Managing Unusual Estrous Cycles

Bruce W. Christensen, DVM, DACT
University of California - Davis
Davis, CA

Normal canine estrous cycles and how to incorporate effective breeding management plans has been covered elsewhere in these proceedings. The purpose of this review is to focus on cycles that stray from the normal pattern.

Delayed puberty

Most bitches will experience their first estrous cycle between 9 and 24 months of age. Smaller breed dogs tend to mature earlier than larger breed dogs. If a dog of any breed has not shown signs of estrous by 2 years of age, delayed puberty is suspected. Causes for perceived delayed puberty include normal physiological variation in individuals or between breeds, inadequate observation of the owner (i.e., puberty occurred, but went unnoticed), inadequate nutrition, intense training programs (i.e., Greyhound bitches on the track), disorders of sexual differentiation, and ovarian agenesis.

Diagnosis first involves evaluating the list of differential diagnoses and ruling them up or down based on the initial history and physical exam of the patient. Larger breed dogs are expected to undergo puberty later than smaller breed dogs and so, for example, a Great Dane bitch should not be considered abnormally late in entering puberty until she has reached 2 years of age, whereas a Yorkshire Terrier would be expected to undergo puberty closer to 1 year of age. Asking the owner questions regarding why they are sure that puberty has not occurred will help to clarify if, in fact, puberty might *have* occurred, but gone unnoticed. How has the owner monitored the female? Strictly through observation of behavior? Has the owner noted changes in the vulva? Is there a male dog around that would have shown increased interest? How did the owner monitor the female for serosanguinous vulvar discharge? Some bitches are fastidious in cleaning themselves and it is not uncommon for this discharge to go unnoticed by the owner. With some bitches, it is necessary for the owner to check the bitch's vulva every few days by dabbing it with a white tissue paper in the morning before taking the dog outside to urinate.

Severely malnourished or obese patients may exhibit delayed puberty. Body condition of the patient needs to be in the extreme on either end of the scale for it to have an effect on reproduction. This will be obvious when examining the patient.

Dogs involved in intense athletic programs may not undergo puberty until 3 or 4 years of age. In the case of Greyhounds, this may be further complicated by use of exogenous steroids.

Diagnosis and discussion of sexual differentiation disorders have been reviewed recently. If a disorder of sexual development is suspected, diagnosis may be achieved by performing karyotyping, imaging studies, biopsy of gonadal tissue, and/or hormone analysis.

Ovarian agenesis is a very rare condition. Increased concentrations of follicle-stimulating hormone (FSH) and luteinizing hormone (LH), and low concentrations of estrogens will be noted. Stimulation tests with hCG or GnRH agonists will not affect the low estrogen concentrations.

Treatment for delayed puberty may be attempted as long as the bitch is of a suitable age. Daily administration of 20 IU/kg of equine chorionic gonadotrophin for 5 days and 500 IU/dog of hCG on day 5 may induce estrus. Use of prolactin inhibitors, such as cabergoline, have variable success in inducing puberty.

Prolonged anestrus

The average interestrous interval for a dog is 7 months. Some individuals certainly have longer interestrous intervals. Indeed, this is common in some breeds; the Basenji usually has only one estrous cycle per year. If the time since the last estrous cycle is more than 12 months, prolonged anestrus may be suspected.

The first differential diagnosis for a perceived prolonged anestrus is simply that the estrous cycle occurred, but went unnoticed by the owner. Documentation of elevated serum progesterone concentrations (> 2 ng/mL) is evidence of an estrous cycle within the previous 2 months. Owners should be instructed to closely monitor their animals twice a week by noting any behavior changes, vulvar swelling, and using a white tissue to wipe the vulva in the mornings before the bitch is taken outside to urinate in order to note any serosanguinous discharge. Vaginal cytology may be performed every other week to detect signs of proestrus or estrus.

Both poor body condition and systemic illness may cause a cessation of estrous cyclicity. The examination of the patient should make it clear if the bitch is malnourished or systemically ill. Correction of the underlying cause often results in a return of estrous cyclicity. Endocrinopathies, such as hyperadrenocorticism or hypothyroidism, have often been blamed for a cessation of cyclicity in bitches, but proof of this effect is lacking in the scientific literature. If obvious clinical signs, such as poor hair coat or change in body functions, are absent, it is unlikely that an endocrine disorder is causing a lack of estrous cyclicity.

In cases where underlying disease is not suspected, and the owner is not willing, or able, to detect potentially "silent" heats with greater accuracy, an estrus induction protocol may be attempted. The best results have been obtained using a prolactin inhibitor, such as cabergoline (5 μg/kg) once daily until the first signs of proestrus. Most bitches respond within 30 days of treatment and best results are obtained if the bitch has been in anestrus for at least 3-4 months.

Split estrus

Occasionally, a bitch may show signs of proestrus without subsequent progression into estrus, and consequently not have an ovulation. These episodes are usually followed by another proestrus period 2-12 weeks later, which may or may not proceed into a normal estrus and ovulation. This is known as a "split heat" and is most common in the pubertal phase or in young bitches, in general (< 4 years of age). The likely reason for this occurrence is that the proper receptors to FSH and LH are not present or functioning in the earlier proestrous periods. The most effective treatment is in recognizing the condition by conducting a thorough breeding management with vaginal cytology, vaginoscopy, and serum progesterone monitoring, and then breeding at the correct time after ovulation has actually occurred.

Short interestrous intervals

Some bitches may have unusually short interestrous intervals, but different than the split heat phenomenon described above. Some lines of German Shepherd Dogs, for example, have interestrous intervals of 4 months. In these cases, either the preceding estrous was anovulatory, and therefore not accompanied by a normal luteal phase, or the luteal phase was prematurely shortened. In the case of anovulatory cycles, this may be treated with administration of hCG (500 IU once daily for 3 days, starting at the rise of progesterone > 2 ng/mL) to induce ovulation on the next cycle. In the case of a shortened luteal phase, exogenous administration of a progestagen throughout pregnancy may be attempted, but may cause cryptorchidism or masculinization of female fetuses.

References

Christensen BW. Disorders of Sexual Development in Dogs and Cats. The Veterinary clinics of North America Small animal practice 2012;42: 515-526.