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Gastroesophageal Reflux

Developed by Viane Faily and Dr. Jackie Lee for PedsCases.com.
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Introduction:

Hello everyone! My name is Viane Faily and I am a medical student at the University of Alberta. This podcast on gastroesophageal reflux in pediatrics was created with guidance from Dr. Jackie Lee, a general pediatrician at the Stollery Children's Hospital in Edmonton, Alberta, Canada.

We will focus on the following learning objectives:

1. Review the definitions of gastroesophageal reflux and gastroesophageal reflux disease and discuss how to differentiate between these two conditions.
2. Discuss the pathophysiology of gastroesophageal reflux.
3. Outline the clinical manifestations of gastroesophageal reflux in different age groups.
4. Review red flag signs and symptoms that may suggest an alternative diagnosis.
5. Discuss the management of an infant or child with gastroesophageal reflux disease.

Case

You are working in a community clinic when your preceptor asks you to see Ethan, a four-month-old infant. His mother is concerned about his feeding. Specifically, over the last month, he has been "spitting up" multiple times a day, always shortly after feeding. He is exclusively breast-fed.

What else would you like to know about Ethan?

Definitions

Let's start off with some important definitions.

Gastroesophageal reflux is defined as the passive movement of gastric contents into the esophagus. It is considered a normal physiologic process that occurs several times a day in healthy infants and children. Gastroesophageal reflux occurs in more than two-thirds of otherwise healthy infants and its incidence peaks at age four months, typically resolving by the age of one year in the majority of uncomplicated cases (1).

It is important to distinguish normal gastroesophageal reflux from gastroesophageal reflux disease, also known as GERD, which occurs when the reflux of gastric contents causes

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troublesome symptoms and/or complications. Symptoms due to reflux are considered troublesome when they have adverse effects on a patient's wellbeing (2).

Pathophysiology

Gastroesophageal reflux occurs when the lower esophageal sphincter transiently relaxes, which permits gastric contents to enter the esophagus. Factors that contribute to infantile gastroesophageal reflux include: a liquid diet, their horizontal body position, a short and narrow esophagus, a small and relatively non-compliant stomach, and an immature lower esophageal sphincter (1).

Compromise in normal esophageal clearance and secretions and decreased lower esophageal sphincter tone can contribute to the development of GERD. Risk factors for the development of GERD in the pediatric population include prematurity, neurologic impairment, obesity, pulmonary diseases like cystic fibrosis, and anatomical abnormalities of the gastrointestinal tract including congenital diaphragmatic hernia or esophageal atresia. (1, 2).

Clinical Manifestations

Signs and symptoms of reflux and GERD vary by age.

In infants between one and six months old, the most common presentation of normal physiologic gastroesophageal reflux is regurgitation, colloquially known as "spitting up," which is the passive movement of gastric contents into the mouth. Reflux can also present with vomiting, which is the forceful expulsion of gastric contents using a coordinated autonomic and voluntary motor response (1). Reflux can also present with apneas or apparent life-threatening events, wheezing, chronic cough, recurrent pneumonia, and abnormal posturing known as Sandifer syndrome (2). Less commonly, reflux can become GERD, with consequences such as failure to thrive, feeding refusal, and back-arching due to pain.

Children and adolescents often present similarly to adults, with symptoms such as heartburn or epigastric pain. In severe cases of GERD, children may develop erosive esophagitis, which can manifest as dysphagia or hematemesis. Extra-esophageal signs and symptoms in children can include anemia, chronic cough, wheezing, recurrent pneumonia, and dental erosions (2).

Differential Diagnosis

When evaluating a child for suspected GERD, it is important to consider the broad differential diagnosis for regurgitation and/or vomiting. A detailed history focusing on feeding history, pattern of regurgitation, bowel habits, growth, and a complete review of systems, along with a physical exam, are helpful in ruling out other causes of regurgitation and/or vomiting in children. These causes include cow's milk protein allergy, food protein induced enterocolitis syndrome, pyloric stenosis, malrotation with volvulus, intussusception, eosinophilic esophagitis, peptic ulcer disease, post-tussive emesis, increased intracranial pressure, and migraines in older children.

Red flags that require further investigation include bilious vomiting, hematemesis or hematochezia, progressively worsening forceful vomiting, failure to thrive, diarrhea or constipation, fever or bulging fontanelle, and abdominal tenderness or distension.

