Efficacy of Domperidone on Induction of Ovulation in Anestrous and Transitional Mares

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Administration of the dopamine antagonist domperidone at a dose of 1.1 mg/kg or 2.2 mg/kg body weight PO q 24 h did not significantly advance the day of the first ovulation of the year in deep anestrous mares maintained outside under ambient light conditions or in transitional mares maintained inside under a stimulatory artificial photoperiod. Authors’ addresses: Animal Reproduction and Biotechnology Laboratory, Colorado State University, Ft. Collins, CO 80523 (McCue, Buchanan, Farquhar, and Squires) Animal, Dairy and Veterinary Sciences Department, Clemson University, Clemson SC 29634 (Cross). © 1999 AAEP.

1. Introduction
Domperidone is a synthetic antagonist of the natural neurotransmitter dopamine. Domperidone has received a great deal of attention in the past several years as an effective treatment for fescue toxicity in pregnant mares.1 Fescue toxicity occurs when mares ingest fescue grass infested with a fungus (Acremonium coenophialum) that produces an ergot alkaloid that acts as a dopamine agonist and results in the suppression of prolactin secretion.

Dopamine antagonists, including domperidone and sulpride, have recently been reported to stimulate ovarian follicular activity and advance the first ovulation of the year in seasonally anestrous mares.2,3 Equine practitioners and breeding farms are currently incorporating the use of dopamine antagonists in the management of transitional mares with limited clinical data to support their use.

The goal of this 2-year study was to compare the efficacy of an artificial photoperiod with that of once-daily administration of domperidone in stimulation of follicular development and ovulation in deep anestrous and transitional mares.

2. Materials and Methods
A. Year 1
Forty mares in deep winter anestrus were randomly assigned to four treatment groups of 10 mares each on January 15, 1998. Mares in Group 1 were maintained under an ambient photoperiod and did not receive domperidone. Mares in Group 2 were maintained under an artificial photoperiod consisting of 16 hours of light and 8 hours of darkness and did not receive domperidone. Mares in Group 3 were maintained under an artificial photoperiod consisting of 16 hours of light and 8 hours of darkness and did not receive domperidone. Mares in Group 3 were maintained under an artificial photoperiod and received domperidone 1.1 mg/kg body weight q 24 h for a maximum of 60 days. Mares in Group 4 were maintained under an ambient photoperiod and re-
received domperidone 2.2 mg/kg body weight q 24 h for a maximum of 60 days.

B. Year 2
Forty-eight mares in deep anestrus were placed indoors under an artificial photoperiod consisting of 16 hours of light and 8 hours of darkness on December 15, 1998. On January 22, 1999, 20 of these mares with transitional ovaries (largest follicle, 20—29 mm in diameter) were randomly assigned to two treatment groups. Group 1 mares (n = 10) were maintained under lights with no domperidone treatment. Group 2 mares (n = 10) were maintained under lights and received domperidone 1.1 mg/kg body weight q 24 h for a maximum of 30 days.

Mares in both studies were examined twice weekly by palpation and ultrasonography of the reproductive tract per rectum to monitor follicular development. All mares received 2500 IU of human chorionic gonadotropin (hCG) IV once a follicle ≥35 mm was detected to induce ovulation. Mares were examined daily after administration of hCG to determine the day of ovulation.

The interval from onset of treatment to ovulation was compared in Year 1 by analysis of variance and in Year 2 by Student's t test. All data are presented as the mean ± SD.

3. Results

A. Year 1
The mean interval from onset of treatment to ovulation was not significantly different (p > 0.05) between Group 1 (control) mares (109.9 ± 22.8 d) and mares receiving domperidone 1.1 mg/kg (Group 3, 105.1 ± 19.1 d) or 2.2 mg/kg (Group 4, 89.0 ± 29.4 d). Mares maintained outside under a stimulatory artificial photoperiod (Group 2) ovulated significantly (p < 0.05) earlier (56.1 ± 11.4 d) than control mares or mares receiving domperidone.

B. Year 2
There was no significant difference (p > 0.05) in the interval from onset of the stimulatory artificial photoperiod and the mean day of ovulation for mares not receiving domperidone (Group 1, 63.56 ± 6.6 d) and mares receiving domperidone (62.1 ± 18.7 d).

4. Discussion
In the first study, administration of the dopamine antagonist domperidone did not advance the onset of the first ovulation of the year when administered to deep anestrous mares maintained outdoors under ambient light conditions compared with untreated control mares. Domperidone treatment was not as effective in stimulating follicular development in deep anestrous mares as was use of an artificial photoperiod. In the second study, domperidone was also ineffective at advancing the first ovulation of the year when administered to mares in transition maintained indoors under a stimulatory artificial photoperiod compared with untreated control mares maintained under similar conditions.

In contrast, Brendemuehl and Cross report that domperidone, when administered at the same dosage in the present study, was effective in advancing the first ovulation of the year in seasonally anestrous mares maintained outdoors under natural photoperiod and ambient temperature in the Southeastern United States. In addition, Daels et al. reported that the dopamine antagonist sulpride stimulated follicular development in anestrous mares housed indoors and was ineffective in mares maintained outdoors under natural light conditions in the Northeastern United States. It is possible that climatic conditions, such as ambient temperature, and follicular status (i.e., deep anestrus versus transitional) influenced the efficacy of dopamine antagonist administration in stimulating ovarian activity in anestrous mares. No studies have been published to date on the effects of ambient temperature on domperidone-induced follicular activity.

In summary, the efficacy of dopamine antagonist administration in stimulating follicular development and ovulation in anestrous mares is still controversial. Equine practitioners should be advised to continue the use of a stimulatory artificial photoperiod in the management of the transition period and not rely completely on a dopamine antagonist until further studies have been reported.

References