The Correlation Between Anti-Müllerian Hormone and Antral Follicle Count in Mares Undergoing Estrous Cycle Manipulation

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Anti-Müllerian hormone (AMH) concentration is correlated with antral follicle count (AFC) in the mare. Because of this relationship, potential lies in the ability of AMH to act as a prognostic tool for assessing a mare's overall fertility or, more specifically, predicting a mare's potential as an oocyte donor for the production of in vitro-derived embryos. It is unknown if AMH concentrations remain correlated when mares are undergoing hormone therapy protocols aimed at increasing AFC to promote oocyte aspiration efficiency. The aim of this project is to determine if AFC is correlated to AMH values in mares undergoing cycle manipulation with only follicle ablation (controls) or undergoing hormone therapy targeted to increase AFC with either progesterone and estradiol (P&E) or with a proprietary drug that supports follicular growth. We hypothesize that AMH concentration will be positively correlated with AFC in mares undergoing cycle manipulation. For this study, data was analyzed from two previous experiments. In the first experiment, 10 mares underwent a crossover design in which mares did (P&E group) or did not (Control group) receive a dose of a slow-release formulation of progesterone and estradiol 17β (P&E, a total dose of 1.5 g and 50 mg, respectively) on Day 0. On Day 0, all mares underwent transvaginal follicle ablation. On Days 0, 3, 6, and 10, AFC was determined via transrectal ultrasound and serum was stored for AMH enzyme-linked immunosorbent assay (ELISA). In the second experiment, a group of 6 mares (Proprietary Drug group) underwent transvaginal follicle ablation (Day -10) followed by prostaglandin (5 mg dinoprost tromethamine IM, Day -4) to lyse existing luteal tissue and act as a means of cycle synchronization. The proprietary drug was administered on Days 0 through 4. On Days 0 through 4 and Day 7, AFC was determined via transrectal ultrasound and serum samples were stored for AMH ELISA. Data was analyzed for normality via Shapiro-Wilk and correlation was determined by Kendall rank correlation coefficient. Day 0 AMH and AFC data was removed prior to analysis, as this was the first day in which cycle manipulation (i.e., drug administration or ablation) occurred in most mares. Significance was set at $P < 0.05$ for all analyses and performed in R version 4.3.1. There was no significant correlation (R = 0.17; p = 0.19) between AMH and AFC in the Control group (n=10), a moderately positive correlation (R=0.51; p = 0.00011) in the P&E group (n=10), and a weak positive correlation (R = 0.36; p = 0.0062) in the Proprietary Drug group (n=6). This study demonstrates that there is a statistically significant positive correlation between AMH concentration and AFC in mares undergoing two treatments that support follicular growth. Future studies are needed to determine if AMH concentration can be a tool used to help assess oocyte aspiration potential and fertility in the mare.