

POST-ANESTHETIC ESOPHAGEAL DYSFUNCTION IN A DOG

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CASE PRESENTATION

A 5 year-old spayed female Labrador dog was presented at the Veterinary Teaching Hospital with a chief complaint of left hind leg lameness. The dog lived indoors but goes out unsupervised. Two weeks ago it came home limping. The owner took it to a veterinarian who diagnosed hip luxation and referred the dog to the hospital. The dog had no previous medical history.

On admission, the physical examination was normal with the exception of non-bearing left hind leg lameness. Blood parameters were within normal limits. Radiographs revealed femoral head luxation and moderate hip dysplasia. Based on radiological findings, the dog was scheduled for THR (total hip replacement).

The dog was fasted from midnight (approximately 8 hours before premedication). It was premedicated with acepromazine 0.05 mg/kg and morphine 0.5mg/kg IM, induced with 1mg/kg propofol and 0.5mg/kg diazepam, intubated with a 10mm ID endotracheal tube and placed on isoflurane in 100% oxygen. Duration of surgery was three hours. All anesthetic parameters were within normal limits during surgery. The dog was moved to radiology for postoperative radiograms while still anesthetized. Anesthesiologist noticed that the cuff of the endotracheal tube was ruptured during removal of the dog from the surgery and endotracheal tube was replaced. During this time, some gastroesophageal reflux (GER) was noted, a gastric tube was placed and gastric lavage performed. The rest of the anesthesia was uneventful.

During the first 12 hours following surgery the dog was depressed and in some pain. She therefore received morphine at a dosage of 0.5mg/kg every 4 hours. She also refused food and was reluctant to move. Aspiration pneumonia was suspected. Although chest auscultation and radiographs were normal the dog was placed on antibiotic therapy. 24 hours after the surgery the dog had completely recovered and was discharged from the hospital.

A week after surgery the dog came back to the hospital with a complaint of coughing. Blood work and radiograms were performed. Nothing abnormal was found and dog was sent home with suspected esophagitis. After a few days the dog started vomiting and was scheduled for endoscopy. Endoscopical examination revealed an esophageal stricture. Endoscopically-guided balloon dilatation of the stricture was performed. Repeated balloon dilatation was performed every three months for relief of the stricture.

DISCUSSION

What is the incidence of GER, esophagitis and esophageal stricture during anesthesia? Are there certain breeds that are predisposed to GER or certain surgical procedures in which we can expect it to occur, and therefore prevent it?

Gastroesophageal reflux in dogs and cats during anesthesia occurs more often than suspected. Many anesthetic drugs like acepromazine, diazepam, morphine, halothane, isoflurane, xylazine, and atropine can lead to GER by abolishing the tone of the gastroesophageal sphincter (1,2,3). In most cases this is called "silent reflux" and is clinically unapparent. It cannot be detected visually but rather by measuring esophageal pH during surgery (4). Fasting is one of the most important steps in preventing GER, although fasting guidelines can vary among the authors. Bednarski recommended free access to water up to 2 hours before anesthesia and no food for 6 hours (5). Hall *et al.* 2001 suggested free access to water up to 2 hours before anesthesia and no food for 12 hours(6). Other studies suggest that increasing the duration of preoperative fasting is associated with an increased incidence of reflux in dogs. If the first study none of 30 dogs fasted 2-4 hours refluxed, whereas 4/30 (13.3 %) dogs fasted 12-18 hours had a reflux episode during anesthesia ($p=0.112$) (7). In another study, none of 31 dogs fasted 3 hours refluxed, whereas 6/29 (20.7 %) dogs fasted 10 hours had a reflux episode ($p=0.009$) (8). In this study, the dogs had been fed a commercial canned canine diet at half the daily rate.

Other risk factors for GER during anesthesia remain controversial. There is no correlation with body positioning during anesthesia. There is a higher incidence with abdominal surgery than with other procedures. One study reported the incidence of GER to be as high as 41% of dogs undergoing intraabdominal surgery versus 16%- 17% of dogs undergoing anesthesia with or without surgery (8, 9). In a different study of 90 dogs undergoing elective orthopedic surgery, 51 dogs had 1 or more episodes of acidic GER during anesthesia (10). Prolonged exposure of the esophagus to gastric acidic content also places animals at greater risk of developing esophagitis. Esophageal mucosa may be damaged by contact with gastric contents of $pH < 2.5$ for as little as 20 minutes (11). Clinical signs of dogs with esophageal stricture are consistent. In one study of thirteen dogs with post-anesthetic esophageal dysfunction (10 with stricture, three with esophagitis) a cough was present in five dogs with esophageal stricture. Signs described by the owners

compatible with esophageal pain included stretching the neck while swallowing, repeated swallowing and standing with the neck extended. Aerophagia was noted in the history or was radiographically evident in seven of the dogs (in four dogs with strictures and in all dogs with simple esophagitis). In every case but one, there was mention of weight loss in the medical record. Median weight lost was 14.4% (range 5% to 44%) in the dogs with strictures, and 23% (range 15% to 43%) in the three dogs with only esophagitis (12). The mortality rate in this study was 23% (three of 13 dogs). Following aggressive therapy, full return to normal function was achieved in 10 (77%) of the dogs. Most dogs required a prolonged course of medical therapy and intensive nursing care to recover from the esophageal dysfunction. Four dogs with esophageal stricture developed aspiration pneumonia that was diagnosed by clinical and radiographic findings. Dogs with esophagitis alone did not develop aspiration pneumonia (12).

CONCLUSION

None of the present studies has predicted or prevented gastroesophageal reflux completely. There are some guidelines for the reduction of the incidence of GER. Fasting should not be longer than 10 hrs or shorter than 5 hrs approximately. Most episodes of reflux were silent and clinically undetected. Measuring esophageal pH during anesthesia represents a practical assessment of esophageal function of dogs. If reflux occurs, gastric and esophageal lavage should be done. Preanesthetic drug treatment should be applied in dogs with a medical record of gastroesophageal disorders and vomiting or other suspected conditions that can increase the incidence of GER. Post-anesthetic esophageal dysfunction is a dangerous and expensive complication of anesthesia that should be prevented.

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