Efficacy of Seramune in the Treatment of Failure of Passive Transfer in Foals

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The oral administration of a concentrated oral IgG supplement (Seramune) to neonatal foals, in accordance with the manufacturer’s dosage recommendations, does not increase plasma IgG concentrations to the desired target of 800 mg/dl, but it may help to minimize neonatal infections. Authors’ addresses: Dept. of Animal and Veterinary Sciences, Clemson University, 150 Plant and Animal Bldg., Clemson, SC 29634-0361 (Evans and Cross) and College of Veterinary Medicine, North Carolina State University, 4700 Hillsborough St., Raleigh, NC 27606 (all other authors). © 1998 AAEP.

1. Introduction
Failure of passive transfer (FPT; IgG <200 mg/dl) and partial failure of passive transfer (PFPT; IgG 200–800 mg/dl) are known to be risk factors for the development of infection in neonatal foals. In cases in which the absorption of oral immunoglobulins is still possible (foals <18–24 h of age), FPT and PFPT are most often treated by the administration of colostrum from other mares (from a colostrum bank). Bovine colostrum may be used instead, although bovine IgG is short lived in the foal.

A number of concentrated equine serum products and lyophilized or concentrated IgG products are commercially available; however, to our knowledge there is very limited research evaluating their efficacy in the treatment of FPT in foals. Seramune is a concentrated equine IgG product that reportedly increases serum IgG concentrations in normal foals that nurse normal mares. The purpose of this study was to evaluate the efficacy of Seramune in the treatment of FPT in newborn foals born to mares with suboptimal colostrum.

2. Materials and Methods
Twelve light horse mares from the Clemson University Equine Center were used. These mares were part of a study investigating the effects of increased doses (5×) of domperidone as part of a pharmaceutical safety study. The doses used resulted in premature lactation in all mares. Immediately following spontaneous parturition, milk was collected from each mare and frozen. Each foal received Seramune by nasogastric tube according to label directions (two doses of 150 ml, 1–2 h apart) within 4 h of birth. The foals were allowed to suckle their mares ad lib. All foals received tetanus antitoxin 1500 IU IM at birth. Blood was collected prior to the administration of Seramune (n = 12) and at 12 h (n = 3) and 24 h (n = 5) of life. Blood-sample collection continued at biweekly intervals (n = 3–12 at different time points) until the foals were 12 weeks of age. The condition of the foals and any treatment, including antibiotic therapy, were recorded. Blood was also collected from foals suckling normal mares at 24 h of age and at biweekly intervals (controls, n = 3).
Colostral and plasma IgG concentrations were measured by radial immunodiffusion\(^b\) and group means were compared by paired \(t\) test.

3. Results
All of the treated mares had colostral IgG concentrations that were markedly below established normal values. When the foals were at 24 h of age, the mean plasma IgG concentrations for foals that received Seramune were significantly lower than those of control foals (105 ± 2.6 mg/dl vs. 3967 ± 1966 mg/dl; \(p < 0.0017\)), and they remained significantly below control values throughout the study. Five of the Seramune-treated foals required treatment for mild illness (lethargic or slow to nurse), diarrhea, or joint effusion with lameness. These foals received 3–6 days of antibiotic therapy (oral trimethoprim-sulfa, or intramuscular penicillin and gentamicin, or intramuscular ampicillin), and they were clinically normal following antibiotic treatment. All treated and control foals survived the 12-week study period.

4. Discussion
The results of this study indicate that, at the recommended dosage, Seramune is ineffective in raising plasma IgG concentrations above 800 mg/dl in foals that suckle mares with suboptimal colostrum. However, despite low plasma IgG levels, none of the foals experienced severe or life-threatening illness, and all survived to at least 12 weeks of age. Madigan suggested that the early administration or ingestion of colostrum reduces the risk of illness in foals by inducing early gut closure and preventing the absorption of pathogenic bacteria.\(^3\) Early ingestion of Seramune may have similar benefits. The incidence and severity of infection in foals with FPT or PFPT are influenced by management practices, environmental conditions, virulence of pathogens, concurrent stress or disease, and specificity of colostral antibody.\(^1\) Thus, the absence of significant illness in the foals in this study could also be attributed to low numbers of pathogenic bacteria in the foal’s environment.

The efficacy of concentrated oral immunoglobulin products such as Seramune in the treatment of FPT in foals requires further investigation. In particular, the dose of Seramune required to increase plasma IgG concentrations to >800 mg/dl, and its usefulness in suboptimal management situations, in which an increased pathogenicity of bacteria increases the risk of neonatal infection, requires evaluation.

References and Footnotes
\(^a\)Seramune, Sera, Inc., P.O. Box 15866, Shawnee Mission, KS 66285-5866. The Seramune used in this study was generously donated by the company.
\(^b\)Triple J Farms, 23404 N.E. 8th St., Redmond, WA 98053.