Determining the lowest dose of prostaglandin needed for luteolysis of a mature corpus luteum in cycling donkeys in the Caribbean

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By gaining a better understanding of the jenny's reproductive characteristics efforts can be made to improve breeding management for population control, or in the case of endangered species, better reproductive efficiency. Although donkeys are often treated similarly to horses there is evidence that they metabolize agents very differently. Dinoprost tromethamine is a luteolytic agent used in cycling mares to control time of estrus. The labeled dose is known to cause adverse effects mimicking colic behavior but studies have shown that one-eighth of the labeled dose is effective and does not cause unwanted side effects. The aim of this study was to determine the lowest effective dose of dinoprost tromethamine in cycling jennies in the Caribbean. The study also characterized adverse side effects at each tested dose of dinoprost tromethamine.

Seven reproductively sound, non-pregnant Caribbean jennies between 3 and 12 years of age were monitored via transrectal ultrasonography daily to detect follicular and corpus luteum (CL) formation. Seven days after the formation of a CL one of four dinoprost tromethamine treatment doses (Full, Half, Quarter, Lowest) was administered to donkeys arranged in a cross-over design. They were monitored for 30 minutes following treatment and pulse, respiration and behavior recorded every 5 minutes. After treatment, the measurement of the two largest follicles as well as the CL were recorded daily until a new ovulation occurred. Seven days later, donkeys received a different assigned treatment. They continued in this cycle until all four treatments were concluded. Estrous cycle lengths were extracted from this and compared by treatments. Cycle length was analyzed by mixed effects multiple linear regression using jenny as a random variable and treatment dose as fixed effect.

Overall respiration rate and heart rate were similar throughout all treatment groups but behavior was notably different. For the adverse effect of cramping the full dose treatment group had 7/7 adverse effects, the half dose had 3/7, the quarter dose had 1/7 and the lowest dose had 0/7 effects. All treatment doses of dinoprost tromethamine were effective at reducing the estrous cycle length compared to the jennies' normal (untreated) cycle ($P < 0.0001$). Estrous cycles were reduced by an average of 6.6 days for the full dose, 5.7 days for the half dose, 6.6 days for the quarter dose and 4.4 days for the lowest dose. The lowest dose showed the most variable response ($P = 0.001$), while still reducing cycle length overall.

The results of these experiments correlate to those found in mares and show that lower doses of dinoprost tromethamine effectively shorten estrous cycles in the jenny. Future research will test the efficacy of a different synthetic prostaglandin, cloprostenol used at lower than conventional doses.

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