PATHWAYS THROUGH PREGNANCY: STEPS TO A SUCCESSFUL BREEDING

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INTRODUCTION

The investment of time and money made by a breeder planning and implementing a breeding is significant. Pregnancy and delivery of a healthy litter are the goals. Many factors could prevent a successful mating and put the investment, as well as the health of the bitch, at risk. Knowledge of the proper path and the steps that need to be taken can help ensure a success.

PLAN AHEAD

During selection of the stud, consider his reproductive history and availability for breedings. Obtain all indicated health clearances on the bitch. Perform Brucellosis testing on both the stud and the bitch if indicated. Decide logistically what type of breeding will occur and consider having a back-up plan. Don't wait until the bitch has come into season to start planning.

VET THE VET

Ensure that your veterinarian is familiar with reproductive procedures and emergencies. The Society for Theriogenology maintains a referral service for breeders looking for a qualified reproductive veterinarian in a given geographic area (www.therio.org). Question your veterinarian about emergency procedures, availability, equipment, and staffing.

PREPARATION

Bitches should be well conditioned and maintained at optimal weight prior to breeding. Obese bitches should undergo a weight reduction program prior to pregnancy. Obesity can predispose to infertility, dystocia, and poor lactation. Bitches should be adequately vaccinated for rabies and other infectious disease as indicated by their potential for exposure. If you anticipate that your bitch will be due for vaccinations during her pregnancy, have them administered prior to breeding. Feed a high quality diet approved for all life stages. Vitamin supplements, if administered, should be started weeks prior to the start of her estrous cycle. Her diet should be continued at maintenance levels until after confirmation of the pregnancy.

OVULATION TIMING

Accurate timing of the fertile period is best accomplished by quantitative hormone measurements combined with observations such as vaginal morphology and cytology. The parameters monitored for ovulation timing (in order of their clinical accuracy) are: clinical signs of vulvar swelling and discharge, attraction of males, vaginal cytology, vaginoscopy and vaginal crenulation, progesterone levels, and Leutinizing Hormone (LH). The sequence of events that follows can be estimated and appropriate breeding dates determined by the LH surge. Ovulation follows the LH surge by 2 days. Canine oocytes require 2–3 further days for maturation in the oviducts. Following oocyte maturation the eggs can remain fertile for 4 days or longer. Complete ovulation timing is the best method for timing breedings and accurate prediction of the delivery date.

ENSURE THE BREEDING

If natural breeding (ties) cannot be obtained, various artificial insemination methods may be utilized. The method used will depend on several factors including the equipment available and the experience of the inseminating veterinarian. Semen quality is known in advance when utilizing frozen semen, but will not be apparent until collection with fresh or chilled breedings. The reproductive history of the bitch should also be taken into consideration.

Vaginal insemination is the simplest and most common technique. Semen is deposited into the cranial vagina using a rigid pipette. In general, vaginal insemination should only be considered when using fresh semen or high quality chilled semen.

Surgical insemination is one method of intra-uterine implantation of semen. Because the sperm is placed beyond the cervix, these techniques are associated with the greatest chance of conception. Surgical insemination can be utilized with fresh semen of lower motility or concentration, extended semen or frozen semen.

Transcervical insemination also involves intra-uterine deposition of semen, but is performed without a surgical procedure. It involves endoscopically guided passage of a catheter through the cervix and into the uterine lumen. Endoscopic transcervical insemination requires a significant investment in equipment and training for a veterinarian. It is associated with high conception rates and minimal risks to the female.

DIET AND EXERCISE

It is important to maintain the bitch in optimal condition prior to breeding and during pregnancy. The bitch's body weight should not notably increase during the first 3 weeks of gestation. A highly digestible, high energy commercial dog food that is balanced for vitamins and minerals and labelled suitable for "all life stages" or for small and/or medium breed puppies is recommended. Diets which meet this criteria will have guaranteed analysis of at least 26–30% protein and 16–20% fat. Any dietary change should be undertaken gradually to prevent gastrointestinal upset. Dietary changes are best accomplished weeks prior to

breeding. During the last four weeks of pregnancy, bitches experience an increase in dietary energy demands and require intake increases of 1.25–1.5X maintenance. Late in gestation, bitches should be fed multiple small meals to meet their dietary needs. Normal weight gain will generally be between 15–25% during pregnancy for bitches with average sized litters.

PREGNANCY DIAGNOSIS AND MONITORING

Pregnancy should be confirmed between the third and fourth week after breeding. Uterine enlargements can usually be palpated easily by day 28 to 30 after ovulation. Pregnancy may be diagnosed by ultrasound at 20–22 days after the LH surge. The increased size of the gestational sac by day 26 makes visualization easier. Ultrasonography does not accurately determine the number of fetuses, but can detect problems such as pyometra, fetal death and/or resorption. Fetal resorption can result in fetal loss with no external signs.

Radiographs should be taken in the 8th and 9th weeks of gestation to ascertain the number of feti in utero. At this visit emergency procedures should be reviewed with the veterinarian. The administration of unnecessary supplements, prescription drugs and other medications during pregnancy should be avoided.

PARASITE CONTROL

Parasite control for external and internal parasites should be optimized prior to breeding and maintained throughout pregnancy and lactation. Ivermectin and milbemycin monthly heartworm preventives are safe for bitches throughout pregnancy. Hookworm and roundworm larvae can infect puppies prior to as well as just after birth. A protocol of administration of fenbendazole from day 45 of gestation until post-partum day 14 has been shown highly effective at prevention of transplacental and transmammary migration of larvae.

KNOW THE NORMAL

Labor is initiated once serum progesterone levels have dropped to <2.0 ng/ml for 24–48 hours. The first stage of labor is characterized by heavy panting, nesting behavior, a temperature drop, anorexia, mild but progressive uterine contractions, and cervical dilation. In the second stage the cervix has fully dilated, and puppies move progressively through the birth canal. The third stage occurs intermittently along with the second, and is defined as the passage of fetal membranes. In most canine deliveries two puppies will be delivered within 10–20 minutes followed by a 1–2 hour interval between subsequent deliveries.

The need for an elective Cesarean (C)-section can be predicted from the history of the bitch's previous litters or closely related dogs. A history of prior uterine inertia, prolonged labor with the loss of puppies, a small or unusually deformed pelvic canal, vaginal strictures or previous C-sections should alert you to the potential need for surgical delivery of puppies. Dogs with small litters (1–2 pups) or exceedingly large litters are also candidates for elective C-section.

THE DIFFICULT DELIVERY

The causes of dystocia are many and varied. They are grouped according to maternal and fetal factors. Maternal factors include primary and secondary uterine inertia, breed conformation, uterine, vaginal, vulvar or pelvic abnormalities, and other disease processes that weaken or debilitate the bitch. Fetal factors include the fetal presentation and position, fetal size or abnormal development, and fetal death.

The bitch should be examined for dystocia and fetal stress when she is beyond her predicted due date, when strong contractions occur for over 1 hour without producing a puppy or after 2–4 hours of weak or absent contractions. A vaginal discharge of lochia, uteroverdin or blood prior to delivery of the first puppy is also an indication of possible dystocia. If there is no progression to second stage labor after 12–24 hours of first stage labor, the bitch should be examined. Obvious problems, such as a stuck puppy, call for immediate attention.

The treatment of dystocia may involve simple manipulative interventions. Medical treatment involves the administration of low doses of oxytocin, calcium injections, and glucose administration by a veterinarian. When indicated, prompt surgical intervention by C-section can minimize fetal losses.

REFERENCES AND SUGGESTED READING

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