Dystocia

Opinion of a Theriogenologist:

1. Be sure the bitch is actually at the end of pregnancy before intervening - most common problem is going too soon

2. If she’s actually in stage II labour and in dystocia (see the intervention thresholds in the notes) then it’s usually prudent just go straight to surgery. With respect to medical management of dystocia, there are no good controlled studies of outcomes comparing oxytocin/medical management vs surgery. Don’t use oxytocin without a clear understanding of the way it works, the pros and cons of treatment, a knowledge of effective doses and overdoses and a very clear belief that your bitch/queen does not have obstructive dystocia, for which oxytocin would be contraindicated. If the goal of the client is to have healthy puppies, then it’s my opinion that generic use of oxytocin is of limited benefit and can be harmful”

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CLINICAL SIGNS

- Failure to commence labour by appropriate date*
- Systemic illness in a bitch at or beyond due date
- Tachycardia in the bitch (>120)
- Uterine and Abdominal contractions, but no neonate within 20 min
- Abdominal contractions for >1-2hrs with no neonate

*Very hard to diagnose without measurement of progesterone because of variability of gestation length - 57-72 days from mating

DIAGNOSTICS

- PCV/TS
- Electrolytes
- Abdominal + Pelvic Radiographs
- Abdominal US (Fetal heart rates)

STAGES OF LABOUR (BITCH AND QUEEN)

1\textsuperscript{st} stage of labour (6-12hrs)
- Cervical & Vaginal relaxation and dilation
- Intermittent uterine contractions only
- Behavioural changes (restless, panting, nesting)
- May or may not be lactating

2\textsuperscript{nd} stage of labour (3-12hrs, up to 24hrs with big litters)
- Intensified uterine contractions + voluntary abdominal contractions
- Foetal expulsion (3-4 kittens/queen, 4-8 puppies/bitch)
- Foetal survival can last up to 6-8hrs for the 1\textsuperscript{st} puppy only from the start of 2\textsuperscript{nd} stage labour
- >2hrs between births endangers foetal life
- 60% delivered in cranial presentation (40% caudal)

3\textsuperscript{rd} stage of labour
- Placental expulsion and uterine involution
- Allow 5-10 mins for placenta expulsion following parturition if not seen at the birth

**HISTORY**

- Have there been any previous litters and were they successful
- Has she been eating with a normal appetite and given twice her normal calorie intake the past 3 weeks
- Any green coloured discharge seen coming from the vulva
- How long has the bitch been showing abdominal contractions

**PATHOPHYSIOLOGY**

Dystocia is described as being functional (ie: inertia) or obstructive, with the former further characterised as primary or secondary.

In a case series of 510 Bitches presenting for dystocia to a Brisbane practice which required caesarian section, the reason for presentation were:

73% of cases were presented for perceived abnormality in the progression of labour of which:

- 1 in 3 were failure to begin Stage II Labour
- 1 in 2 had prolonged Stage II Labour without pup delivery
- 1 in 5 had cessation of Active Labour

The causes of the dystocia in these cases were:

Maternal origin in 13% of cases, foetal in 37% of cases and attributed to very large or small litters in 17% of cases. In about 30% of cases a clear diagnosis could not be achieved even after surgery

**Functional Dystocia**

- **Primary uterine inertia**
  Weak, infrequent uterine contractions from the myometrium. This is classified as partial (2\textsuperscript{nd} stage labour has started) or complete (1\textsuperscript{st} stage labour has started only). Stress, electrolyte abnormalities (Ca, Gluc, Mg), hereditary, obesity, small or excessive litter sizes contribute to its pathology.

- **Secondary uterine inertia**
  Prolonged 2\textsuperscript{nd} stage labour and can also be associated with an obstructive dystocia. This can be from a diaphragmatic rupture, muscle fatigue, perforated trachea or uterine rupture.

**Obstructive dystocia**

- **Relative foetal oversize (maternal obstructive dystocia)**
Normal foetal size that cannot pass along a small/restricted maternal birth canal. Can be due to round ligaments encircle the uterine horn, ectopic pregnancy, inadequate cervical dilation (fibrosis, congenital) or reduced pelvic size (breed, congenital).

- **Absolute foetal oversize (foetal obstructive dystocia)**
  Foetus is too large to pass along a normal sized maternal birth canal. It is related to foetal position/posture and presentation, foetal oversize, developmental defect or foetal death.

### DIAGNOSTICS

**PCV/TS + Electrolytes**
- There may be an anaemia if there is a uterine tear. Emergency surgery is required for haemostasis and delivery
- Hypocalcemia and hypoglycaemia may be present, which contribute to uterine inertia. Magnesium can be measured if available due to its role in calcium influx/efflux across the sarcoplasmic reticulum and endothelial cell wall. Calcium supplementation should be considered despite normal blood calcium

**Radiographs (Abdominal)**
- Radiology can be used to confirm that pregnancy is finished, and can give an indication of how many foetuses remain, although this is not considered definitive.
- Radiology is not useful for diagnosis of foetal/maternal disproportion and cannot predict whether vaginal birth is possible.
- Intra-fetal gas patterns and awkward fetal postures are the earliest signs of fetal death.

