# Glass Ingestion in a Boxer: 1 Case, 2 Options

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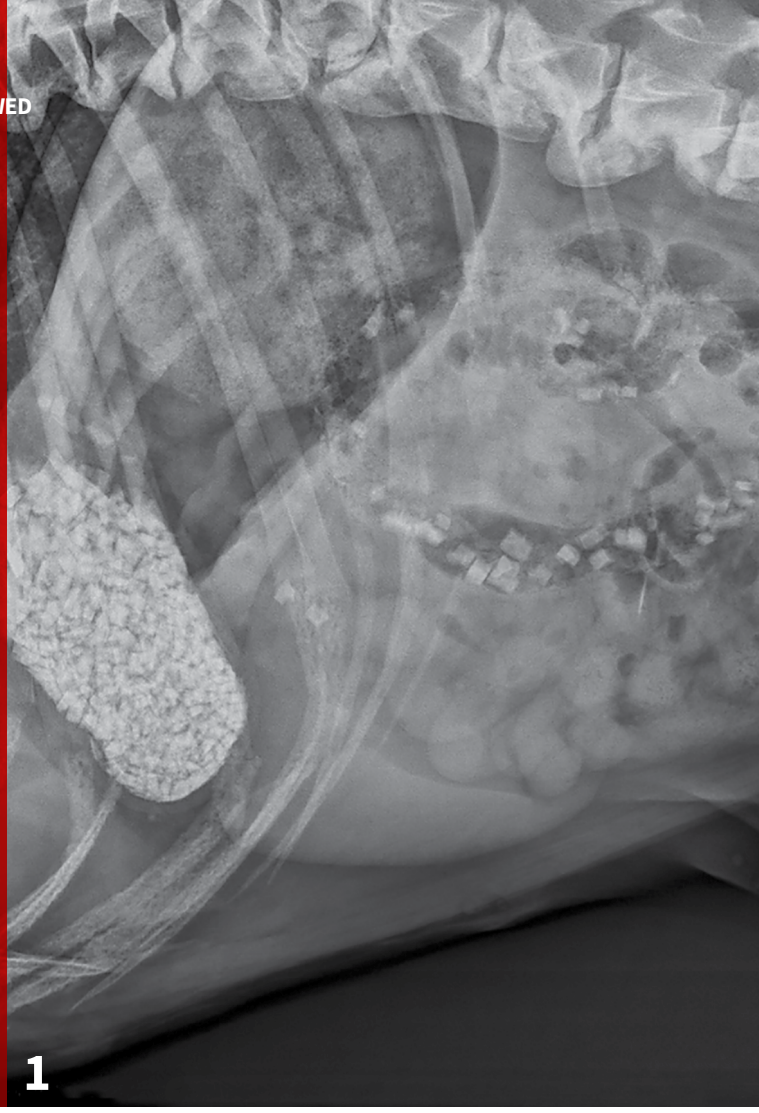



▲ A right lateral abdominal radiograph taken approximately 24 hours after glass ingestion. Multiple, irregularly shaped mineral opacities are present within the stomach, small intestine, and colon.

## THE CASE

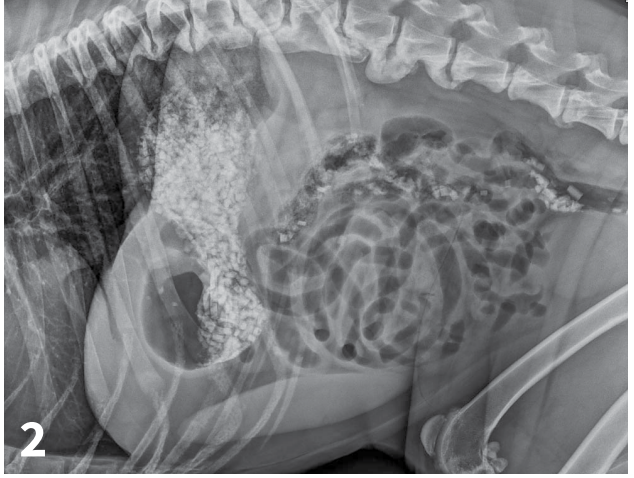
A 6-year-old castrated boxer is presented ≈24 hours after consuming a 3-lb pork roast and the glass top of a slow cooker. The owners report an episode of vomiting followed by an episode of diarrhea. The patient has a normal energy level with a mildly reduced appetite.

At presentation, the dog is bright and alert with normal vital signs. Mucous membranes are mildly hyperemic and moist with no evidence of oral ulcerations or masses. The patient is tense and nonpainful on abdominal palpation. On digital rectal examination, there are palpable pieces of tempered glass (each ≈10×10 mm) without evidence of blood.

