The Use of Betamethasone to Advance Fetal Maturation in the Equine

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Various attempts to induce precocious maturation of the equine fetus have met with mixed results. Intrafetal injections of adrenocorticotropic hormone (ACTH), betamethasone (BMS), and dexamethasone (DEX) have been shown to advance equine fetal maturation, but are associated with a high (~30%) incidence of spontaneous abortion. Currently, practitioners utilize high doses of DEX (100mg) given on four consecutive days to initiate equine fetal maturation although DEX is thought to be effective only when given very late in gestation. In the human, betamethasone sodium phosphate (Celestone™) is more commonly used to advance fetal maturation. Therefore, the aim of this pilot study was to ascertain whether fetal maturation of the foal could be induced precociously by maternal injection with BMS. To this end, 13 Quarter Horse mares received either saline (SAL, n = 5), or BMS injections (im) at 12 mg (n = 3), 24 mg (n = 3) or 30 mg (n = 2) on Day 305, 306 and 307 of gestation. Delivery was induced (20 IU oxytocin injections) on Day 320 in five mares (two 12 mg, two 24 mg and one 30 mg). Other BMS-treated mares were not induced due to a poor response to treatment. Foal blood samples were collected at 0, 24 and 48 h and analyzed for cortisol (C), P4, T4 and T3 concentrations. Blood cell counts at 0h and 24h post-partum were also used as markers of foal maturity. All SAL and non-induced treated mares foaled at term without complications. Only one mare in the 24 mg group delivered normally following induction. All other induced mares required assistance. Complications associated with the premature induction of parturition in mares included one mare refusing her foal, one having a cervical tear and one having a uterine and cervical tear. In addition, one of the 24 mg mares had a mild nocardioform placentitis found on histopathologic examination that may have caused precocious maturation of that fetus. Two foals (24 mg) survived to weaning while the remaining three (two 12 mg and one 30mg) were euthanized within 48 h due to dysmaturity and failure to respond to clinical support. Consequently, data was analyzed as SAL (non-induced, n=5), treated non-induced (T-NI, n=3) and treated induced (T-I, n=5). Serum C was undetectable in four of five T-I foals with P4 values greater (12.5. $\pm$ 3.1 ng/ml, $P>0.05$) at 0 h compared to SAL and T-NI foals (9.1 $\pm$ 1.9, 8.7 $\pm$ 1.7 ng/ml, respectively). White blood cells at 0 h were greater in T-I than T-NI ($P<0.05$) and SAL ($P<0.1$) foals. SAL and T-NI treated mares foaled at term without complications, with BMS advancing delivery by 7-14 days in T-NI mares. In conclusion, while maternal BMS treatment appeared to advance delivery date in non-induced mares, it did not accelerate fetal maturation adequately to successfully induce pre-term delivery of foals.

Key words: Foal, Fetal Maturation, Betamethasone