**Ultrasound (Abdominal)**
- Foetal bradycardia is an early sign of foetal hypoxia
- A foetal heart rate >220 indicates a vigorous puppy, 180-220 suggests mild distress, and a HR <180 indicates foetal distress and requires intervention.
- Any bowel movement in the foetus on US indicates foetal distress and emergency caesarean is indicated to save the puppy – 100% foetal puppies with a HR <180 have bowel movement, 40% foetal puppies with HR 180-220 have bowel movements.
- A single uterine contraction will lower the foetal heart rate to <150 beats/min, so this should be evaluated with caution and repeated in 1 min intervals where necessary.

### Definitive Intervention Thresholds

- Obstruction
- Bitch is systemically sick
- P4<6nmol/l and there is no labour (also >4 hours from green discharge with no pup)
- Ultrasound findings of foetal distress

*Caesarian is a reasonable option when labour has definitely commenced but is not progressing appropriately*
TREATMENT

MEDICAL MANAGEMENT

(20-40% success rate) – discontinued if no foetus is delivered within 1hr

*Prior to commencing medical management, sterile palpation of the cervix and pelvic canal with sterile lube is indicated to be sure the cervix is dilated enough and there are no restrictions within the pelvic canal. Any uncertainty in passing a litter due to an obstructive process, surgical management is indicated only (C1)

- Palpation of the pelvic canal
  - Determine if there is a fetus within the birth canal. Do not attempt to break the placental sac if still intact and the neonate is positioned caudally (C1)
  - Aseptically place a urinary catheter in the pelvic canal and liberally place sterile lubricant to allow easier expulsion of the neonate (C1)
  - Retraction is not recommended due to risk of disarticulations and limb amputations of the fetus. If applied, it should be in a caudal-ventral movement and only if lubricant has been placed in the pelvic canal as recommended (C2)
  - Gentle stroking of the dorsal roof of the pelvic canal elicits uterine and abdominal contractions (Ferguson reflex). An absent Ferguson reflex indicates either a premature birth, or primary uterine inertia is present and surgical management is required (C1)

- Crystalloid therapy
  - Hartmanns 10ml/kg over 1hr (C1)

- Electrolytes and Glucose
  - Hypocalcemia
    - Supplement 0.5ml/kg of 10% calcium gluconate not faster than 0.5ml/min regardless of measured calcium. Can be repeated once (C1)
    - An ECG should be attached to the patient to monitor for arrhythmia’s (C1)
  - Hypoglycaemia
    - Single IV bolus at 0.5ml/kg 50% glucose diluted in 1:3 ratio with 0.9% NaCl (C2)

- Oxytocin
  - Give 0.5-2IU IM per bitch or queen. Repeated use is controversial (C1)
  - NB: Doses greater than 5iu, and potentially smaller doses when repeated may cause uterine tetany and decreased fetal blood flow leading to inadequate uterine contractions and fetal distress
  - 1 unit of oxytocin has been shown to result in intra-uterine pressures in excess of 100mmHg

SURGICAL MANAGEMENT

(>90% success rate) – Hysterotomy (Caesarian)
*Performed immediately if the bitch or queen's clinical status is compromised from having the fetuses (e.g.: uterine rupture, diaphragmatic hernia), complete uterine inertia, fetal distress, maternal pelvic obstruction, absent Ferguson reflex, or no puppies are seen after 1 hr of medical management.

- **Anaesthesia** (AIM: induction to delivery time is short as possible)
  - Hartmanns is administered at 10ml/kg/hr during the anaesthetic to maintain MAP and uterine perfusion (C1)
  - Clip the dam prior to delivering any anaesthetic agent (C1)
  - Pre-oxygenate the Dam for 2 mins prior to induction
  - Induce the dam with alfaxan to allow intubation (C1)
    - One study showed no difference between alfaxan and propofol puppy viability up to 3 mths of age, though alfaxan was reported to show better neonatal vitality at 60 mins post-parturition
  - Maintain general anaesthesia using isoflurane at 1-2% with an FiO2 of 100% at 1-2L/min (C1)
  - Once all fetuses are removed, single 2-4ug/kg boluses of fentanyl can be given IV to the dam for analgesia. (C2)
  - Once the dam is awake, a NSAID can be given for additional analgesia
    - Meloxicam 0.2mg/kg SC once to the bitch or queen, or (C2)
    - Carprofen 2mg/kg to the bitch only (C2)

*Alpha-2 agonists, Barbiturates and Dissociate agents (ie: Ketamine) should be avoided (C3)

