many gastrointestinal pathogens, false negative results are possible, and the chance of a false negative increases once antimicrobial treatment begins, and/or late in the disease course. Collection of whole blood and feces should be done prior to initiating treatment. In the event of a negative PCR with compatible clinical signs, serology may be useful. ● While **serologic assays** are available in a variety of formats, all the assays detect antibodies against *L. intracellularis*. Ideally, paired samples 7-14 days apart would be utilized to support a diagnosis of EPE; however, the clinical course of disease often prompts treatment prior to this waiting period. As a result, many practitioners will submit a single serum sample. Unfortunately, definitive cutoff titers are not available to delineate clinically affected from unaffected but exposed animals. Because of this, serology should be used to support a presumptive diagnosis of EPE and not be the only test a practitioner utilizes.

- **Hypoalbuminemia**, often severe, is a consistent finding in cases of EPE. Other clinicopathologic abnormalities may include leukocytosis, hyperfibrinogenemia, and increased hematocrit. CBC and biochemistry changes (such as severe leukopenia, neutropenia, thrombocytopenia, hyponatremia, hypochloremia, hypo- or hyperkalemia, azotemia, hyperlactatemia) have been associated with necrotizing-EPE, which often results in sudden decompensation and euthanasia/death.

Post-mortem Findings

Uncomplicated cases of EPE have a high survival rate and are rarely seen in a postmortem setting. Gross lesions may be absent or limited to mild thickening of the distal small intestine with an increase in prominence of the mucosal folds of the ileum. In more severe cases, there may be marked thickening of the ileal mucosa extending into the adjacent jejunum. There may be evidence of systemic hypoproteinemia characterized by effusion in the thoracic or abdominal cavity as well as subcutaneous edema. In cases with complications of bacteremia or thrombosis, necrotizing enteritis, thrombosis of the intestine or other organs and infection of distant organs may be observed.

The histopathology of the ileum is characteristic with marked hyperplasia of the crypts, loss of goblet cells and increased mitotic activity. The organism can be demonstrated intracellularly using a silver stain. Feces and a scraping of ileal mucosa are the diagnostic samples of choice in postmortem cases.

Treatment

Treatment for EPE consists of antimicrobial treatment and supportive care. The most commonly used antimicrobials include tetracyclines (oxytetracycline, doxycycline, minocycline) or chloramphenicol. The antimicrobial choice should reflect the age of the animal and the risk for gastrointestinal or renal toxicity. While macrolides demonstrate efficacy against *Lawsonia intracellularis*, the use of this class of antimicrobials in older foals and adults is associated with an increased risk of life-threatening colitis. A standard time course of treatment, based on the antimicrobial selected, is typically sufficient for cases of EPE. The clinical and physical condition of the horse as well as normalization of albumin levels may take significantly longer, in some cases months, to completely recover.

Supportive care typically involves intravenous fluids, in addition to oncotic support such as plasma or colloids. Additional treatments may include anti-ulcer medications and enteral or parenteral nutrition.

Shedding of Organism Following Resolution of Clinical Signs	Shedding of *L. intracellularis* typically ends within several days following the initiation of antimicrobial treatment. General biosecurity recommendations would be to isolate affected horses for seven days following the start of treatment to ensure complete cessation of shedding.
Environmental Persistence	*Lawsonia intracellularis* thrives in environments with low oxygen concentrations (such as feces) and may remain infective at milder temperatures for up to two weeks.
Specific Control Measures	Limited studies have described immunization of foals via rectal administration of the porcine vaccine against *Lawsonia intracellularis*, with vaccinated foals demonstrating less severe disease and reduced pathogen shedding when compared to unvaccinated foals. Practitioners should be cautioned that this represents an off-label use of the product and are advised to check their state rules to discern whether it is acceptable to vaccinate animals with vaccines labeled for another animal species.
Biosecurity Recommendations	Isolation of affected horses for approximately 7 days and prompt removal of feces is suggested. Additionally, it is best to limit wildlife and rodent exposure as much as possible, especially in barns.
Disinfection	No specific recommendations.
Zoonotic Potential	There are no known zoonotic concerns.
Further Reading	Page, A.E., Slovis, N.M. and Horohov, D.W. (2014) *Lawsonia intracellularis* and Equine Proliferative Enteropathy. In: *Veterinary Clinics of North America: Equine Practice New Perspectives in Infectious Diseases*, Ed: R.H. Mealey, Elsevier.

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Supported and reviewed by: AAEP Infectious Disease Committee