Animal Reproduction

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Injectable progesterone, follicular dynamics and estrous synchronization in cyclic ewes

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Resumo

The aim of the present study was to evaluate the pharmacokinetics of two different doses of injectable long-acting commercial progesterone (P4i) in cyclic ewes, and thus to evaluate its effects on sexual behavior and follicular dynamics. For this, the estrous cycle of 30 adult multiparous Santa Ines was synchronized with the administration of two doses of prostaglandin (120 µg cloprostenol i.m.; Estron, Agener União, São Paulo, Brazil), separated 7 days. After the second dose of prostaglandin, ewes were immediately allocated to the experimental groups of 10 ewes each. One group received 20 mg (G20) of P4i (progesterone i.m.; Progecio Agener, São Paulo, Brazil), 40 mg (G40) or remained as a control group (GCon), with no administration of P4i. In order to determine the pharmacokinetics of P4i, blood samples were collected every 12h for four days for posterior dosage of circulating progesterone by radioimmunoassay. After the administration of P4i, the females were kept with rams for estrous detection and the ovaries were daily scanned through ultrasound. The progesterone concentration was analyzed with a mixed model which treatment, time, and their interaction as main factors, and including time as a repeated measurement. The other data were compared with Mann-Whitney and Kruskall Wallis test, or the Fisher exact probability test. A significance of $P<0.05$ was used. There was a significant interaction between time and treatment in progesterone concentrations ($P<0.0001$), which reached the maximum concentration 12 h after its' administration, being 1.94 ng/mL and 1.62 ng/mL for G40 and G20 ewes, while remained in 0.0 ng/mL in GCon ewes (pooled SEM=0.2; $P<0.0001$ in both comparisons, without differences between G40 and G20). Progesterone concentrations remained above 1 ng/mL in both, G40 and G20 until 24 h after the administration (1.4 ng/mL and 1.0 ng/mL respectively vs 0.0 ng/mL in GCon; $P<0.0001$, without differences between G40 and G20). Thirty-six hours after treatment, progesterone concentrations did not differ between groups, with only a tendency to have greater concentrations in G40 than GCon (0.5 vs 0.02, ng/mL $P=0.067$). The administration of 20 mg of progesterone delayed the estrous onset (104.0 ± 25.6 h vs 94.0 ± 15.9 h and 16.7 ± 9.4 h in G40, G20 and GCon, $P<0.05$; respectively). More GCon than G40 ewes ovulated (9/10 vs 2/10; $P= 0.003$, and G20 than G40 tended to ovulate - 6/10 vs 2/10; $P=0.075$). The size of the ovulatory follicle in G20 and GCon ewes did not differ (5.6 ± 0.4 mm vs 5.4 ± 0.6 mm, ns). In conclusion, circulating progesterone concentrations remained at luteal levels (>1 ng/mL) only for 24 h, with similar profiles despite administering 20 or 40 mg. The doses of P4i used in this experiment seems no to be useful to control the estrus in ewes.

Keywords: estrus synchronization, ultrasound, sexual behavior

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