Care of the Pregnant Bitch

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

Pregnancy diagnosis

Caring for the pregnant bitch starts with establishing that she is, indeed, pregnant and assessing the health of that pregnancy. Various modalities for pregnancy diagnosis exist and each have their strengths and weaknesses. While other modalities have been reported for assessing pregnancy status in the bitch, the ones reported here are the most useful in a clinical setting. It is important to note that since none of the modalities for pregnancy diagnosis discussed can detect pregnancy before 21 days gestation, loss of pregnancy in the first trimester cannot be distinguished from failure to conceive. All gestational times listed below use the LH surge as day 0, unless otherwise stated.

Palpation

A skilled veterinarian can reliably palpate pregnancy in a bitch beginning between 3 and 5 weeks of gestation, and from around 7 weeks till term. At 3 weeks, the fetal swellings are around 15 mm in diameter and, assuming there are multiple fetuses, give the impression of "beads on a string" high within the abdomen. By 4 weeks they are about 25 mm, ovoid, and lower in the abdomen. At about 5 weeks, the fluid content of the fetal swellings has increased to an extent that adjacent fetuses cannot be well differentiated from each other and the gravid uterus simply gives an impression of a full abdomen during palpation. It is not until the fetal skeletons begin to mineralize at around 7 weeks of gestation that palpation again becomes a reliable diagnostic tool. Health of the pregnancy and number of fetuses cannot be assessed with palpation.

Hormone analysis

There is only one pregnancy-specific hormone that can be reliably used to diagnose pregnancy in the bitch: relaxin. In the bitch, relaxin is produced by exclusively by the placenta, and therefore its presence in the serum of the bitch is exclusive to pregnancy. This is to be contrasted with progesterone, which is often mistakenly assumed to be a hormone assay specific for pregnancy. Progesterone comes from the corpus lutea, which remain active in both pregnant and non-pregnant bitches for roughly the same amount of time (2 months), and so cannot be used as an indicator of pregnancy. Relaxin may be detected in the serum as early as placentation begins (18 days) but may produce false negative results at this early stage. The best clinical plan is to wait until at least 25 days of gestation before evaluating relaxin concentrations. In-house ELISA kits are very accurate, but do not give any information regarding number of fetuses or the health of the pregnancy. Relaxin is of the most use in clinics where ultrasound is not available.

Ultrasonography

Use of ultrasound to evaluate pregnancy provides the most sensitive information regarding the health of the pregnancy. Fetal vesicles may be detected as early as 17 days of gestation by a skilled ultrasonographer and are readily detected by 25 days of gestation. At this stage, fetal heartbeats may be detected and heart rates may even be measured. Echogenecity of fetal fluids should be hypoechoic. As the pregnancy progresses, placental attachments may be assessed. Throughout pregnancy, ultrasound provides a sensitive indicator of fetal development and dying or resorbing fetuses may be detected and documented. The accuracy of counting fetuses with ultrasound is low.

Radiography

Use of radiography to detect pregnancy is only useful in the very late stages of gestation when fetal skeletons have mineralized. This reportedly happens as early as day 42, but a better clinical recommendation would be to wait until around day 55 before taking radiographs. Trying to radiograph around day 42 will result in false negative results as less of the fetal skeletons will have mineralized and may be obscured by contents in the bowels. Fetal loss may also still occur at this late stage and partial abortions (which may be unobserved by the owner) have been documented. The real strength of radiography in pregnancy diagnosis is in counting the fetuses. With this in mind, waiting until the week before expected whelping would be the best clinical plan. While some radiographic signs indicate fetal death (malposition of skeletal extremities or gas surrounding a fetus), this is not a sensitive diagnostic test for assessing fetal health.

Nutrition

Energy requirements of pregnant and lactating bitches are increased over non-pregnant bitches and should be compensated for by increasing energy intake in their diet. Specific energy requirements have been addressed elsewhere. As a basic guideline, a wellrounded maintenance diet is appropriate for most dogs for the first 42 days of gestation. A high-energy diet, such as a growth (puppy) formula is more appropriate for the last 21 days of gestation. Giant breed dogs may require a high-energy diet throughout gestation.

Common mistakes of breeders include calcium levels in diets. Dogs fed homemade, meat-based diets may suffer from too little calcium in their diets and dogs that receive supplemental calcium from their owners will be at high risk for having too much calcium in their diets. Both scenarios predispose dogs to eclampsia. The calcium-phosphorus ratio should be close to 1:1. Veterinarians should instruct owners of pregnant dogs to feed a well-rounded commercial diet without supplements, especially not calcium.