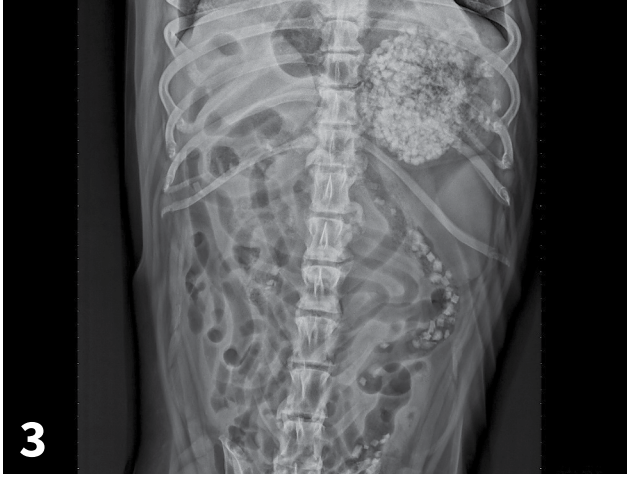
CBC reveals a leukocytosis (19.34 × $10^3$/µL; range, 5.10-14.00) characterized by a lymphocytosis (5.5 × $10^3$/µL; range, 1.4-4.6) and a mature neutrophilia (13.10 × $10^3$/µL; range, 2.65-9.80) with a mild thrombocytopenia (171 × $10^3$/µL; range, 147-243). A pancreatic-specific lipase is elevated (580 µg/L; range, 0-200 µg/L) and consistent with pancreatitis. Abdominal radiographs (***Figures 1-3***) reveal a moderately distended stomach that contains a large number of irregularly shaped mineral opacities. Additional mineral opacities are present in multiple small intestinal segments as well as the colon. There is also a mild decrease in serosal detail in the mid-abdominal region.

You suspect pancreatitis and elect to admit the patient for hospitalization and supportive care.

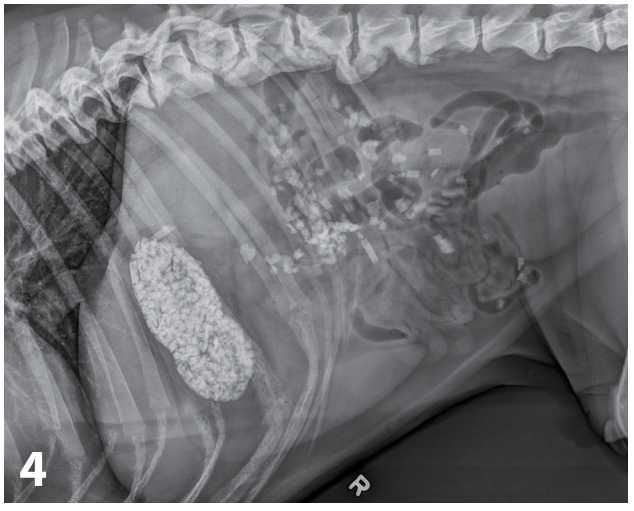
Abdominal radiographs, repeated 14 hours later, reveal minimal aboral movement of the mineral opacities (***Figures 4*** and ***5***).



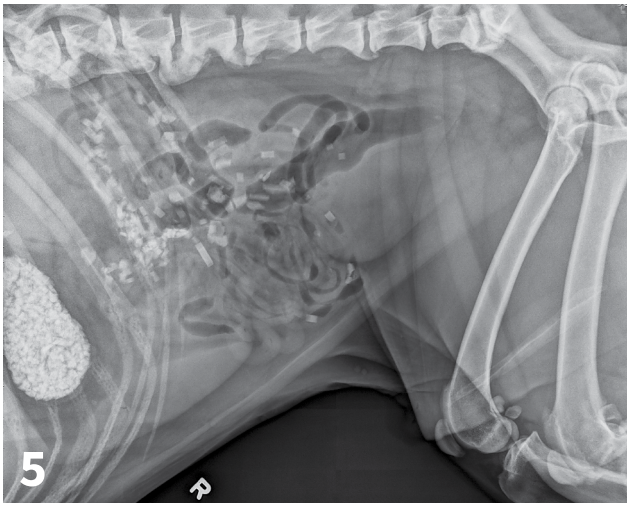

▲ A left lateral radiograph reveals multiple mineral opacities within the stomach, small intestines, and colon.




▲ An abdominal VD radiograph reveals multiple mineral opacities within the stomach, small intestines, and colon.




▲ A right lateral radiograph taken ≈38 hours after ingestion reveals minimal passage of material from the stomach into the small intestines.




▲ A right lateral abdominal radiograph shows a large amount of mineral foreign material in the stomach, small intestines, and large intestine. There is no evidence of obstruction.

## THE CHOICE IS YOURS ...

**CASE ROUTE 1**

To hospitalize the patient for management of presumptive pancreatitis and foreign body ingestion without surgical intervention, turn to page 72.

**CASE ROUTE 2**

To take the patient to surgery for a gastrotomy and enterotomies, turn to page 73.

**On digital rectal examination, there are palpable pieces of tempered glass without evidence of blood.**

# CASE ROUTE 1

You elect to manage the patient conservatively in hospital with gastroprotectants, IV fluid therapy, antiemetics, analgesics, and frequent enemas.

## Case Progression

An abdominal ultrasound collected on day 2 shows an enlarged, hypoechoic pancreas surrounded by a hyperechoic rim. Multiple mineral opacities are present within the stomach and throughout the small intestine with no evidence of obstruction. The patient continues to pass soft stools with intermittent passage of glass pieces.

