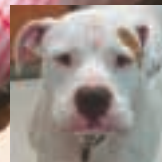


Bread Dough Toxicosis

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A 3-year-old, spayed female American bulldog presented after eating a loaf of rising bread dough.



History. The owner had set out a loaf of yeast-containing bread dough to rise before dinner. A few hours later, the owner found the empty pan on the floor. The dog was experiencing flatulence, and her stomach appeared bloated.

Physical Examination. The abdomen was distended, and depression was noted. Heart rate was elevated (180 bpm), and the patient was mildly ataxic as she walked around the examination room. Rectal temperature was slightly subnormal at 99.6° F.

Abnormal Diagnostic Findings

Variable	Results	Reference Range
Glucose (mg/dl)	150	53–117
Sodium (mEq/L)	129	146–156
Potassium (mEq/L)	3.3	3.9–5.5
Venous blood pH	7.29	7.34–7.46

ASK YOURSELF ...

With this patient's history, what other clinical signs or complications could be expected?

- A. Vomiting and progressive ataxia
- B. Foreign body obstruction, gastric dilatation, possibly volvulus
- C. Metabolic acidosis, shock, seizures, or CNS depression
- D. Coma, respiratory depression, possibly death
- E. All of the above

continues

Correct Answer: E
All of the above are potential signs or complications.

Mechanism of Action. Most forms of bread dough contain yeast—a single-celled fungus that in warm, anaerobic environments undergoes an enzymatic process during which sugars turn into carbon dioxide and alcohol. Carbon dioxide causes the dough to rise, while ethanol adds to the flavor before it evaporates during the baking process. Ingestion of raw dough not only raises concerns about the large mass of dough in the stomach, but the warm environment allows fermentation to continue, resulting in ethanol toxicosis.

Clinical Signs. Dogs may initially present with a distended abdomen (that may or may not be painful) from the expanding dough; carbon dioxide gas is also released. They may actively vomit or retch unproductively. Some dogs may present with signs similar to gastric dilatation with or without volvulus. Besides posing a foreign body hazard, the expanding dough mass may result in gastric distention, compress blood vessels, and cause vascular compromise to the gastric wall. Theoretically, gastric rupture or dilatation–volvulus could occur in severe cases, although these complications have not been reported.

As the fermentation continues, ethanol levels increase. Ethanol production and secondary signs may occur rapidly (within 30 to 60 minutes), but are often delayed for 2 or more hours

after dough is ingested. Ethanol is rapidly absorbed from all parts of the gastrointestinal tract. Gastric alcohol dehydrogenase can metabolize ethanol before it can be absorbed, but in dogs the amount metabolized by this pathway is relatively low.

Treatment. Steps to treat bread dough toxicosis are listed in **Tx at a Glance**. Symptomatic care involves fluid therapy, monitoring, treating seizures, thermoregulation, and managing vomiting.

Monitor cardiovascular function (heart rate, ECG, blood pressure); tachycardia and hypotension as well as various arrhythmias may be seen. Urine output and respiratory function should also be monitored; provide ventilatory support as needed. In cases of life-threatening respiratory depression, any of the following agents could be used: atipamezole (0.05 mg/kg IV), yohimbine (0.1 mg/kg IV), naloxone (0.02–0.04 mg/kg IV), or doxapram (1–5 mg/kg IV). However, these are off-label uses of these medications, and results may vary.

If seizures occur, treat with diazepam (0.5–2.0 mg/kg IV), which is preferred over phenobarbital because barbiturates can exacerbate respiratory and CNS depression.

Thermoregulation is necessary because hypothermia secondary to mental depression or recumbency may be exacerbated by general anesthesia and cold-water lavage. Regulate body temperature with heating blankets, warm IV fluids, and warm-water enemas. Manage vomiting as needed. Use caution with prokinetic agents, and central-acting antiemetics that can worsen CNS depression. Any of the following gastrointestinal protectants may be indicated: famotidine (0.5–1.0 mg/kg IV Q 12–24 H), cimetidine (5–10 mg/kg IV Q 8–12 H), or sucralfate (0.5–1 g PO Q 8 H).

Recovery may take 12 to 24 hours, depending on clinical signs. With prompt treatment, the prognosis is generally good. The patient in this case was treated medically and recovered by the following morning. ■

Tx at a glance

DECONTAMINATION

- If asymptomatic, offer cold water or ice chips, +/- induction of emesis under veterinary supervision.
- If symptomatic, stabilize first; then radiograph abdomen. If gas is present, may need to decompress with gastric tube. Perform gastric lavage with cold water, +/- a low dose of activated charcoal with cathartic (0.25–0.5 g/kg).
- Antiemetics may be necessary to manage vomiting, but some of these agents must be used with caution: Metoclopramide may increase the amount of dough in the intestine, potentially raising blood ethanol levels; this and other centrally acting antiemetics (chlorpromazine, prochlorperazine) could exacerbate CNS depression.
- Manage abdominal pain or cramping with analgesics, such as butorphanol.
- Avoid medications that will further alter gut motility; do not use nonsteroidal antiinflammatory agents, as these can exacerbate GI irritation. GI protectants, such as H2 blockers or sucralfate, may be beneficial in vomiting animals.
- Monitor in a veterinary facility for at least 12 hours.

LABORATORY EVALUATION

- Monitor urine output, blood glucose levels, electrolytes, and acid–base status in symptomatic animals.
- Supplement fluids with dextrose as needed, and thiamine.
- Correct acidosis and electrolyte disturbances, if present. Pay particular attention to sodium and potassium levels. If pH is < 7.2, correct with bicarbonate.

See Aids & Resources, back page, for references, contacts, and appendices.

TAKE-HOME MESSAGES

- Bread dough expands in the stomach, leading to risks for gastric dilatation and possibly shock and foreign body obstruction.
- As yeast ferments it forms alcohol, resulting in ethanol toxicosis. This can lead to acid–base disturbances, hypoglycemia, ataxia, CNS depression, and possibly seizures and death.

CNS = central nervous system; ECG = electrocardiogram; GI = gastrointestinal