Effects of Fescue Toxicosis and Fluphenazine on Relaxin Concentrations in Pregnant Pony Mares

Peter Ryan, PhD; Karen Bennet-Wimbush, PhD; Wayne Loch, PhD; Wendy Vaala, VMD; and Carol Bagnell, PhD

Data presented here indicate that serum relaxin concentrations in pregnant pony mares exhibiting signs of endophyte-infected tall-fescue toxicosis were depressed. A one-time injection of fluphenazine resulted in a significant increase in relaxin concentrations and improved pregnancy outcome.

Authors' addresses: Dept. of Molecular Biology, Princeton University, Princeton, NJ 08544 (Ryan); Ohio State Agricultural Technical Institute, Wooster, OH 44691 (Bennet-Wimbush); Dept. of Animal Science, University of Missouri, Columbia, MO 65211 (Loch); Mid-Atlantic Veterinary Clinic, P.O. Box 188, Ringoes, NJ 08551 (Vaala); and Dept. of Animal Sciences, Rutgers University, New Brunswick, NJ 08903 (Bagnell). © 1998 AAEP.

1. Introduction
Tall fescue is one of the most widely grown forage grasses for horses. However, it is frequently infected (58% of the acreage) with the endophyte Acremonium coenophialum, which produces ergot alkaloids that cause severe adverse effects in pregnant mares. Mares foaling on endophyte-infected tall-fescue pastures frequently experience placental thickening, prolonged gestation, complicated deliveries, agalactia, and a high incidence of foal mortality. Also, endophyte toxins cause a decrease in serum prolactin and progesterone in brood mares. Foal mortality is due to dysmaturity and hypoxia, which may result from poor blood flow to the placenta and is consistent with placental thickening. In addition, the agalactia syndrome seen in animals affected by fescue toxicosis may be related to poor mammary gland development, which has been shown to be relaxin dependent in other species. The objective of this study was to investigate whether relaxin concentrations in pregnant ponies exhibiting signs of fescue toxicosis were reflective of placental function and pregnancy outcome. This study is an extension of a previous study that examined serum prolactin and the efficacy of fluphenazine as a treatment for fescue toxicosis in pregnant pony mares.

2. Materials and Methods
Twelve pregnant pony mares (ages 5–20) were randomly assigned to one of two treatment groups. Group TRT (n = 6) received fluphenazine deconate 25 mg IM (a long-acting D2-dopamine receptor antagonist) on day 320 of gestation. Group CTL (n = 6) served as untreated controls. All of the mares were grazed on 80% endophyte-infected tall-fescue pasture throughout their pregnancy. Blood samples were collected daily at 1700 h by jugular venipuncture, and serum was analyzed for relaxin at Rutgers University (Department of Animal Sciences), using a homologous equine relaxin radioreimmunoassay.
Data were grouped according to week prior to parturition (days 0 to 7 = week -1; days -8 to -14 = week -2) and to week after treatment (days 320 to 327 = week 1; days 328 to 335 = week 2). Results were analyzed by an analysis of variance and Fisher’s protected least-squares difference test.

3. Results

The length of gestation of pony mares grazed on endophyte-infected tall fescue was variable, ranging from 325 to 357 days with an average gestation length of 338 ± 4.6 days. In contrast, animals treated with fluphenazine delivered consistently close to the expected due date (330 ± 0.7 days; p < 0.11).

Fluphenazine treatment resulted in a significant (p < 0.05) increase in serum relaxin concentrations in pony mares. When the data were examined on a weekly basis, mean relaxin concentrations in both groups of mares during the week prior to treatment were variable but not different (TRT, 61.5 ± 3.8 ng/ml; CTL, 54.3 ± 1.5 ng/ml). However, in the 2 weeks prior to delivery, there was a significant difference in relaxin levels; this effect was most dramatic (p < 0.01) during the last week of gestation (TRT, 65.5 ± 2.1 ng/ml; CLT 48.4 ± 2.0 ng/ml). The same outcome was obtained when data were compared from day of treatment (day 320 of gestation). Three of the six untreated mares exhibited at least one of the signs of fescue toxicosis (thickened placenta, still birth, agalactia), while only one treated mare showed obvious clinical symptoms. When these mares were grouped together, their serum relaxin levels were lower (p < 0.05) than those in mares exhibiting no signs of fescue toxicosis.

4. Discussion

Data presented here indicate that serum relaxin concentrations in pregnant pony mares exhibiting signs of endophyte-infected tall-fescue toxicosis were depressed. The results suggest that the lower relaxin levels in untreated pony mares may be attributed to compromised placentas. Furthermore, the presence of agalactia postpartum may result from lower circulating levels of relaxin than normal, since relaxin is important for normal mammary gland development and lactation in other species.

The clinical observations of this study also suggest that a one-time injection of fluphenazine resulted in an improved pregnancy outcome by reducing the effects of fescue toxicosis concomitant with improved relaxin levels.

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References