Effect of Intra-Uterine Infusion of Diluted N-Acetylcysteine on Equine Endometrium

Alicia Gores-Lindholm, DVM; Scott Ahlschwede, DVM; Robert Causey, DVM, PhD; Maron Calderwood-Mays, VMD, PhD, Diplomate ACVP; and Michelle M. LeBlanc, DVM, Diplomate ACT

Chronic uterine infection or persistent inflammation in the mare may be associated with hypersecretion of mucus and disruption of the architecture of the endometrial epithelium. An infusion of 3.3% N-acetylcysteine (NAC), a mucolytic agent, into the uterus of reproductively healthy and barren mares did not adversely affect endometrial histology or epithelial architecture. When included in a treatment regimen, infusion of NAC before breeding was associated with higher than expected pregnancy rates in subfertile mares, whereas other treatment regimens without NAC infusion had been unsuccessful. Authors’ addresses: Rood and Riddle Equine Hospital, PO Box 12070, Lexington, Kentucky 40580 (Gores-Lindholm, Ahlschwede, LeBlanc); Department of Animal and Veterinary Sciences, 5735 Hitchner Hall, University of Maine, Orono, Maine 04469 (Causey); and Florida Veterinary Pathology Consultants, PO Box 67, Bushnell, Florida 33513 (Calderwood-Mays); e-mail: arglindholm@gmail.com. © 2009 AAEP.

1. Introduction
Previous work has shown that mares with delayed clearance or chronic endometritis produce more mucus than reproductively healthy mares. Therefore, treatment with a mucolytic agent such as N-acetylcysteine (NAC) may assist in the clearance of mucus as well as antibiotic penetration, and this combination may increase pregnancy rates.

2. Materials and Methods
Twenty-two mares were divided into 3 groups: fertile control (n = 6), fertile treatment (n = 6), and barren treatment (n = 10). Endometrial biopsies were taken before (day 1) and after (day 4) a uterine infusion of 150 ml of saline (control mares) or a 3.3% solution of NAC (30 ml of a 20% solution in 150 ml of saline; treatment mares). On days 2 and 3, the uterus was irrigated with 1 l of Lactated Ringers solution. Endometrial tissues were given a Kenney grade, and mucus production was measured by computerized image analysis. Additionally, 20 Thoroughbred mares repeatedly bred in 2008 were mated naturally after they received a 0.6% solution of NAC either one treatment cycle before breeding (n = 10) or 48 h before breeding (n = 10). Post-breeding treatments (including uterine lavage, antibiotic infusion, acupuncture, and other therapies) were performed in some mares.

3. Results and Discussion
Uterine infusion containing NAC was not harmful to the endometrium. When incorporated into the treatment regimen, infusion of diluted NAC before breeding was associated with higher than expected pregnancy rates in subfertile mares (17 of 20 mares; 85%).