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Ataxia & Vomiting in a Labrador Retriever Mix



A 29-kg, 2-year-old, neutered male Labrador retriever mix was presented for ataxia and vomiting.

History. The dog was previously healthy; vaccinations and heartworm prevention were up to date. While the owner was visiting a neighbor's house, the dog got into a kitchen cabinet. When the owner returned home, the dog vomited and was ataxic.

Physical examination. The dog was in good body condition, and hydration was normal. He was moderately ataxic and depressed. The temperature, pulse, and respiration were normal. The owner had brought in the vomitus, which contained a few pieces of gum and wrappers.

Laboratory evaluation. Results of a chemistry panel are listed in the **Table**.

Diagnostic Testing

Variable	Result	Reference Range
Glucose (mg/dl)	43	76.0–145.0
Potassium (mmol/L)	3.1	3.5–5.8
Phosphorus (mg/dl)	2.5	3.1–7.5
Blood urea nitrogen (mg/dl)	18	16–36
Creatinine (mg/dl)	1.3	0.8–2.4
Total bilirubin (mg/dl)	0.3	0.0–0.9
Alanine aminotransferase (U/L)	120	12–130
Alkaline phosphatase (U/L)	88	14–111

ASK YOURSELF ...

- What are possible differential diagnoses for the dog's condition?
- What additional information would be helpful to make a diagnosis?
- What monitoring tests should be performed on this dog?

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Diagnosis: Hypoglycemia due to xylitol ingestion

After further questioning, the owner said that there were no diabetic medications in the house. However, the gum wrappers were determined to be from a xylitol-sweetened gum. The dog was given an IV bolus of dextrose and started on 5% dextrose in water IV infusion. The signs quickly resolved. The dog was kept overnight, and blood glucose was monitored; he was able to maintain normal blood glucose after the dextrose infusion was stopped in the morning. A repeated chemistry panel was unremarkable, and the dog was discharged. Liver enzyme and bilirubin levels were rechecked daily for another 2 days and remained normal.

Xylitol is a sugar alcohol used as a sweetener in sugar-free gums and mints, toothpastes and mouthwashes, and baked goods; it is also available as a granulated powder. Dogs ingesting xylitol develop hypoglycemia secondary to the release of large amounts of insulin.

Because of increased availability of xylitol-containing products, the reports to the ASPCA Animal Poison Control Center of xylitol ingestion by dogs have increased greatly in the past few years: there were only 3 reports in 2002, 20 in 2003, 82 in 2004, and 193 in 2005.

Manifestations

In dogs the most common initial sign is vomiting. Central nervous system dysfunction due to acute hypoglycemia can follow, with progression from lethargy and depression to ataxia, collapse, and possibly seizures. Mild to moderate transient hypokalemia and hypophosphatemia may also occur. Some dogs may present with hyperglycemia, which is probably due to the liver's mobilization of glycogen. Signs may appear within 30 minutes of ingestion; however, hypoglycemia may be delayed for about 12 hours, especially with gum ingestion. Hypoglycemia may persist for about 24 hours. According to the Animal Poison Control Center, xylitol doses greater than 0.1 g/kg of body weight may cause hypoglycemia.

Liver enzyme levels may increase within 6 to 12 hours of xylitol exposure. Affected dogs may

DID YOU ANSWER...

- Hypoglycemia due to toxic or metabolic causes. Common toxic agents that can cause hypoglycemia include sulfonylurea antihyperglycemic medications (such as glipizide and glyburide), α -lipoic acid (thioctic acid), and xylitol. Metabolic causes of hypoglycemia include hunting dog hypoglycemia and insulinoma (pancreatic β -cell carcinoma).
- Further history. The owner was asked about the products and medications in the cabinet.
- Because of the possibility of hepatic failure from xylitol ingestion in some dogs, liver enzymes, total bilirubin, and possibly coagulation measures should be monitored for at least 3 days after xylitol exposure.

develop full-blown acute hepatic failure in 1 to 3 days, with hyperbilirubinemia and prolonged clotting times. Histopathology may show severe, widespread hepatic necrosis. Liver failure may occur without hypoglycemia developing first. Any dog ingesting more than 0.5 g/kg of xylitol (as per experience of the Animal Poison Control Center) may be at risk for hepatic failure.

Treatment

Treatment of xylitol ingestion in dogs may include emesis (if the dog is not already symptomatic); central nervous system signs may increase the risk for aspiration. Activated charcoal is unlikely to be useful. Baseline blood analysis, including glucose, potassium, phosphorus, bilirubin, and liver enzymes, should be performed; a baseline coagulation profile may also be helpful. Blood glucose should be monitored every 1 to 2 hours for at least 12 to 24 hours. In hypoglycemic dogs an IV bolus of 25% dextrose (1 to 2 ml/kg) should be given, followed by 2.5% to 5% dextrose infusion. Dextrose administration should be continued until the dog can maintain normal blood glucose without supplementation about 24 hours after ingestion. Chemistry measures should be monitored at least once a day for 3 days. If elevated liver enzymes and hyperbilirubinemia develop, then coagulation values should also be measured.

In dogs ingesting more than 0.5 g/kg of xylitol, a bolus of dextrose followed by dextrose infusion may help protect the liver by helping it to restore depleted energy stores from metabolizing the xylitol. In addition, liver protectants and antioxidants such as n-acetylcysteine (140 to 280 mg/kg, followed by 70 mg/kg Q 6 H PO/IV), SamE (17 to 20 mg/kg per day PO), silymarin (20 to 50 mg/kg per day PO), and vitamin E (100 to 400 IU Q 12 H PO) may be useful

because the liver damage may also be due to oxidative damage to the liver; these drugs can be used in combination. If coagulopathy develops, plasma transfusions should be given. Prognosis for uncomplicated hypoglycemia is good with prompt treatment. The prognosis for acute hepatic failure, especially if hyperphosphatemia develops, is guarded to poor. ■

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

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at a glance

- Induce emesis (contraindicated in symptomatic dogs).
- Obtain baseline glucose, potassium, phosphorus, liver enzymes, and bilirubin, with or without coagulation profile. Monitor glucose every 1 to 2 hours for 12 to 24 hours; monitor the other measures daily for at least 3 days.
- If hypoglycemia develops, give 1 to 2 ml/kg of 25% dextrose IV. Continue a 2.5% to 5% dextrose infusion until normal glucose can be maintained without supplementation.
- If xylitol ingestion is greater than 0.5 g/kg, start dextrose therapy as outlined above. Consider starting hepatic protectants such as n-acetylcysteine (140 to 280 mg/kg, followed by 70 mg/kg Q 6 H PO/IV), SamE (17 to 20 mg/kg per day PO), silymarin (20 to 50 mg/kg per day PO), and vitamin E (100 to 400 IU Q 12 H PO).
- If hepatic failure develops, treat symptomatically with fluids, plasma, dextrose, and so forth.