

A 4-week-old full-term boy is brought to the pediatrician for vomiting. He has always had small spit-ups after feeding but now has had forceful emesis after every feed for the past week. The emesis consists of formula and is neither bilious nor bloody. Despite this, the boy has an excellent appetite and "always seems hungry." He passes one small stool every other day. His weight is unchanged from birth. On examination, the infant is awake and alert. His anterior fontanel is sunken and he has decreased skin turgor. Capillary refill is 3 seconds. His abdomen is soft, nontender, and nondistended without masses. He has normal male genitalia. Which of the following is the most likely cause of this patient's vomiting?

- ☐ A. Colonic obstruction
- ☐ B. Formula allergy
- ☐ C. Gastric outlet obstruction
- ☐ D. Incomplete closure of the lower esophageal sphincter
- ☐ E. Increased intracranial pressure
- ☐ F. Mineralocorticoid deficiency

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- ☐

A. Colonic obstruction [1%]
- ☐

B. Formula allergy [7%]
- ☒

C. Gastric outlet obstruction [78%]
- ☐

D. Incomplete closure of the lower esophageal sphincter [13%]
- ☐

E. Increased intracranial pressure [0%]
- ☐

F. Mineralocorticoid deficiency [1%]

Proceed to Next Item

Explanation:

User Id:

Infantile hypertrophic pyloric stenosis	
Risk factors	<ul style="list-style-type: none">• First-born boy• Erythromycin• Formula feeding
Clinical presentation	<ul style="list-style-type: none">• Projectile nonbilious emesis• Poor weight gain• Dehydration• "Olive-shaped" abdominal mass
Laboratory findings	<ul style="list-style-type: none">• Hypochloremic metabolic alkalosis
Diagnostic	

Proceed to Next Item

Explanation:

User Id: [REDACTED]

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Clinical presentation	<ul style="list-style-type: none"> • Projectile nonbilious emesis • Poor weight gain • Dehydration • "Olive-shaped" abdominal mass
Laboratory findings	<ul style="list-style-type: none"> • Hypochloremic metabolic alkalosis
Diagnostic studies	<ul style="list-style-type: none"> • Abdominal ultrasound
Treatment	<ul style="list-style-type: none"> • Intravenous rehydration • Pyloromyotomy

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This infant has gastric outlet obstruction due to infantile hypertrophic pyloric stenosis. The etiology is unclear but **first-born boys** are at significantly higher risk. **Formula feeding** is also thought to cause gradual hypertrophy of the pylorus until symptom onset at **age 3-5 weeks**. Compared to breastfed infants, formula-fed infants have slower gastric emptying and consume more volume in less time. The increased gastric burden may stimulate growth of the pylorus muscle.

Pyloric stenosis presents with postprandial **projectile vomiting** followed by hunger (eg, "hungry vomiter"). The emesis is **nonbilious** as the obstruction is proximal to the bile duct. Infants have poor weight gain and are often dehydrated (eg, sunken fontanel, decreased skin turgor, delayed capillary refill). The classic **"olive-shaped" abdominal mass** is palpable in <50% of patients. It is best felt when the patient is calm after emesis as the distended stomach can obscure the mass. However, the abdomen is soft and nondistended because minimal air can pass the gastric outlet.

Treatment

• Pyloromyotomy

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Persistent vomiting can cause **hypochloremic metabolic alkalosis**. Diagnosis is confirmed by **abdominal ultrasonography**, which demonstrates a **thick and elongated pylorus**. Definitive treatment consists of **pyloromyotomy**.

(Choice A) Colonic obstruction can cause vomiting and dehydration. However, intestinal air accumulation would cause abdominal tenderness and distension, making this diagnosis unlikely.

(Choice B) Milk protein allergy can present with vomiting, poor weight gain, and bloody stools. Affected infants should be switched to a hydrolyzed formula and avoid cow's milk-based and soy-based formulas. However, the dehydration and projectile nature of the vomiting in this patient are not characteristic of milk protein allergy.

(Choice D) Gastroesophageal reflux is a physiologic process that occurs in most infants due to incomplete closure of the lower esophageal sphincter, short esophagus, and decreased angle between the esophagus and stomach. In contrast to the forceful vomiting in pyloric stenosis, reflux is small in volume and does not cause dehydration.

(Choice E) Brain tumors and hemorrhage increase intracranial pressure and can cause vomiting. In contrast to pyloric stenosis, infants with increased intracranial pressure would be lethargic with bulging anterior fontanelle and poor appetite.

(Choice F) Mineralocorticoid deficiency (eg, congenital adrenal hyperplasia) causes vomiting, weight loss, and dehydration. However, affected infants are critically ill due to inability to maintain blood pressure. Boys would have virilization and scrotal hyperpigmentation, making this diagnosis unlikely.

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Educational objective:

Infantile hypertrophic pyloric stenosis is most common in first-born boys age 3-5 weeks. Protracted projectile, nonbilious vomiting causes a hypochloremic metabolic alkalosis. Abdominal ultrasonography confirms the diagnosis.

References:

1. [Infantile hypertrophic pyloric stenosis.](#)
2. [The changing clinical presentation of hypertrophic pyloric stenosis: the experience of a large, tertiary care pediatric hospital.](#)
3. [Gastroesophageal reflux in infancy and childhood.](#)
4. [Bottle-feeding and the Risk of Pyloric Stenosis.](#)
5. [Pre- and perinatal risk factors for pyloric stenosis and their influence on the male predominance.](#)

Media Exhibit

rophic pyloric stenosis Hypertrophic pyloric stenosis

