Could Luteotropic Agents Prevent Or Delay The Effect Of Prostaglandin $F_{2\forall}$ In Cattle?

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As an approved product for reproductive management, prostaglandin $F_{2\alpha}$ (PG) is used routinely in dairy herds. The inadvertent use of PG in pregnant cows could result in luteolysis (CL regression) and pregnancy loss. There are approved luteotropic (supporting CL function) agents that may counteract the luteolytic (destroying the CL) action of PG but information on their efficacy is lacking. The objective of this study was to determine if the luteolytic effects of PG could be prevented, minimized, or delayed by luteotropic agents, using a non-pregnant cow model. Eighteen lactating non pregnant Holstein cows with a history of normal reproductive cycles were assigned randomly but equally (n=6) to one of three treatment groups. Ovarian status of cows was synchronized using an ovsynch protocol, and ovulation confirmed by ultrasonography (d 0). Between d 8 and 10, PG [25 mg dinoprost tromethamine; Lutalyse ®, Pfizer Canada] was administered intramuscularly to all cows. Exactly five minutes after giving PG, treatments of pLH [25 mg porcine LH; Lutropin-V, Bioniche Animal Health], or GnRH [200 :g gonadorelin acetate; Fertiline®, Vetoquinol NA Inc] or sterile saline solution (2 ml, Control) were given (i.m.) to cows within each treatment group. The time interval of 5 min between PG and luteotropic treatments was chosen as a realistic time frame to take remedial action, i.e., if an accidental PG administration occurred. Blood samples were collected from the jugular vein from all cows 12 h before PG treatment [-12 h], immediately before PG [0 h], 1 h and 6 h after PG, then every 6 h until 48 h after PG, and thereafter twice daily for the next 36 h. Plasma concentrations of progesterone were measured by enzyme-immunoassay. The effects treatment, time (of sampling), and their interactions were determined using the MIXED procedure of SAS. The main effect of time was detected in all treatment groups as progesterone concentrations declined rapidly during the first 24 h following PGF treatment. Decline in progesterone concentrations did not differ between GnRH and control, but progesterone did not fall below 1 ng/mL in cows treated with pLH until after 72 h. Results suggest that pLH countered the effect of PGF and delayed luteolysis. Whether repeating the pLH treatment every 6-8 h for the first 24 h after PGF administration will prevent luteolysis is worth investigating.

Implications: We investigated if either gonadotropin releasing hormone (Fertiline) or porcine luteinizing hormone (Lutropin-V) will counter the effect of PG. Lutropin-V appeared to delay the effect of prostaglandin for several hours, but neither product was effective in preventing CL regression.