Progesterone levels and interovulatory intervals of mares treated with intrauterine fractionated coconut oil

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Intrauterine plant oil infusion, including one milliliter (ml) of fractionated coconut oil, was reported to be a safe, cheap and reversible option to prolong the luteal phase in mares when administered on day (D)10 of the estrous cycle. The objective of this study was to understand and compare the utero-ovarian response to one ml and 0.5 ml of coconut oil administered into the uterus using an insemination pipette and an embryo transfer gun, respectively, on D10 of diestrus. We hypothesized that intrauterine administration on D10 of both volumes of coconut oil with either infusion device would result in prolonged luteal function. Light horse mares (n=12) were examined using transrectal palpation and ultrasonography to determine if they had a normal interovulatory interval, and then were examined daily in estrus until the D of ovulation (D0), and every other D during one estrous cycle. Mares were randomly assigned to treatment and studied over one to two estrous cycles with a resting (“washout”) cycle after each treatment cycle. Jugular blood was drawn on D11,13,15 and 17, centrifuged and serum stored until further assaying for progesterone (P4; Siemens Coat-a-Count Progesterone RIA, Los Angeles, CA). Groups were: diestrus control (n=5), coconut oil 1.0 ml (Miglyol 810, Sasol Oil, Witten, Germany) infused in the uterus with an artificial insemination pipette on D10 (n=5) and coconut oil 0.5 ml infused in the uterus with an embryo transfer gun on D10 (n=5). All statistical analyses were performed using Stata, version 13.1, College Station, TX at p<0.05. Normality was evaluated using the Shapiro-Wilk tests and non-normal data analyzed using non-parametric tests. Days to luteolysis (DTL) defined as P4 <2.0 ng/ml, was examined using ANOVA, and a post hoc Bonferroni test. There was a significant difference (p=0.0083) in DTL (mean ± SD) between the control (15.8 ± 1.09), coconut oil infused 1.0 ml (12.2 ± 0.45) and coconut oil infused 0.5 ml (15.2 ± 2.48), mare groups, with the control group greater than the 1.0 ml group (p=0.011), and the 0.5 ml group greater than the 1.0 ml group (p=0.034). The effect of treatment and D on P4 levels were analyzed using the Kruskal-Wallis, and Dunn’s tests. There was a significant effect of treatment (p=0.0098) on P4 levels with control group P4 levels higher than the 1.0 ml group (p=0.0012), and the 0.5 ml group higher than the 1.0 ml group (p=0.0495). There was a significant effect (p<0.0001) of D on P4. The overall median P4 levels in ng/ml [median (quartiles)] for the four D were: control [8.0 (1.5, 13.8)], coconut oil 1.0 ml [0.7 (0.005, 6.1)], and coconut oil 0.5 ml [3.9 (0.35, 12.3)]. Post hoc tests showed significant differences (p<0.03) between all D except D11 vs D13, and D15 vs D17. We concluded that intrauterine coconut oil administration lowered progesterone levels during diestrus and did not prolonged the luteal phase of the mares.

Keywords: Coconut oil, mare, interovulatory, progesterone.