

Progesterone Supplementation: A Brief Overview

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Progesterone is a central component of pregnancy maintenance in many domestic animal species. The mechanisms of action of progesterone include myometrial quiescence, reduction of spontaneous contraction, down-regulation of gap junction formation, increased cervical tone, and decreased production of chemokines (i.e. IL-8) by the fetal membranes. In addition, progesterone is thought to modulate local immune reaction and decrease the risk of immune rejection of the conceptus and its associated structures.^{1,2,3,4}

Scientific evidence of luteal insufficiency is very difficult to obtain prospectively, but has been suggested as a cause of pregnancy loss in many species including bovine, equine, canine and camelidae. Most documented cases are based on successful maintenance of pregnancy following progesterone treatment. Progesterone supplementation in alpacas is still considered a subject of debate.

Progesterone concentration in serum or plasma is used commonly to determine pregnancy and cyclicity status in alpacas.¹ Progesterone supplementation has been described implemented in cases of luteal insufficiency.^{2,3} In camelids, the ovary being the only source of pregnancy,

progesterone supplementation is required throughout pregnancy.⁴

Progesterone levels of 1.5 ng/ml or higher suggest presence of a corpus luteum and are compatible with pregnancy. Progesterone levels between 1.0 and 1.5 ng/ml are usually considered as suspect and progesterone levels below 1.0 ng/ml are considered to be incompatible with pregnancy.⁴ The precise determination of the level of progesterone is even more important in the case of alpacas with recurrent pregnancy losses. Many of these are suspected to be due to progesterone insufficiency.

Pregnancy loss seems to occur in three large categories in alpacas. The first is during the first 60 days of pregnancy. The second occurs between three and six months of gestation, and lastly abortions in the form of premature delivery.

The main products used for progesterone supplementation are hydroxyprogesterone caproate, at two



to three week intervals, and daily altrenogest (Regumate). Other products are available and include native progesterone, but require frequent, possibly daily, injections. A recent experiment conducted by our group showed that oral altrenogest is not able to maintain pregnancy in alpacas. The

study also showed that injectable altrenogest gave variable results.

Hydroxyprogesterone caproate is the only available drug that sustains pregnancy with a relatively high degree of efficacy in females with no other source of progesterone. Although this hormone is used quite frequently in alpacas, it has not been critically evaluated. The reported supplementation dose of hydroxyprogesterone caproate is 250 mg IM given every three weeks and discontinued during the last four weeks of pregnancy.⁶ The author would like to add that failure of cervical dilation has been associated with progesterone supplementation. Ceasing supplementation during the last four weeks of pregnancy will substantially reduce that risk.

Diagnostic errors in progesterone levels have been relatively frequent in cases referred to me. One study our group performed reports that the laboratory has a significant effect on progesterone levels.⁵ Agreement among laboratories in this study was 100% for samples known to be positive for progesterone (>1.5 ng/mL). However, one laboratory reported high (> 1.5 ng/mL) and suspect (>1 and <1.5 ng/mL) progesterone in 13.3% and 26.6% of the negative (P4 < 0.5ng/mL) samples, respectively.⁵ This creates the potential for false positive pregnancies and will create a problem for both veterinarians and breeders alike. The gold standard is to use radioimmunoassay for progesterone level determination.

A brief review for owners is the following; blood samples should be taken and placed in red top tubes. These can be stored at 5°C for up to five days without a detectable effect.⁵ the most important factor in clinical measurement of progesterone is the reliability of the laboratory. A lab that utilizes radioimmunoassay to determine progesterone levels will give you more reliable results. Accurately diagnosing the cause of infertility requires a thorough evaluation that should include history, physical examination as well as a complete evaluation of the reproductive organs. Candidates for progesterone supplementation should be carefully selected in consultation with your veterinarian and based on elimination of other causes of early pregnancy loss or abortion (infections, uterine fibrosis, etc). Hydroxyprogesterone caproate can be compounded easily by many pharmacies. Your veterinarian will be able to locate a pharmacy and provide a prescription. More research is needed on luteal insufficiency in alpacas and its relationship to metabolic disorders and in particular obesity and insulin resistance. I am currently conducting a study focusing on body condition and its effect on circulating progesterone levels. This year, I have already placed nearly a dozen females on supplementation. This frequency

has led to my writing this article. It is imperative to involve your veterinarian in the decision making process. Each individual case must be separately evaluated and carefully considered. Complications observed with overuse of progestogens include, poor uterine contraction, failure of cervical detachment, premature placental separation and mummification or maceration.^{4, 6} also, caution should be exercised in propagating any syndrome of luteal deficiency by progesterone supplementation of maiden females.

References:

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