Evaluation of an Avirulent Live Vaccine of \textit{Lawsonia intracellularis} in the Prevention of Equine Proliferative Enteropathy in Experimentally Infected Weanling Foals

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Intrarectal administration of a commercial avirulent vaccine against \textit{Lawsonia intracellularis} resulted in protection against equine proliferative enteropathy (EPE) in vaccinated foals. Vaccinated foals were also protected against subclinical disease and maintained average daily weight gains similar to the control foals. The use of the \textit{L. intracellularis} vaccine should be considered on naïve and endemic farms in an attempt to reduce or prevent EPE. Authors’ addresses: Department of Veterinary Medicine and Epidemiology (Pusterla, Mapes, Collier, Hill, DiFrancesco, White, Akana, and Simonek) and The William R. Pritchard Veterinary Medical Teaching Hospital (Nogradi), School of Veterinary Medicine, University of California, Davis, CA 95616; and Department of Veterinary and Biomedical Sciences, College of Veterinary Medicine, University of Minnesota, St. Paul, MN 55108 (Vannucci and Gebhart); e-mail: npusterla@ucdavis.edu. *Corresponding author. © 2011 AAEP.

1. Introduction
Equine proliferative enteropathy (EPE) is an emerging disease of foals caused by the obligate intracellular organism \textit{Lawsonia intracellularis}. Although the clinical entity, diagnostic work-up, and treatment of EPE are well-established and described, preventive measures for the disease have remained largely unaddressed. The purpose of this study was to investigate the efficacy of an avirulent \textit{L. intracellularis} vaccine using naïve weanling foals experimentally challenged with an equine \textit{L. intracellularis} isolate.

2. Materials and Methods
Healthy weanling foals were randomly assigned to a vaccinated (n = 4), non-vaccinated (n = 4), or control (n = 4) group. Vaccinated foals received 30 mL avirulent \textit{L. intracellularis} vaccine intrarectally given 60 and 30 days before experimental challenge. One day post-weaning, vaccinated and non-vaccinated foals were challenged through nasogastric intubation with a virulent heterologous isolate of \textit{L. intracellularis}. Clinical observation, weight, serum concentration of total solids, ultrasonographic evaluation of small intestine, fecal excretion of \textit{L. intracellularis},
and seroconversion were measured for 56 days in each foal. Clinically affected foals were treated with appropriate antimicrobials and supportive care.

3. Results

All vaccinated foals were protected against clinical disease after challenge with virulent *L. intracellularis*. Three of four non-vaccinated foals developed moderate to severe clinical signs between days 19 and 29 post-challenge, including hypoproteinemia and thickened small intestinal loops by sonographic evaluation. Vaccinated foals had significantly less fecal shedding of *L. intracellularis* compared with non-vaccinated foals. Serological responses between vaccinated and non-vaccinated foals post-challenge administration were similar. Control foals remained unaffected, and polymerase chain reaction and serological testing confirmed absence of *L. intracellularis* infection throughout the study period.

4. Discussion

Results of this study showed that weanling foals vaccinated intrarectally with an avirulent live vaccine against *L. intracellularis* were protected against clinical EPE after challenge exposure with a virulent *L. intracellularis* isolate of equine origin. This finding was determined by lack of clinical disease, absence of hypoproteinemia and ultrasonographic abnormalities compatible with EPE, and significant reduction in the pathogenic *L. intracellularis* fecal shedding in vaccinated foals compared with non-vaccinated foals. Furthermore, average daily weight gains from the vaccinated foals over the entire study period were similar to the control foals and were significantly higher compared with the non-vaccinated foals, highlighting the benefit of the vaccine in the prevention of subclinical disease.

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