When Whelping Goes Wrong: Dystocia and C-Section

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Dystocia is a common emergency presented to all practitioners regardless of their interest in canine reproduction. It is important for any veterinarian to be able to recognize the signs of dystocia so early intervention can be implemented in order to save the dam and pups. In order to understand dystocia, a basic knowledge of normal canine parturition is essential. As there are many ways to medically manage a dystocia and perform a Caesarean section, my goal is to provide the busy practitioner with an easy step by step approach to provide effective and safe treatment.

Normal Parturition

Normal canine parturition is divided into three stages. The normal physiology and timing of these stages is very important as any deviation of normal may be an early sign of dystocia. Stage 1 is the period of cervical dilation and fetal positioning. Many uterine contractions are taking place during this stage but these will not be evident externally. The bitch will become restless, often panting and digging in bedding (known as “nesting”). Stage 1 is highly variable in length with some maiden bitches taking 24 hours or more. The average is 6-12 hours for most bitches. Stage 1 leads into stage 2 which is initiated by the rupture of the fetal membranes and ends with the delivery of the last fetus. This is the period where true dystocia will take place and an external abdominal press will be noted. The duration is variable depending on parity, litter size, and breed. Stage 3 is the final stage and is the delivery of the fetal membranes. Stage 2 and 3 often occur simultaneously.

Dystocia

Dystocia is defined as “difficult birth” and is very common in the bitch. Some breeds (English bulldog, Pekingese) have extremely high instances of dystocia. Early recognition of dystocia and early intervention is essential for the health of dam and pups. As length of parturition increases, there is a marked increase in fetal mortality, thus it is essential that both clients and veterinarians are educated on the signs. In our practice, we will schedule the bitch to be seen a week prior to her due date to take “puppy count” radiographs and thoroughly educate the client on when to contact us in case of dystocia. Dystocia is a true medical emergency and should be treated as such. We provide our clients with a handout that very clearly outlines the instances where a veterinarian should be called:

1. Prolonged gestation length beyond 65 days from ovulation or 72 days from the first breeding
2. More than 4 hours between the “water breaking” and the delivery of the first puppy
3. More than 30 minutes of hard pushing without a delivery of a puppy
4. More than 2 hours between delivery of puppies
5. Any green-black discharge prior to the delivery of the first pup by more than 1-2 hours or increasing amounts of discharge without uterine contractions
6. Any significant frank bloody discharge at any point (small amounts may be normal)
7. Bitches that are ill, febrile, shocky, or collapse during labor

Causes of dystocia can include fetal or maternal factors. Fetal factors include fetal oversize, fetal anasarca ("water puppy"), or head size too large to pass through the pelvis as is often seen in brachycephalic breeds. Maternal factors include uterine inertia, anatomic defects, obesity, or behavior. Uterine inertia is the #1 maternal cause of dystocia and results as a failure of the uterus to contract effectively. Medical treatment of dystocia is aimed at correcting this cause.

**Medical Management of Dystocia**

When the bitch initially presents for dystocia she should be quickly and thoroughly evaluated. A history including breeding dates, ovulation timing, prior history of dystocia, and health issues should be taken. A complete physical exam should be performed including digital exam of the vagina to look for the presence of a fetus, fetal membranes, vaginal bands or strictures, and to evaluate the bitch’s response to feathering. Feathering is the firm stroking of the dorsal vaginal wall. Normally this will elicit the “Ferguson’s response” or strong contractions of the uterus and vagina in response to pressure. If these contractions are absent or weak, hypocalcemia or hypoglycemia are likely. If the bitch is stable, an ultrasound examination is performed to evaluate fetal maturity, character of fetal fluids, and fetal heart rate. Fetal heart rate of less than 180 bpm indicates fetal stress and Caesarean section is warranted. If the fetal heart rate is below 150 bpm consistently, profound fetal stress is evident and a C-section should be performed immediately. A complete blood count and chemistry profile should be performed. If indicated, a urine sample can also be obtained to look for ketones or glucosuria. If medical management is to be attempted, a radiograph is performed to evaluate for presence of pelvic obstruction.

If the bitch is in good condition, has not been in prolonged labor, there is no fetal distress, and there are four or less pups, medical intervention may be attempted. The purpose of medical management is to first correct underlying abnormalities. Hypocalcemia can be treated by administration of 10% calcium gluconate solution (10-20 mg/kg IV or SQ, 1-5 ml/dog SQ). It’s important to note that uterine hypocalcemia can occur before peripheral hypocalcemia is noted so often a bolus of calcium is given concurrently with oxytocin even if serum calcium is normal. If subcutaneous calcium is given it is important to dilute the volume 1:1 with saline. Calcium may be repeated in 6-8 hours if needed and it takes approximately 30-40 minutes to take effect if given SQ. In toy breeds or breeds with pregnancy toxemia, IV dextrose may be warranted.

