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The Whelping Bitch and Paediatrics Mini Series

Session 1: Pre-natal Care and Whelping

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Normal parturition and management of dystocia in dogs and cats

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Gestation length in dogs solely based on mating dates can be extremely variable. This is due to the long oestrous period and oocyte survival time of the bitch, as well as the long survival time of canine sperm in the female reproductive tract. 'Apparent' gestation lengths may therefore vary between 57 and 73 days. The fertile period in the bitch is around 10 days (which equates to an oocyte survival time of three days plus a sperm survival time of seven days), whereas the fertilisation period is much shorter at three days. This is further complicated by the fact that the canine oocyte is not ready for fertilization until two days after ovulation.

The hormones released around ovulation are similar to other species, with a rise in oestrogen followed by a luteinizing hormone (LH) peak that induces ovulation 48 hours later. Dogs are, however, unique in producing progesterone from follicles before ovulation and this can be used to predict and monitor ovulation (Hewitt and England 2000). The actual gestation time in the bitch is about 63 days ±24 hours from ovulation or 61 days from fertilisation. Large litters are born earlier and small breeds tend to have shorter gestation times. Progesterone starts to rise before ovulation, peaks in mid-pregnancy and decreases towards the end of gestation when it falls sharply 24 to 36 hours before parturition. This drop in progesterone coincides with a transient drop in body temperature lasting for eight to 12 hours, which is more marked in small breeds. Many breeders use this as indicator for impending birth. If breeders have used ovulation testing to determine the optimum time of mating, gestation length does not vary much. Any bitch over 63 days' gestation should be monitored carefully for primary inertia or any other problems.

Ultrasound examination is useful for determining the viability of puppies at a particular time. However, it cannot help to predict parturition or give any indication of primary inertia. Progesterone testing can be used to monitor the end of a pregnancy. ELISA kits for ovulation testing can be used to provide instant results and can be read in 'reverse' order to show the decline or absence of progesterone. Blood progesterone levels fall to less than 1 to 2 ng/ml before parturition commences in the bitch. A drop in blood progesterone indicates that the fetuses have matured, causing luteolyses of the corpora lutea and the beginning of parturition. If the blood progesterone level is still high (>3 ng/ml) and ultrasound examination confirms strong heartbeats, the bitch has not started to give birth and should be re-examined the next day.

The fact that the mating and subsequent gestation length can vary so much has led to the common belief that it is normal for bitches to carry litters for much longer than the usual benchmark of 63 days. Concerned breeders may be sent away by practitioners and told not to worry. Sometimes an ultrasound examination is performed to confirm that the puppies are alive and can be provided as further proof to wait 'a little bit longer'. When dealing with an apparently 'overdue' bitch, it is

important to check that the animal is really pregnant, and also that mating dates and gestation length have been calculated correctly and whether ovulation testing has taken place.

PREPARATION FOR THE BIRTH

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Vaccinations should be up to date, preferably before mating. Failing that, vaccinations can be administered after the first three weeks of pregnancy. The worming regimen will depend on the animals worming status, but certain products (eg, Panacur; Intervet/Schering Plough) can be used in the last 20 days of pregnancy to prevent migration of larvae to puppies.

In late pregnancy (≥40 days), the bitch will find it harder to eat enough to support the fetuses, especially when large litters or small breeds are involved. The animals should therefore be fed little and often.

Many breeders will switch pregnant bitches to puppy food, which is higher in protein, has a sufficient calcium:phosphorus ratio and is more concentrated, and can also be fed during lactation. Calcium supplementation should be avoided as this may depress parathyroid function and prevent the mobilisation of calcium.Bitches should be introduced to the whelping area at least two weeks before parturition. However, some animals may choose to go elsewhere and provisions should be made (eg, paper and towels) to accommodate this. It is important for a whelping bitch to have a warm, calm and secure environment away from the buzz of every day life.

NORMAL PARTURITION

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First-stage labour

The end of pregnancy is marked by a drop in the level of progesterone and a rise in prolactin. Bitches become restless, more attached to the owner and seek seclusion. This phase can last for two to three days. The beginning of first-stage labour is defined as the start of uterine contractions that will eventually open the cervix. The extent of cervical dilation cannot be examined digitally as the canine vagina is very long and narrow (around 25 cm in labrador retrievers). However, on physical examination, palpation will reveal a relaxation of the vulva and vagina as well as the pregnant abdomen. Bitches will show signs of anorexia, intermittent panting, shivering and occasional vomiting. Obsessive nesting behaviour and vulval licking may also occur. Firststage labour normally lasts between six and 24 hours, but can take up to 36 hours in nervous or primiparous animals. During pregnancy, the orientation of the fetuses within the uterus is distributed 50:50 caudally and cranially.

