

A 4-year-old boy is brought to the emergency department with nausea, vomiting, diarrhea, and abdominal pain over the past hour. The child's grandmother found pills scattered on the kitchen floor next to an open, unlabeled bottle several hours before the onset of these symptoms. His temperature is 37.2°C (99°F), blood pressure is 80/40 mm Hg, pulse is 140/min, and respirations are 50/min. During examination, the boy develops hematemesis. Abdominal x-ray reveals several small opacities in the stomach and duodenum. Laboratory results are as follows:

Complete blood count

Hemoglobin	13.5 g/dL
Hematocrit	42%
Platelets	300,000/ μ L
Leukocytes	15,800/ μ L

Serum chemistry

Sodium	135 mEq/L
Potassium	3.5 mEq/L
Chloride	102 mEq/L
Bicarbonate	16 mEq/L
Blood urea nitrogen	14 mg/dL
Creatinine	0.3 mg/dL
Glucose	118 mg/dL

Arterial blood gases

pH	7.3
PaO ₂	90 mm Hg
PaCO ₂	29 mm Hg

Which of the following was most likely ingested?

Platelets 300,000/ μ L

Leukocytes 15,800/ μ L

Serum chemistry

Sodium 135 mEq/L

Potassium 3.5 mEq/L

Chloride 102 mEq/L

Bicarbonate 16 mEq/L

Blood urea nitrogen 14 mg/dL

Creatinine 0.3 mg/dL

Glucose 118 mg/dL

Arterial blood gases

pH 7.3

PaO₂ 90 mm Hg

PaCO₂ 29 mm Hg

Which of the following was most likely ingested?

- ☐ A. Acetaminophen
- ☐ B. Aspirin
- ☐ C. Iron
- ☐ D. Lead
- ☐ E. Vitamin A
- ☐ F. Vitamin B2
- ☐ G. Vitamin D
- ☐ H. Vitamin K

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Which of the following was most likely ingested?

PaCO₂

29 mm Hg

Which of the following was most likely ingested?

- ☐ A. Acetaminophen [6%]
- ☐ B. Aspirin [38%]
- ☒ C. Iron [54%]
- ☐ D. Lead [1%]
- ☐ E. Vitamin A [0%]
- ☐ F. Vitamin B2 [0%]
- ☐ G. Vitamin D [0%]
- ☐ H. Vitamin K [0%]

Proceed to Next Item


Explanation:

User Id: [REDACTED]

Iron Poisoning	
Clinical features	<ul style="list-style-type: none"> • Within 30 minutes to 4 days: <ul style="list-style-type: none"> • Abdominal pain • Vomiting (eg, hematemesis) • Diarrhea (eg, melena) • Hypotensive shock • Metabolic acidosis • Within 2 days: hepatic necrosis • Within 2-8 weeks: pyloric stenosis
Diagnostic findings	<ul style="list-style-type: none"> • Anion gap metabolic acidosis • Radiopaque pills
Treatment	<ul style="list-style-type: none"> • Whole bowel irrigation • Deferoxamine

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Diagnostic findings	<ul style="list-style-type: none">• Anion gap metabolic acidosis• Radiopaque pills
Treatment	<ul style="list-style-type: none">• Whole bowel irrigation• Deferoxamine• Supportive care for circulation, airway and breathing

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This patient's symptoms and x-ray findings are highly suggestive of iron poisoning, one of the most common causes of death by poisoning. When ingested in large amounts, elemental iron is corrosive to the gastrointestinal mucosa, causing abdominal pain, nausea, vomiting, diarrhea, and **hematemesis** within 30 minutes to 6 hours of ingestion. Iron is also a potent vasodilator and toxic to cellular processes. Severely affected patients develop **hypotensive shock** and **anion-gap metabolic acidosis** from poor perfusion and accumulation of lactic acid. These patients may become tachypneic and develop respiratory alkalosis to compensate for the acidosis. Other dangerous complications include liver necrosis, coagulopathy, seizures, and death. Patients who survive acute toxicity are at risk of **gastric scarring** and pyloric stenosis within weeks of ingestion.

The diagnosis is confirmed by measuring serum iron levels. Iron is **radiopaque**, and

Treatment

- Deferoxamine
- Supportive care for circulation, airway and breathing

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The diagnosis is confirmed by measuring serum iron levels. Iron is **radiopaque**, and visualization of gastric tablets on abdominal x-ray further supports the diagnosis. Treatment depends on the severity of the poisoning. **Whole-bowel irrigation** is sometimes instituted, but other methods of decontamination (eg, activated charcoal, syrup of ipecac, gastric lavage) are not routinely recommended. Chelation therapy with intravenous **deferoxamine** is used in moderate-to-severe cases and would be indicated in this patient.

(Choice A) Acute acetaminophen overdose can cause nausea and vomiting, but many patients remain asymptomatic within 24 hours of ingestion. Acetaminophen also is not associated with acute hematemesis, making this diagnosis unlikely.

(Choice B) Acute aspirin poisoning is characterized by tinnitus, fever, hyperpnea (respiratory alkalosis), and metabolic acidosis. However, aspirin is not radiopaque and would not appear on abdominal x-ray, making this diagnosis less likely.

(Choice D) Lead poisoning in children is typically a chronic process identified by routine laboratory screening, as most children are asymptomatic. Children who become symptomatic may experience abdominal pain, vomiting, anemia, and behavioral problems. Like iron, lead is radiopaque on x-ray. However, it is not corrosive to gastric mucosa, making this diagnosis unlikely.

(Choice E) Acute overdose of vitamin A causes nausea, vomiting, and blurry vision. Chronic toxicity can result in increased intracranial pressure (pseudotumor cerebri). It is not associated with hematemesis.

(Choice F) Vitamin B2 (riboflavin) is a water-soluble vitamin. Excessive amounts are usually not absorbed and therefore are unlikely to cause toxicity.

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(Choice G) Symptoms of acute vitamin D overdose are related to hypercalcemia and include nausea, vomiting, confusion, polyuria, and polydipsia. Vitamin D is not known to erode the gastric mucosa and cause hematemesis, making this diagnosis unlikely.

(Choice H) Vitamin K toxicity is very rare but can cause hemolytic anemia and hyperbilirubinemia in infants.

Educational objective:

Acute iron poisoning presents as abdominal pain, hematemesis, and metabolic acidosis. Iron is radiopaque, and ingested tablets can be seen on x-ray. Chelation therapy with deferoxamine should be provided for moderately to severely ill patients.

References:

1. [Iron poisoning: a literature-based review of epidemiology, diagnosis, and management.](#)
2. [Iron: not a benign therapeutic drug.](#)