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Foreign Body & Peritonitis in a Pregnant Dog



ATHENA, A 2-YEAR-OLD PREGNANT MASTIFF, was presented for vomiting and lethargy of several days' duration. The patient was febrile (104°F), depressed, anxious, lethargic, and dehydrated (5%-7%), with injected mucous membranes and apparent pain on caudal abdominal palpation. There was no evidence of vaginal discharge. According to the owner, the dog had been in estrus 60 days previously. A CBC revealed neutropenia with toxic changes and increased band neutrophils. Abdominal ultrasonography revealed 4 to 5 live fetuses (in utero 45-50 days), free abdominal fluid, and an echic structure in the small intestine. Radiographs revealed loss of serosal detail, bowel dilation, and a radiodense foreign body in the cranial intestinal area. Organ displacement caused by pregnancy prevented better localization of the foreign body with noninvasive diagnostic techniques. To avoid potential uterine perforation, abdominocentesis was not performed. The diagnosis was intestinal foreign body with potential perforation and subsequent peritonitis. Hospitalization, antibiotic therapy, and abdominal exploratory were recommended.

Which of the following drugs would be appropriate in the management of this patient?

Based on the information provided, how would you grade the following drugs and why?

Turn the page and compare your results ►

RED = do not use YELLOW = proceed with caution GREEN = safe

Drug	RED	YELLOW	GREEN
Ampicillin-sulbactam	RED	YELLOW	GREEN
Enrofloxacin	RED	YELLOW	GREEN
Cefazolin	RED	YELLOW	GREEN
Opioids/naloxone	RED	YELLOW	GREEN
Acepromazine	RED	YELLOW	GREEN
Propofol	RED	YELLOW	GREEN
Sevoflurane	RED	YELLOW	GREEN
NSAIDs	RED	YELLOW	GREEN
Glucocorticoids	RED	YELLOW	GREEN
Oral micronized progesterone	RED	YELLOW	GREEN

CBC = complete blood count, NSAID = nonsteroidal antiinflammatory drug



Did you answer?

The following represents the best responses based on drug metabolism, pharmacokinetics, species, diagnostic differentials, clinical and laboratory data, and other pertinent findings.

Ampicillin-sulbactam

| CORRECT RESPONSE



Because of the presence of free abdominal fluid and the need for surgery, antimicrobial therapy should begin at hospitalization and continue postoperatively. Penicillin derivatives can cross the placental barrier but have not been shown to be harmful to the fetus.¹ Ampicillin-sulbactam has a good spectrum of action against anaerobes, *Enterococcus* spp, and *Escherichia coli*.²

Enrofloxacin

| CORRECT RESPONSE



Fluoroquinolones have been shown to cross the placental barrier and can cause articular cartilage damage if administered to patients during times of active growth.³⁻⁶ Therefore, administration of fluoroquinolones to pregnant dogs can be considered if further gram-negative coverage is needed in late pregnancy and in pediatric patients younger than 30 days, with minimal cartilage damage.^{3,7} Because fluoroquinolones administered in high doses have been shown to cause teratogenic and embryotoxic effects in some species during early pregnancy, they should be avoided in this dog for the first 40 days of gestation.^{8,9}

Cefazolin

| CORRECT RESPONSE



Cephalosporins, like other β -lactams, can cross the placental barrier but have not been shown to be harmful to the fetus.^{3,6,10,11} Cephalosporins can be used as an alternative to ampicillin treatment if indicated by culture results and susceptibility testing. However, the poor activity of cephalosporins against *Enterococcus* spp may be a concern in patients with intestinal perforation.¹²

Opioids/naloxone

| CORRECT RESPONSE



This patient's severe abdominal pain and planned exploratory procedure necessitate analgesic use. Butorphanol, an opiate derivative, can cross the placental barrier and has caused respiratory and cardiac depression in neonates during cesarean delivery.¹³ Because this patient is not at term, however, butorphanol can be administered, provided the fetal heart rates remain within normal limits.^{3,14} Because of its shorter half-life, fentanyl may also be used as a constant-rate infusion. Naloxone, an opiate antagonist, is safe for opiate reversal in pregnant and neonatal patients.^{13,15}

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Acepromazine

| CORRECT RESPONSE



Although premedication may be warranted in a restless patient, phenothiazines should be avoided in near-term dogs, as it can depress the fetal and neonatal central nervous system.¹

Propofol

| CORRECT RESPONSE



Propofol can provide a quick and smooth anesthetic induction^{16,17} but also can cause profound cardiovascular depression by producing hypotension after excessive vasodilation. This effect is dose dependent and lasts only a few minutes because of propofol's rapid redistribution. The patient should be preoxygenated for at least 10 minutes before induction to minimize injury resulting from oxygen debt, which can occur during the period of hypoxia associated with induction. Most pregnant dogs and fetuses tolerate induction with propofol with no significant problems after preoxygenation.¹⁷

Sevoflurane

| CORRECT RESPONSE



Sevoflurane is preferred over isoflurane because the former has not been associated with teratogenic effects.¹⁸ Isoflurane and halothane have shown teratogenic effects in mice,¹⁹ but subsequent studies in rats were unable to reproduce these results.²⁰ Isoflurane has been used successfully in patients undergoing cesarean section,²¹ but gas anesthetics pass the placental barrier easily and can have a suppressive effect on respiration, preventing clearance of the anesthetic in neonates.¹³ In cases of apneic neonates, cardiorespiratory resuscitation can be performed until gas is cleared from circulation.²²

NSAIDs

| CORRECT RESPONSE



Because of the signs of peritonitis in this patient, antiinflammatory and analgesic drugs may be indicated; however, nonsteroidal drugs in laboratory species have been associated with early closure of the ductus arteriosus²³ and orofacial clefts¹⁰ resulting from inhibition of COX production and a decrease in the prostaglandin production necessary to maintain ductus patency.

Most pregnant dogs and fetuses tolerate induction with propofol with no significant problems after preoxygenation.

COX = cyclooxygenase, NSAID = nonsteroidal antiinflammatory drug

MORE ►



Corticosteroids have been associated with cleft palate and other congenital malformations as well as premature labor.

Glucocorticoids

CORRECT RESPONSE

Low-dose corticosteroids can be used to regulate production of inflammatory mediators; however, corticosteroids have been associated with cleft palate and other congenital malformations²⁴ as well as premature labor²⁵ and, therefore, should be avoided during pregnancy.²⁶

Oral micronized progesterone

CORRECT RESPONSE

Postsurgical release of prostaglandins can disrupt the corpus luteum, which is responsible for secreting progesterone and maintaining pregnancy. Therefore, plasma progesterone concentrations should be monitored frequently during pregnancy and replacement therapy started immediately if levels fall below 5 ng/mL 1 week before the patient's estimated whelping date.²⁷ Improper use of synthetic progestogens has been associated with cryptorchid males and masculinization of female fetuses in early pregnancy; therefore, progesterone should not be administered to pregnant bitches before day 35 of pregnancy.^{1,28,29}

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ISSUES & ANSWERS

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