Abdominal radiographs repeated on days 4, 6, and 8 reveal continued movement of glass fragments out of the stomach and small intestines. A focused ultrasound repeated on day 8 shows adequate peristalsis and no evidence of obstruction along the GI tract. A decreased number of opacities are identified within the small intestines and stomach.

## Clinical Considerations

In this clinical scenario, the risks for leaving a large amount of glass in the intestines should be considered.

Of note, the lid of the slow cooker was made from *tempered glass* (vs standard or nontempered glass; ***Figure 6***). This glass fragments into pieces with smooth edges, theoretically posing less risk for GI perforation than the sharp glass shards created with standard glass. Patients managed conservatively after ingestion of a foreign body should be monitored closely in hospital for signs of perforation and sepsis (eg, lethargy, abdominal pain, abdominal distension, vomiting, diarrhea, shock). Worsening signs warrant additional diagnostics, such as repeat imaging or abdominal fluid cytology and chemical analysis.

Pancreatitis management should also be considered for this patient. Ultrasound findings and an elevated pancreatic-specific lipase, combined with the history of dietary indiscretion, are highly suggestive of pancreatitis. Diagnosis of pancreatitis via ultrasound results has been reported to have a sensitivity of up to 68% in dogs[1] but can be highly variable based on the experience of the ultrasound operator and severity of lesions. Elevations in serum pancreatic lipase are approximately 82% sensitive for diagnosis of pancreatitis.[2]


▲ Tempered glass is a type of safety glass designed to shatter into fragments with smoother edges as compared with standard glass.

In general, treatment of pancreatitis is supportive and includes IV fluid therapy, correction of electrolyte abnormalities, gastroprotectants, analgesics, and antiemetics. Prognosis with pancreatitis is difficult to predict given the variable severity of the disease. Mild cases are often self-limiting and can resolve without therapy. More severe cases can result in acute shock, sepsis, and disseminated intravascular coagulation. Patients that recover should avoid high-fat foods to prevent recurrence.[2]

## Outcome

The patient is discharged after 8 days with gastroprotectants. Recheck radiographs repeated 1 week following discharge show few remaining glass fragments.

## Your Choice's Implications

In this scenario, conservative management was elected. Although the outcome was successful, long-term hospitalization was financially costly.

# CASE ROUTE 2

You elect to take the patient to surgery because the amount of glass in the stomach seems unlikely to pass naturally and without serious consequences.

## Case Progression

An abdominal exploratory surgery is performed, and glass is palpated along the entire length of the GI tract. The intestines are diffusely hyperemic, and the pancreas is erythematous and edematous. Moderate splenomegaly is present.

A gastrotomy is performed with manual removal of the glass fragments using a bladder spoon (***Figure 7***). The gastric mucosa is closed with 3-0 PDS in a simple continuous pattern, and the rest of the gastric layers are closed using a continuous Cushing's pattern with 3-0 PDS. Contaminated instruments and gloves are replaced with those that have been sterilized, and the abdomen is lavaged with 3 L of warm saline. An omental pexy is performed over the gastrotomy site with 3-0 PDS to improve vascularity and provide a local seal.

The surgery is without immediate complications, and the patient is managed postoperatively on analgesics, gastroprotectants, antiemetics, and an appetite stimulant. Enemas are performed twice a day to facilitate passage of the remaining glass. The patient is hyporexic postoperatively but otherwise remains largely free of clinical signs for pancreatitis.

## Clinical Considerations

In this clinical scenario, surgical removal is elected to avoid continued, prolonged GI irritation and provide more rapid resolution. Glass ingestion has rarely been documented in the veterinary literature; in human medicine, reports of glass ingestion most commonly occur in young children or psychiatric patients. Reported complications include retropharyngeal abscessation, mediastinitis,[3] esophageal perforation,[4]


▲ A photo taken intraoperatively shows glass fragments removed via gastrotomy.

bowel perforation with secondary peritonitis,[5] hematemesis, and abdominal pain.[6]

Surgical or endoscopic removal, considered when conservative management is risky or fails, is pursued in all cases of GI perforation. Factors such as the location and type of foreign body, time since ingestion, severity of clinical signs, and evidence of bleeding should be taken into consideration.[6] Reports in veterinary medicine are largely limited to avian patients.[7] In the authors' experience, the decision to proceed with surgical removal is largely determined on a case-by-case basis and is based on examination findings, abdominal radiographs, ultrasound, and owner preference.

## Outcome

The patient does well postoperatively and is discharged 24 hours later on analgesics and gastroprotectants.

## Your Choice's Implications

In this scenario, risks of surgery and anesthesia should be considered. In 1 study of 499 dogs with foreign bodies, the overall survival rates were good, with 96% surviving to discharge.[8] Causes for mortality include septic peritonitis, acute respiratory distress or systemic inflammatory response syndrome, intestinal infarcts, or euthanasia because of financial limitations.

In this scenario, the cost of surgery and brief hospitalization was less than in Case Route 1. However, extensive hospitalization for surgical complications or worsening pancreatitis would have resulted in a significant estimate increase.

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