- **Caesarian procedure** (Hysterotomy)
  - Make a ventral midline incision extending from just cranial to the umbilicus to cranial to the pubic bone. Care as the linea alba is thinned, which can lead to premature opening of abdominal cavity
  - Gently exteriorize both uterine horns by lifting (DO NOT pull) one at a time. Once both gravid horns are exteriorized, flip them 180° caudally to expose the dorsal surface of the uterine body
  - Place saline soaked abdominal sponges underneath the uterus to pack-off the abdomen and prevent uterine secretions and contents from spilling into the abdominal cavity
  - Tent and make a small midline incision through the dorsal surface of the uterine body, then extend using metzenbaums. A neonate lodged in the pelvic canal should be removed first, followed by neonates in the uterine horns.
    NB: incisions can be made in the uterine horn to hasten neonate removal, though this adds to anaesthesia time as 2x incisions are required
  - Break each placental sac and clamp (haemostats) each umbilicus of the neonate distally and proximally and tear the umbilicus in between. Keep both haemostats clamped.
  - Hand the neonate to a nurse aseptically for resuscitation and cleaning. Each neonate should be rubbed vigorously, but gently to induce the respiratory reflex.
  - Place gentle traction at placental membranes only. They should only be able to be removed once they detach from the uterine wall naturally. If they take too long to detach, they can be left and allowed to pass naturally.
    NB: pulling at placental membranes can cause significant haemorrhage and death
  - Lavage the external uterine wall to remove debris
neonate viability

handling neonates at delivery

- inspect for uterine vessel avulsion or uterine tears (ligate or repair, respectively)
- lavage the abdomen and suction contents if there was spillage of uterine contents
- close the uterine body +/- horns (if incised) in a 2x layer closure
  - 1st layer: Use 3-0 PDS in a simple continuous pattern with mucosa-mucosa apposition
  - 2nd layer: Use 3-0 PDS in a continuous inverting pattern (Cushing or Lembert)
- close the abdomen in 3x layers (rectus fascia, subcutaneous tissue and skin), and clean mammary glands of all material (including blood and antiseptic)

NB: Intra-dermal sutures may be used to prevent irritation of neonates when feeding

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Interactions between neonates and mothers must be closely monitored because of the risk of maternal aggression. A staff member must be within arms-reach of the neonates at all times and able to intervene immediately.

- **Modified APGAR Scoring system** (5 parameters; scored out of 10) – used to determine short-term survival of the puppy. Each parameter is scored between 0-2 at 5 min mark of being born (C1)
  
  NB: Appearance, Pulse, Grimace, Activity, Respiration (developed by Virginia Apgar, obstetrician)
  
  - **Heart rate**
    - (HR >220 = 2, HR 180-220 = 1, HR <180 = 0)
  
  - **Respiratory effort**
    - (Clear crying + >15 RR = 2, Mild crying + RR 6-15 = 1, no crying + RR <6 = 0)
  
  - **Reflex irritability**
    - (Gentle compression of tip of paw; crying + quick leg retraction = 2, little to no crying + weak leg retraction = 1, weak or absent attempt to leg retraction = 0)
  
  - **Motility**
    - (Strength of spontaneous movement; strong = 2, mild = 1, weak to absent = 0)
  
  - **Mucus membrane colour**
    - (pink = 2, pale = 1, cyanotic = 0)

* Delivery method does not effect survival, though an APGAR score of 0 at 10 mins indicates a high risk factor for death or disability
* Those scored in the 7-10 range were far greater at surviving than in the 0-3 and 4-6 range. Between 2-24hrs post whelping, there is 100% mortality if in 0-3 range with spontaneous whelping, and a 50% risk of mortality if medical management is applied. No puppy was assessed in the 0-3 category if caesarian was provided.
* Any neonate with a score less than and equal to 6 requires ongoing medical attention till its score improves to >7

**COSTS AND HOSPITALISATION**

- Hospitalisation time to expect: 1-2 days
- Costs whilst hospitalized:
  - Medical management: $700-1000
  - Surgical management: $2500-4000

**PROGNOSIS AND RISK FACTORS**

- Overall incidence of dystocia in the bitch is 5% of all pregnancies, and 5-8% in the queen
- Puppies with <20% weight of the average puppy weight have intrauterine growth retardation
- APGAR scoring system is used accurately for short-term puppy viability and recognising to continue medical treatment till it improves within the first 2hrs of birth
- Umbilical lactate (UL) >5mmol/L is a measure of fetal distress and emergency caesarean is recommended for the survival of the puppies
- Average neonatal mortality is 15-25% regardless of delivery method, occurring mainly immediately after birth up to a few days after birth. Main reasons for death are respiratory distress following dystocia and bacterial infections
# REFERENCES

*Use of any of this material is not for retail or public disclosure. It is intended for personal use and knowledge only

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