Equine Thyroid Hormone Levels and Pregnancy Rates at 15 to 16 Days Post-Ovulation

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A significant relationship does not exist between total thyroxine (T4) levels and pregnancy rates at 15 to 16 days post-ovulation. Thyroid hormone supplementation does not have a significant effect on pregnancy rates at 15 to 16 days post-ovulation. Authors’ addresses: Rood and Riddle Equine Hospital, P.O. Box 12070, Lexington, KY 40580-2070. © 2000 AAEP.

Introduction

The role that equine hypothyroidism plays in fertility in the mare is unclear.1 This is largely due to the inadequacies of current routine diagnostic capabilities.2 Practitioners rely solely on serum thyroxine (T4) levels and clinical signs, if present, to arrive at a presumptive diagnosis of hypothyroidism. Many broodmares are treated with exogenous thyroxine supplementation as a result of a perceived thyroid hormone deficiency. The scientific validity of this practice and the cost-to-benefit ratio remain in question.

To our knowledge, information comparing T4 levels and fertility in mares does not exist.1,3-5 The purpose of this study was to determine if a relationship existed between T4 levels and pregnancy rates at 15 to 16 days post-ovulation.

Materials and Methods

Three hundred twenty-nine clinically normal broodmares bred on four central Kentucky thoroughbred farms during one breeding season were used as the study population. The data and results generated represent only the first cover of the season for each mare.

Pregnancy was documented on mares at 15 to 16 days post-ovulation by rectal palpation and by the ultrasonographic presence of an embryonic vesicle. Blood was collected to measure serum T4 concentrations following ultrasonographic examination. Serum T4 was measured with the AxSYM® system and a Fluorescence Polarization Immunoassay (FPIA).a The assay measures both protein-bound and unbound forms of T4.

Chi-Square statistical analysis, Fisher’s Exact test, and regressional analysis were used to determine correlations between T4 values and pregnancy rates at 15 to 16 days post-ovulation and to compare pregnancy rates in supplemented and non-supplemented mares.b The Fisher’s Exact test was used when the sample size was small.

Results

Serum T4 concentrations were measured in 329 mares. Serum T4 ranged from 4.5 µg/dL to 53.9 µg/dL, with 24 µg/dL as the mean and 23.8 µg/dL as the median. Serum T4 concentrations in the 231...
mares that were diagnosed pregnant 15 to 16 days post-ovulation were found to be normal in 198 mares (16–45 μg/dL), low in 31 mares (<16 μg/dL), and high in 2 mares (>45 μg/dL). Serum T4 concentrations in the 98 mares not found to be pregnant were normal in 85 mares, low in 9 mares, and high in 4 mares. There was no significant relationship between T4 levels and pregnancy (p = .282). Neither the age of the mare nor serum T4 concentrations at the 15- to 16-day pregnancy examination were related to pregnancy outcome.

Of the 269 mares not supplemented with thyroid hormone, 187 were and 82 were not pregnant at the 15 to 16 day pregnancy examination. Of the 60 mares supplemented with thyroid hormone, 44 were and 16 were not pregnant at the 15- to 16-day examination. There was no significant relationship between thyroid hormone supplementation and pregnancy at 15 to 16 days post-ovulation.

Discussion
There was no demonstrable relationship between T4 levels and pregnancy in mares at 15 to 16 days post-ovulation. A significant relationship between thyroid hormone supplementation and pregnancy in mares at 15 to 16 days post-ovulation did not exist. Based upon this data, we feel that T4 testing should not be a routine part of a breeding program. Results of this study show that there was not a difference between supplemented mares and non-supplemented mares’ pregnancy rates at the 15- to 16-day examinations. This data supports supplementation only when indicated by more definitive testing. Supplementation of horses with a low T4 value alone is not indicated, nor is it likely to be beneficial.

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References and Footnotes

*Abbott AxSYM® Total T4 System, Abbott Laboratories, Diagnostic Division, Abbott Park, IL 60064.