Effects of decreasing doses of follicle-stimulating hormone on multiple ovulations and embryo production in alpacas
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Alpacas have a gestation length of nearly one year, and therefore females can only produce one offspring per year. In order to accelerate the genetic gain of a herd, superovulation and embryo transfer techniques can be used to produce multiple embryos from genetically valuable females where allowed by breed registries. Our hypothesis was that administration of decreasing doses of follicle-stimulating hormone (FSH) would induce growth of multiple preovulatory follicles resulting in multiple ovulations and increased embryo production. Our specific aim was to determine the effects of FSH administration in decreasing doses on follicular growth, ovulation and embryo production in alpacas. Females were teased with a male daily and transrectal ultrasonography was performed to determine follicular growth. When receptivity to a male was observed, females were naturally mated once to one of two fertile males and ovulation was confirmed by daily ultrasonography and/or teasing (Control Group; n = 15). Females in the treatment group (n = 13) received human chorionic gonadotropin (hCG; 1000 IU, IV) when a preovulatory follicle >7 mm was present to induce ovulation and emergence of a new follicular wave. Starting at 60 h post-hCG, females received twice daily intramuscular injections of FSH at decreasing doses (i.e. Day 1 = 50mg; Day 2 = 40 mg; Day 3 = 30; Days 4 to 7 = 20 mg). Administration of FSH was discontinued when half of the follicles in the growing cohort were ≥ 7 mm in diameter, or after seven days. On the last day of FSH administration, females received cloprostenol (187 µg, IM, twice) to induce luteolysis. Receptive females were bred twice (within 12 h) and received hCG (2000 IU, IV) at time of the first breeding. Embryo collections were performed 7 to 9 days after breeding by transcervical uterine lavage without manipulating the reproductive tract per rectum. Only cycles that resulted in breeding and ovulation were included in the data analysis (Control = 32 cycles; Treatment = 14 cycles). Data were evaluated by one-way ANOVA and Fisher’s exact test. Significance was set at P<0.05 and data are presented as mean ± SD. In the treatment group, females received FSH for a total of 5.2±1 days. Females treated with FSH had a significantly higher number of ovulations per cycle (8.9±4.4) compared to spontaneously ovulating females in the control group (1.03±0.2). In addition, more embryos were collected per flush from females receiving FSH (2.9±3.1) compared to control (0.48±0.6). However, embryo collection rates per ovulation tended (P=0.09) to be higher for females in the control group (47%) versus FSH-treated (32%). In conclusion, administration of decreasing doses of FSH to alpacas was effective in increasing the number of ovulations and consequently, the number of embryos produced. Future studies will focus on improving the efficiency (i.e. embryos produced per ovulation) of superovulation protocols in alpacas.

Keywords: Alpaca, embryo transfer, superovulation, camelid, follicle-stimulating hormone