Dehydroepiandrosterone sulfate and testosterone concentrations in mares carrying normal pregnancies

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Dehydroepiandrosterone, a product of the fetal gonads, is utilized by the placenta as a precursor for estrogen synthesis during pregnancy. Dehydroepiandrosterone is sulfo-conjugated by the fetal-placental unit. In mares, circulating testosterone is elevated during pregnancy, and this elevation has been associated with the fetal-placental unit. As pregnant mares have increasing concentrations of circulating estrogens between 210 and 240 days of gestation, we hypothesized that androgens achieve maximal concentrations at similar gestational age. The objective of this study was to describe dehydroepiandrosterone sulfate and testosterone concentrations in mares carrying normal pregnancies. Eighteen light-breed mares were used in this study. Mares were bred with fresh extended semen during the breeding season of the northern hemisphere. Ovulation was determined by transrectal ultrasonography by examinations carried out every other day. Blood samples were collected every two weeks from 100 days of gestation to term. Blood was allowed to clot, and serum was harvested and preserved at -20°C until further analysis. Postpartum placentas were examined to assure normality. Determination of dehydroepiandrosterone sulfate (CV’s; intrassay 6.5% and interassay 10.3%) and testosterone (CV’s; intrassay 9.7% and interassay 17%) were achieved with specific equine immunoassays. Data were log-transformed and analyzed using a mixed model (with mare as random effect and time as a fixed effect). Post hoc comparisons were made by Fisher’s protected least significant difference (day effect) test. Significance was set at p<0.05. All mares had normal gestation lengths (mean 348 ± 2.8 days) and delivered normal placentas. There was significant day effect for both androgens (p<0.0001). Concentrations of dehydroepiandrosterone sulfate peaked by six months of gestation (p<0.05), which is one month before the reported peak for estrogens. However, testosterone was progressively elevated from days 100 to 180 (p<0.05), and then plateaued until ~240 days; thereafter a progressive decline was observed until 290 days of gestation (p<0.05). Concentrations of testosterone remained constant between 290 days and term (p>0.05). In conclusion, dehydroepiandrosterone sulfate and testosterone concentrations were elevated in pregnant mares and varied through day 100 to term. As estrogens have been extensively used as biomarkers for pregnancy loss in mares, androgens may be useful biomarkers in mares suffering placental disease; however, this hypothesis should be addressed in further studies.

Keywords: Pregnancy, androgens, fetal-placental unit, fetal gonad, horses

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