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Two doses of prostaglandin F2 alpha in the Ovsynch protocol on follicle diameter and circulating estradiol prior to ovulation in heifers

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Prostaglandin F2 alpha (PGF) plays an important role in the ovulation process increasing the pituitary responsiveness to GnRH to release LH. However, the mechanism of action on the ovulatory process remains unclear. This study tested the hypothesis that the second treatment of PGF on day 8 of the Ovsynch increases the size of the preovulatory follicle and circulating concentration of estradiol at day 9 (prior to GnRH treatment). Holstein heifers ($n = 39$) were randomized to receive either the Ovsynch protocol (PGF1: day 0: GnRH, day 7: PGF, day 9 GnRH, day 10: artificial insemination, AI) or the Ovsynch with an additional dose of PGF at day 8 of the protocol (PGF2). Ultrasonography and blood samples were performed at the days of the protocol to evaluate the diameter of the largest antral follicle and the circulating concentration of estradiol-17 β and progesterone. An additional blood sample was collected on day 8 after AI for hormonal analysis. All heifers were AI by the same technician and pregnancy was confirmed 30 days after insemination. Data (mean \pm S.E.M.) were analyzed (ANOVA/Wilcoxon/ Fisher's Exact Test) with $P < 0.05$ set as a threshold of significance (R statistical software version 3.0.2.). The diameter of the preovulatory follicle at day 9 (13.94 ± 0.92 , 15.21 ± 1.0 mm) and day 10 (14.33 ± 1.01 , 13.71 ± 0.92 mm) of the protocol did not differ between PGF1 and PGF2 treatments, respectively. Estradiol concentration did not differ between PGF1 (9.08 ± 2.38 pg/mL) and PGF2 (9.35 ± 2.42 pg/mL) at day 9 of the protocol. Progesterone concentration at day 8 after AI did not differ between PGF1 (3.24 ± 0.4 ng/mL) and PGF2 (2.77 ± 0.24 ng/mL). Pregnancy rate did not differ between PGF1 (58%; 11/19) and PGF2 (50%, 10/20). In conclusion, our hypothesis that the second treatment of PGF at day 8 of the Ovsynch protocol increases follicle diameter and estradiol circulating concentration prior to ovulation was refuted. Although, further analysis must be conducted to determine the circulating concentration of LH and the follicle blood flow at day 9 to improve understanding of the role of PGF on the follicle ovulation. Therefore, the results of the present study will facilitate the future strategies of evaluating the role of PGF on the ovulatory process, avoiding negative results.