If feathering results in strong uterine contractions, oxytocin can be given immediately. Oxytocin is a hormone released from the posterior pituitary gland and causes smooth muscle contraction, milk letdown, and maternal bonding. It is therefore essential to parturition. Oxytocin should
never be given in the presence of an obstructive dystocia as it has the ability to make this type of dystocia much worse and could cause uterine rupture. Microdoses (0.25-1 unit) should be used with no more than 5 units administered per bitch of any size. Higher doses result in uterine tetany and fetal hypoxia and are not effective. Oxytocin may be administered SQ, IV, or IM. The dose of oxytocin can be repeated in 30 minutes. It is important to adhere to the “three strikes and you’re out” rule when administering oxytocin. If a total of three doses have been given without a puppy being born (and abdominal contractions have been strong) a Caesarean section is needed. If a puppy is born and normal delivery occurs, oxytocin can be given every 30 minutes until all puppies are born or treatment fails to elicit contractions.

Caesarean Section

We treat every dystocia that we see as a potential Caesarean section. At the time the appointment is scheduled, the operating room is prepared and puppy resuscitation equipment inspected and made readily available. Most importantly, several experienced staff members are essential to serve as “puppy catchers” and puppy resuscitators. An incubator or warm water blanket should be available for the neonates. If one isn’t available, several latex examination gloves can be filled with hot water and placed under a towel to serve for external warming.

Bloodwork is obtained during the physical exam to have results prior to surgery. An IV catheter is placed and perioperative fluids administered. Dextrose may be warranted if the bitch has been in prolonged labor. Ideally the bitch should be pre-oxygenated with flow-by oxygen for a minimum of 5 minutes prior to induction. The goal is to have the bitch (and neonates) under anesthesia for as short of a period as possible. The bitch is clipped and scrubbed before induction to minimize this time frame. During the procedure, surgical monitoring is critical as significant blood loss and decreased venous return from the gravid uterus can occur.

Minimal anesthesia necessary is important until all fetuses are removed. There are many anesthetic protocols available and ours is outlined here. Ketamine and xylazine should be avoided as they have been shown to increase neonatal mortality when used in C-sections. We administer propofol IV (5 mg/kg) for induction and intubate the bitch. Fluids are run at 3-5 ml/kg/hr depending on the hydration status of the bitch. The bitch is intubated and placed on isofluorane gas anesthesia and the lowest level to maintain anesthesia. A line block is performed with 2% lidocaine over the midline where the incision is to be made.

A midline incision is made and one or both uterine horns exteriorized. I prefer to make a single incision over the greater curvature of each horn, careful not to incise over a placental site. There is some debate over whether two horn incisions or a single uterine body incision is better. I personally feel that each clinician should use whichever site ensures they can remove the pups.
the fastest and there are pros and cons to both approaches. I prefer to use two incisions to quickly remove the pups and avoid damaging the intercornual uterine septum.

Each pup is removed and the membranes pulled off the face with a gauze sponge. The cord is clamped at the level of the placenta and the pup handed off to a “puppy catcher” who is waiting to receive the pup in a clean dry towel. Immediately after the pups are removed, the bitch is administered an opioid IV to provide analgesia. If any dead pups were present, it is prudent to obtain swabs for culture and cytology from the uterine lumen. Placentas are removed if they can be removed easily. Firmly attached placentas are left in place to pass naturally to avoid the risk of placental bleeding. The uterus is closed using either a two-layer inverting closure (simple continuous and Cushing or Lambert), or a single inverting closure (Utrecht pattern). A 3-0 or 4-0 absorbable monofilament with a taper needle should be used. It is very important that the uterine lumen is not penetrated when closing the uterus to avoid adhesion formation. The sutures need to be tightened well to ensure there is no bleeding. Following uterine closure the uterus and abdomen are lavaged thoroughly with saline to remove uterooverdin that might be present. A small dose of oxytocin is administered intravenously and the uterus inspected for contraction and possible leakage. If leakage is noted and a single inverting suture pattern was used, a second pattern should be placed on top. The abdomen is closed routinely using an intradermal suture pattern in the skin. Staples or external sutures should not be used.

Post-operatively the bitch can be given opioids. The lowest effective dose should be used and for as short of a duration as possible as opioids do cross into the milk. NSAIDs should not be used due to renal immaturity of neonates. During recovery, the pups should be introduced to the dam and allowed to nurse. It is very important that due to the effects of anesthesia, an awake, responsible adult be with the bitch and pups for the first 24 hours.

**Neonatal Resuscitation**

Pups should be rubbed vigorously with dry, warm towels. The head should be supported and the neck extended to prevent occlusion of the trachea. Flow-by oxygen can be provided during stimulation to help with oxygenation. Must pups will recover very quickly once the inhalant is metabolized. Dopram is no longer recommended in neonatal resuscitation as it not effective during cases of hypoxia and is not useul in treating apnea. Suction bulbs can be used to clear airways and nostrils. It is important to note that under no circumstances should puppies be swung! Pups revived this way are in danger of cerebral hemorrhage and accidental injury from being dropped. The cords are clamped 2 cm away from the umbilicus and ligated with suture. Any pups who are not breathing with effective stimulus can use a 25 gauge needle inserted into the Jen Chung acupuncture point (at the nasal philtrum and rotated when bone is contacted). In the case of cardiac arrest 0.1-0.3 mg/kg epinephrine can be administered IV or IO.
References

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