This changes during first-stage labour as each fetus rotates on its long axis, extending its head, neck and limbs to attain the normal birth position, which results in 60 per cent of pups being born in anterior and 40 percent being born in posterior presentation. The start of straining and the appearance of fetal fluid or a pup marks the beginning of second-stage labour.

Second-stage labour

As a pup enters the birth canal, the allantoamnion usually ruptures and clear fluid may be expelled from the vulva. Placental separation precedes the birth of the pup and a greenish-black discharge or uteroverdin may be seen. As the pup passes through the cervix, the neuroendocrine 'Ferguson's reflex' leads to the release of oxytocin and further straining. The pups have to be pushed upwards through the pelvic inlet and then downwards through the vagina and vulva. Pups can only be born normally in longitudinal presentation (ie, with the axis of the pup and the bitch being parallel) and in a dorsal position (with the back of the pup uppermost). Although both posterior and anterior presentations are normal, posterior presentations can cause dystocia in the first pup. The posture of the pups can be with flexed or extended limbs. A breach birth means the pup is in a posterior presentation, with both hindlimbs flexed forward so that only the tail can be seen or palpated. This does not always cause problems, but may be an issue in some cases.

Second-stage labour can last from two to 12 hours and, in rare cases, up to 24 hours, depending on the number of pups and the progression of the birth. If a pup is born with the amniotic sac still intact, the bitch will usually try and break it by licking the pup but, if this does not happen, it should be broken by the person attending the birth. The umbilical cord is usually severed at the same time or ligated and cut to leave a 1 cm stump. There should be a familiar person with the bitch throughout the birth at all times. The animal should never be let out in the garden on its own (eg, to urinate) and, when brought to the surgery, an additional person to the driver should be available, if at all possible. Strong, regular straining should produce a puppy within 30 minutes. The interval between births can be as quick as five minutes or can take several hours. It may be useful to notify the surgery if more than three hours have passed without the birth of a further puppy, as this will delay examination of the birth.

Third-stage labour

Third-stage labour involves the expulsion of the placenta, usually within 15 minutes of the birth of a puppy. It is not unusual for several puppies to be born before the placentas are passed. Retained placentas are not a common problem in dogs. Bitches should be discouraged from eating the afterbirth as it causes diarrhoea, which will contaminate the mammary glands and, subsequently, the puppies. Lochia, a greenish, non-odorous discharge, will occur for about three weeks following parturition, gradually decreasing in volume after the first week. Involution of the uterus should be complete after 12 to 15 weeks.

First-stage labour 6 to 24 hours (36 hours maximum) Second-stage labour 2 to 12 hours (24 hours maximum) Straining 30 minutes Time between puppies 5 minutes to 4 hours

First signs of an abnormal parturition in dogs

- Low progesterone levels, which indicate the need for a caesarean section
- No signs of first-stage labour more than 63 days after ovulation
- No signs of first-stage labour after a drop in body temperature 24 hours previously
- Timings of the different stages of labour exceed normal parameters
- Birth appears to start and then stops, with no signs of progression
- Greenish–black discharge produced, but no puppy is expelled within four hours
- Haemorrhage occurs at any stage
- Rectal temperature is >39.5°C
- Bitch stops eating and seems restless for more than 24 hours
- Bitch looks unwell beyond the normal strains of giving birth

DYSTOCIA

Dystocia is defined as the inability to expel fetuses through the birth canal during parturition. This can be due to maternal or fetal factors that prevent delivery from taking place. Maternal factors typically consist of physiological myometrial failure (primary uterine inertia being the most common) or morphological obstruction of the birth canal. Fetal factors include oversized fetuses, malpresentations, malformations and fetal death. Primary uterine inertia and malpresentations are the first and second most common causes, respectively, of dystocia in dogs and cats (Gaudet 1985, Darvelid and Linde-Forsberg 1994, Eckstrand and Linde-Forsberg 1994, Gunn-Moore and Thrusfield 1995). Some breeds have been reported to have a higher prevalence of dystocia. Congenitally narrowed birth canals are seen in brachycephalic and terrier breeds (eg, bulldogs, Boston terriers and Scottish terriers) and the fetuses may have comparatively large heads, which predispose them to maternal–fetal disproportion. In cats, Siamese and Persian breeds appear to be predisposed to dystocia.