Back to the Case

Upon entering the room, you first check Ethan's vitals and see that they are all normal. His height and weight are tracking along the 25th percentile with normal growth velocity. His head circumference is also at the 25th percentile. He looks well and is interactive and smiling. His physical exam reveals normal neurologic findings and clear lung sounds. His abdomen is soft

and non-tender with no palpable masses or organomegaly. He has moist oral mucus membranes and his anterior fontanelle is soft and flat. The remainder of his physical exam is normal.

What is Ethan's diagnosis and how would you manage him?

Diagnosis and Investigations

For the vast majority of infants and children, a detailed history and physical examination are sufficient and further diagnostic testing is not necessary to diagnose reflux. A diagnostic evaluation should be reserved for infants and children who have red flags on history or physical exam to evaluate for other causes of regurgitation or vomiting.

While an abdominal ultrasound would not help in the diagnosis of reflux or GERD, it is diagnostic in conditions including pyloric stenosis, intussusception, or malrotation, and it should be performed if there is a high index of suspicion of these conditions. In these situations, patients would likely present with red flag symptoms such as projectile vomiting, abdominal tenderness, or abdominal distension.

A 24-hour esophageal pH monitor measures the frequency and duration of acid reflux episodes, but there is no clear distinction between pH findings in physiologic reflux and pathologic GERD, which limits its utility in diagnosing GERD (4).

Esophageal manometry measures esophageal peristalsis, upper and lower esophageal sphincter pressures, and their coordination during swallowing. However, the findings are not sufficiently sensitive or specific to confirm a diagnosis of GERD (4).

Upper gastrointestinal endoscopy allows direct visualization of the esophageal mucosa, which in GERD, can reveal esophagitis, erosions, strictures, or a hiatal hernia. Biopsies can be useful in ruling out other conditions in the differential diagnosis (4).

Upper GI tract contrast radiography involves obtaining a series of fluoroscopic images of swallowed barium. It is useful in detecting anatomic abnormalities such as esophageal stricture, hiatal hernia, or pyloric stenosis, which may be considered in the differential diagnosis of GERD (4).

Management

Parental education and support are usually sufficient to manage healthy infants with symptoms of physiologic reflux that have no impact on feeding or growth. Lifestyle measures that are low risk include: avoiding overfeeding, upright positioning after feeds, and potentially adding a thickening agent for those that are bottle fed (3). In older children, helpful lifestyle changes include maintaining a healthy weight, not eating before sleeping or exercising, and potentially elevating the head of the bed.

In children with GERD and infants who have negative sequelae of reflux, a short trial of medications can be considered to reduce acid production. Histamine-2 receptor antagonists (H2RAs) such as ranitidine decrease acid secretion by inhibiting histamine-2 receptors on gastric parietal cells. However, these agents often result in tachyphylaxis, which is a reduced response with chronic use (4). Proton pump inhibitors (PPIs) such as omeprazole and lansoprazole inhibit acid secretion by blocking the sodium-potassium ATPase in the membranes of parietal cells, which is the final step in parietal cell acid secretion. PPIs are more efficacious than H2RAs and maintain its effects despite chronic use. Although frequently used off-label in infants with GERD, no PPIs are currently approved for infants under one year of age (4).

In extremely severe cases refractory to medical management or in cases of life-threatening aspiration, fundoplication or placement of a feeding nasogastric or gastric tube can be considered (1).

Back to the Case

You reassure Ethan's mother that he has uncomplicated gastroesophageal reflux. You counsel her on positioning options for feeds and to avoid overfeeding. You also advise her to book a follow-up appointment if Ethan develops any warning signs like weight loss or bilious, projectile, or progressively worsening vomiting.

Key Learning Points

Let's go through some takeaway points from this podcast:

1. Gastroesophageal reflux is a physiologic process that involves the passive movement of stomach contents into the esophagus, resulting in regurgitation or emesis in infants. It can be managed with education, anticipatory guidance, and reassurance.
2. A diagnosis of GERD can be made when reflux is associated with failure to thrive or severe symptoms. In these cases, histamine-2 receptor antagonists or proton pump inhibitors to suppress acid production may be considered.
3. Both reflux and GERD are clinical diagnoses. Various studies can be used to help rule out other conditions on your differential diagnosis but are not necessary for the diagnosis of GERD.
4. Remember to evaluate for warning signs that may suggest alternative diagnoses, including bilious vomiting, hematemesis or hematochezia, progressively worsening forceful vomiting, failure to thrive, diarrhea or constipation, fever or bulging fontanelle, and abdominal tenderness or distension.

References

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