Pregnancy physiology

Blood volume increases by 40% during pregnancy to compensate for the large volume of fluids lost at parturition. This results in a normal anemia of pregnancy (hematocrit = 30-35%). Increased heart rate and stroke volume lead to an increased cardiac output. The functional residual capacity of the lungs decreases due to cranial displacement of the diaphragm by the gravid uterus and oxygen consumption increases by 20%. The stomach is also displaced, leading to decreased gastric emptying.

Elevated progesterone during pregnancy stimulates growth hormone secretion. In some bitches (especially older bitches), this may lead to a down-regulation of insulin receptors. In addition, some pregnant bitches show a decreased ability to produce glucose through gluconeogenesis, lipolysis, and glycogenolysis. The resultant type 2 diabetes resolves after serum progesterone concentrations return to baseline levels during anestrus.

Hypoglycemia is rare in pregnant bitches, but may occur, especially in some toy breeds. It is readily diagnosed by checking blood glucose levels and effectively treated with intravenous glucose solutions.

Duration of gestation

Gestation in the bitch is reliably and accurately predicted if the dates of the luteinizing hormone surge or ovulation are known (gestation is 65 or 63 days \pm 1 day, respectively). These are most commonly determined by a thorough breeding management plan, which includes serum progesterone assay monitoring (covered elsewhere in this conference). In the absence of determining specific dates of the LH surge or ovulation, the window of time during which possible whelping may occur must be determined by breeding dates, and may be anywhere from 56 to 72 days after the first day of breeding. The reason for this wide window of time rests on the highly variable lengths of proestrus and estrus in the bitch, compared to the narrower windows of ovulation and fertility within those days.

Abnormalities of pregnancy

Hypoluteoidism as a primary condition is an undocumented, but suspected, cause of late-term pregnancy losses. Serum progesterone concentrations below 2 ng/mL are unable to maintain pregnancy in the bitch. If low progesterone concentrations are documented, or suspected, the bitch may be started on supplemental progestins or natural progesterone. Unnecessary or excessive supplementation may delay whelping, affect lactation negatively, and cause masculinization of female fetuses.

Some bitches that abort prematurely exhibit myometrial contractions that can be detected via tocodynomometry. Tocolytic agents may be used preemptively to prevent premature parturition.

Pregnancy toxemia is rare in the bitch and is associated with animals in very poor body condition. Improved nutrition plans will prevent or treat this condition.

Vasculitides is increased coagulation of the blood during pregnancy and occurs in women and dogs. Unlike in women, there is no effective treatment in dogs that will not negatively affect the pregnancy. Affected dogs should be removed from breeding programs.

A mild rise in serum estrogens in late gestation sometimes causes an exaggerated hyperplasia of the vaginal mucosa, resulting in vaginal prolapse. The prolapsed tissue should be kept moist, if it cannot be replaced. It will resolve spontaneously after whelping, when estrogen levels fall again. In the meantime, the hyperplasia will present an obstacle to parturition and an elective C-section should be planned. This condition is likely to recur and the owners should consider spaying the animal.

Parturition date determination

If specific dates have not been determined by LH surge or ovulation date determination, other tools may be utilized to narrow down the dates of whelping. Ultrasound and radiographic evaluation of fetuses may be used to determine gestational age (2). Other tools may be used to help predict the day of whelping as it approaches.

Behavioral changes may be noted, but can be overlooked or absent in some bitches. Those behavioral changes that may happen vary dramatically from one individual to another. Some bitches seek seclusion; others become excessively needy for attention. More frequent urination and nesting behavior may be noted the day prior to or the day of parturition.

The presence of milk or colostrum in the mammary glands is not a sensitive indicator of whelping date. Primiparous bitches may not develop milk until the day before, or the day of, whelping. Other bitches may have milky mammary secretions up to a week before whelping.

Progesterone drops to baseline concentrations (< 2 ng/mL) approximately 24 hours prior to whelping. Documenting this drop within the window of time expected for potential whelping is a useful, reliable indicator that whelping will begin naturally within the next day (or that an elective C-section may be safely performed). The drop in progesterone also causes a temporary drop in body temperature (as progesterone is thermogenic). Owners can be trained to measure rectal temperatures and should record their results at a minimum of 2 times daily (roughly at the same time each day). Temperatures in toy breeds may drop to as low as 95° F, medium breeds to as low as 96° F, and giant breeds usually not below 97° F. Temperatures may not reach quite that low in individual animals, but should drop more than a degree from what they have normally been during the time of day the temperature is taken. This last point (time of day) is important, because core body temperatures in the dog may vary by more than a degree between morning and evening.

References

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