CLINICAL SIGNS

Dystocia should be suspected if: A definite problem is identified **•** (eg, a fetus is lodged in the birth canal or a pelvic fracture has occurred);

Gestation is prolonged (>70 days) with no evidence of labour;

The animal's body temperature has dropped to <37.8°C and returned to normal with no evidence of labour
There is a green vaginal discharge (indicating placental separation);

Fetal fluids are seen and two hours have elapsed without the expulsion of any fetus;

Strong and persistent contractions fail to result in the delivery of a fetus within 30 minutes;

- Weak and infrequent contractions fail to produce a fetus within four hours;
- More than four hours have elapsed since the birth of a fetus;
- There are signs of systemic illness;
- The animal appears to be in severe discomfort.

MEDICAL MANAGEMENT

If a fetus can be palpated in the birth canal, gentle manipulation should be attempted to encourage expulsion. If required, cautious traction can be applied in a caudoventral direction. Copious amounts of sterile lubricant should be applied digitally or infused around the fetus using a urinary catheter. Radiographs should be obtained for any animal experiencing dystocia. This can help to assess the number, size, location and position of the fetuses, as well as maternal pelvic morphology and possible abdominal pathology. Intrafetal gas patterns and awkward fetal postures are the earliest signs of fetal death, while collapse of the spinal column, overlapping skull bones and intrauterine gas accumulation develop later. Fetal ultrasonography is more useful than radiography for assessing fetal viability, malformations and/or distress. In particular, deceleration of fetal heart rates and the presence of fetal bowel movements are indicators of severe fetal distress. If fetal or maternal obstruction is ruled out, medical management can be attempted. Oxytocin is a peptide hormone that increases the frequency and strength of uterine contractions by promoting the influx of calcium into myometrial cells. It also promotes postpartum uterine involution, aids the control of uterine haemorrhage and assists in the expulsion of retained placentas. Total doses of 5 to 20 iu in dogs and 2 to 4 iu in cats, administered intramuscularly, have traditionally been recommended. A dose of oxytocin that is too high may cause uterine tetany, in effective contractions and decreased fetal blood flow.

More recently, doses of 0.5 to 2 iu have been shown to be effective in increasing the frequency and quality of contraction in the bitch (Davidson 2001). This dose can be repeated after 30 minutes if a fetus has not been expelled. If labour proceeds and a fetus is delivered, oxytocin may be given every 30 minutes to assist in the expulsion of the remaining fetuses. Administration of calcium gluconate should be considered if weak, infrequent contractions are noted, if the initial dose of oxyto cin was non-productive or if hypocalcaemia has been diagnosed. Calcium gluconate (10 per cent) can be administered at a dose of 20 mg/kg, either subcutaneously or added to intravenous fluids and given slowly while the bitch undergoes electrocardiographic monitoring for arrhythmias.

Finally, dextrose infusion can be initiated if hypoglycaemia is evident following haematological analysis. Medical management of dystocia has a reported success rate of 20 to 40 per cent (Gaudet 1985, Darvelid and Linde-Forsberg 1994, Eckstrand and Linde-Forsberg 1994, Gunn-Moore and Thrusfield 1995) and should not continue for more than six hours. Therefore, the decision to proceed to a caesarean section should not be delayed if the response to medical management is poor.

SURGICAL MANAGEMENT

Indications for surgical management A caesarean section is indicated in cases of:

- Complete uterine inertia;
- Partial primary or secondary uterine inertia with a poor response to medical therapy;
- Fetal oversize or malformation;
- Maternal pelvic obstruction (eg, fractures, masses);
- Non-reducible malpresentations;
- Past history of dystocia or caesarean section;
- Fetal distress;
- Systemic illness of the bitch/queen;
- Suspected uterine torsion/rupture/prolapse or herniation.

In cases of confirmed fetal death and in bitches/queens of lesser breeding value, a hysterectomy is more appropriate than a caesarean section.