

# capsules

## THE CURRENT LITERATURE IN BRIEF

### C-Section Anesthesia: Which Protocol?

Time is a key factor in having a successful outcome for cesarean sections. The history should focus on a pertinent medical history (ie, pelvic fractures), problems with prior anesthetic protocols, and the current situation (eg, when did labor start, have any puppies been born). Physical examination should be complete; key things to focus on include palpation of the abdomen to assess size and tone of the uterus, digital examination of the vulva, and examination of the rectum. Radiographs and/or ultrasonography may be needed in some cases to determine fetal viability. At a minimum, packed cell volume, total protein, blood urea nitrogen, calcium, electrolytes, and blood glucose should be measured. Premedication should be administered to facilitate placement of catheters, provide analgesia, and decrease the dose of induction and inhalation anesthetics. Care must be taken in selecting agents. For example, opioids provide sedation and analgesia with minimal cardiac depression but can cause respiratory depression and bradycardia in both bitch and fetus. Studies have shown that only slightly more than 50% of patients receive fluid therapy, despite the fact that it is *strongly* recommended to address fluid imbalances, correct electrolyte and acid-base imbalances, and help counteract the hypotensive effects of anesthesia. Preoxygenation of the bitch with 100% oxygen via a face mask for 5 minutes before and during induction is recommended. Epidural anesthesia can be used successfully for cesarean sections. There is minimal fetal exposure to anesthetics, and pups are more vigorous at birth. Problems with this method include lack of airway protection and frequent need for repeated sedation. General anesthesia is a common protocol for cesarean sections in dogs and is preferred over epidural protocols. Propofol and isoflurane have been shown to be associated with less maternal and fetal mortality. Protocols that use alpha-agonists, ketamine hydrochloride, or methoxyflurane should be avoided because they have been associated with increased mortality in both bitch and fetus. Surgical time can be decreased by clipping the dog before surgery, using premedications, having adequate staff, and preparing the surgical suite. Heart rate, blood pressure, arterial oxygenation, and temperature during surgery are important to monitor.

**COMMENTARY:** There are many options in the anesthetic management of dogs undergoing cesarean section. The selection of a particular protocol can have significant impact on maternal and/or neonatal survival so it is very important to tailor the anesthetic technique to each situation. This article reviews many of the drugs commonly used in the perioperative and anesthetic management of cesarean section. The two protocols for elective and emergent cesarean section presented are succinct and should be particularly useful to the practicing veterinarian. —Eric R. Pope, DVM, MS, Diplomate ACVS

Cesarean section in dogs: Anesthetic management. Ryan SD, Wagner AE. *COMPEND CONTIN EDUC PRACT VET* 28:44-54, 2006.