

MAXIMIZING NEONATAL SURVIVAL

Robert Van Hutchison, D.V.M.

Dr. Hutchison received his DVM in 1972 from The Ohio State University College of Veterinary Medicine. He is currently co-director of Animal Clinic Northview, Inc., a ten-doctor practice located in North Ridgeville, Ohio. Dr. Hutchison is internationally recognized for his work with canine frozen semen and canine reproduction. He is an off-quarter advisor for six veterinary colleges for students interested in small animal theriogenology. Dr. Hutchison has authored numerous articles on canine reproduction in various breed journals and magazines, has appeared on television, and has lectured internationally on reproduction, whelping, pediatrics, and canine/feline infertility.

INTRODUCTION

Multiple studies have indicated that 20-30% of all puppies of normal gestation length die before reaching 6 months of age. Of the many caused of neonatal death, prolonged labor, hypoxia, and dystocia are among the primary causes. To avoid puppy loss, the breeder and the veterinarian need to be aggressive when signs of labor problems appear. A cesarean section is a commonly performed surgical procedure that can be rewarding to both the client and veterinarian.

WHY PERFORM CESAREAN SECTIONS. Cesarean sections (c-sections) are performed for a number of reasons.

- 1. Puppies are not deliverable.** Pelvic shape or size, an overly large puppy, or a mal-positioned pup necessitates quick action to save a litter.
- 2. Uterine inertia.** The progesterone level dropping below 2.5 ng and the pre-whelping temperature drop (a monitoring of the progesterone level dropping) returning to normal (101 – 102o F) should initiate active labor. Treatment with oxytocin at this time may help to actuate labor. Any signs of fetal stress should suggest a more aggressive approach.

Oxytocin will stimulate uterine contraction and initially increase the blood flow to the uterus, thereby increasing the oxygen level to the fetus. If oxytocin is continued to be given, the uterine blood vessels dilate and the blood pressure to the uterus drops, subsequently robbing the puppies of oxygen. The only factors affecting the oxygenation of the puppies in utero are the uterine blood pressure and the fetal heart rate.

A good “rule of thumb” when using oxytocin to aid delivery is to give one dose either intramuscularly or subcutaneously. An average dose should be 2-units/10 lbs. of body

weight (e.g., a 40-lb. bitch would receive 8 units). Most oxytocin is 20 units/ml. If no response is noted in the bitch within 20 minutes, a second injection of oxytocin is given. If there is still no response after the second injection, a c-section should be performed. Further injections of oxytocin can be detrimental.

3. Signs of in utero fetal stress. Black, red or green vaginal discharge before any puppies are delivered signifies placental separation and blood leakage. The puppies should be immediately evaluated for stress by monitoring the fetal heart rates. Normally the fetal heart rate should be twice that of the bitch. The use of ultrasound and Doppler will evaluate the strength and rate of the fetal heart. A slowing of the fetal heart can be the deciding factor as to whether a c-section is needed. The evidence of fetal bowel movements in utero can also indicate fetal stress.

4. Convenience. A planned c-section can be a method for the breeder to assure the most live puppies. Timing of the c-section is critical to assure fetal health.

Puppies need a full gestation period to be ready to survive outside the womb. A bitch's anticipated due date can be calculated as 63 days post ovulation or 65 days post luteinizing hormone surge. Breeding dates cannot be used to calculate the exact whelping date of a bitch.

ANESTHESIA FOR CESAREAN SECTION

Since all anesthetics cross the placenta to some degree, it is a challenge for the veterinarian to choose an appropriate drug for maximum control and comfort for the bitch but not so depressive as to cause puppy lethargy, hypoxia, or even death.

For an anesthetic to be considered for a c-section it must

- Cause rapid induction
- Be safe for the bitch
- Be safe for the puppies
- Allow for rapid recovery
- Not have prolonged after effects

An anesthetic given for c-section must allow for endotracheal intubation. Gastrin, a hormone secreted by the placenta, causes a lowered pH (increased acidity) of the stomach acid. If a pregnant bitch vomits while undergoing or recovering from surgery and aspirates into her lungs, the results could be fatal.

Many anesthetic protocols exist for use in veterinary medicine. However, most do not meet the criteria set forward for safety in a c-section.

- **Local/Epidurals.** Do not allow for intubation of the bitch and provide no oxygen source.

- **Tranquilizers.** Depress blood pressure resulting in fetal hypoxia. Also depresses the pups.
- **Dissociatives.** Increase blood pressure to the uterus, but must be used with a tranquilizer causing cardiovascular and respiratory suppression.
- **Opiates.** Requires 6 days to totally clear the puppy's system, thereby causing depression in the puppies.
- **Barbiturates.** Small doses cause minimal depression, but larger doses can be very depressing to neonates and the bitch.
- **Inhalants.** Isoflurane and sevoflurane are minimally absorbed and clear the bitch and puppies very quickly.
- **Propofol.** Crosses placenta, but clears puppies and bitch very quickly.

No perfect anesthetic for c-sections currently exists. The better protocol currently available includes the use of Propofol for induction and intubation of isoflurane and sevoflurane for maintenance of the bitch. These drugs cause minimal suppression, quick induction, recovery, and no lingering side effects.

PREPARING FOR CESAREAN SECTION

Maternal stress, pain, and anxiety are detrimental to the fetus. An essential element in preparing a bitch for a c-section is for the owner, veterinarian, and medical staff to avoid mental or physical stress to the bitch.

The bitch is pre-treated with atropine sulfate, which crosses the placenta and helps maintain the fetal heart rate. The bitch should have an intravenous catheter and fluids running before and during surgery to maintain normal blood pressure throughout the surgery. Pre-oxygenation of the bitch before anesthesia will help to avoid fetal acidosis should the bitch become apneic (stop breathing) during induction of the anesthesia.

SURGERY

Once the bitch is in an appropriate surgical anesthetic plan, she is placed in dorsal recumbence. Care should be taken not to tip the table as is often done in abdominal surgery, as this would force the gravid uterus against the diaphragm, inhibiting respiration. An incision from the pubis to the umbilicus should initially be made. The incision may need to be extended if the uterus is overly distended with puppies. Care should be taken to not expose too large a surface area of the uterus to the air as this can cause hypothermia, especially in small bitches.

Incisions in the uterus are made to allow quick removal of the puppies. The surgeon should be very sure that all puppies have been removed from the uterus. Any placental tissue still left in the uterus should be removed before closing.

Any inverting pattern of the surgeon's choice, with an absorbable suture material, is used to close the incision sites. If the uterus is slow to contract, an injection of oxytocin should be given intramuscularly. The muscle and skin closure is routine.

The bitch is removed from the table and once the abdomen is cleaned, the puppies are allowed to nurse. If proper fluid perfusion and blood pressure have been maintained, the milk flow is not compromised by the surgical procedure and future breeding is not compromised.

This article was originally published in *Canine Reproduction for Breeders*, Presented at Westminster Kennel Club Dog Show, New York, New York, USA, February 10, 2001. Reprinted with permission. Copyright 2001, The Iams Company, Dayton, OH 45414