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Pediatric Gastroesophageal Reflux Disease

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Introduction

Gastroesophageal reflux is the return of stomach contents into the esophagus. It is normal in the newborn due to an immature gastroesophageal sphincter. Gastroesophageal reflux disease (GERD) is a common condition found in 33% of the pediatric population that occurs when the physiological barrier of the esophageal sphincter opens during a transient lower esophageal sphincter relaxation (TLESR) period (Rinsma et al., 2016) resulting in complications like mucosal erosion, bleeding, dysphagia or failure to thrive (Quattromiletto, Ummarino, Salaino, 2015). GERD in children can be directly related to late maturation of the gastroesophageal (GE) sphincter or an impaired hormonal or neurotransmitter response. A high pressure gradient surrounding the GE sphincter aides in maintaining forward flow of food and stomach content. When either the position of the sphincter or the thick mucosal lining of the GE sphincter are affected, GERD is likely to occur. Recurrent reflux results in inflammation of the esophageal epithelium or eosinophils. It has also been linked to reactive airway disease and otitis media with effusion (Gorecka-Tugela, Jastrzebska, Skladzien, Fidyrek, 2016).

Epidemiology and Etiology

• Infant reflux shows up in the first few months of life, peaks at four months and resolves in nearly all children by the age of 2.
• One out of 300 have significant reflux and associated complications, and it is the most common esophageal disorder for all pediatric patients.
• Symptoms in children are more likely to be chronic and increased and decreased periods of symptomology (Khan & Orenstein, 2016).
• Physiologic GER is the regurgitation that occurs without effort or pain while pathologic GERD in infants and children have frequent and persistent symptoms that affect their nutritional or respiratory status.

Signs and Symptoms

Most clinical manifestations of GERD relate to the pathological effects of acid found outside of the stomach. Symptoms of heartburn and regurgitation are the classic findings (Falk & Vivian, 2015). Infantile reflux happens most commonly after meals as simple regurgitation. Infants have regurgitation in the early years or complaints of abdominal and chest pain as they age. Sleep has been found to be interrupted with or without obstructive sleep apnea when they have GER (Machado et al., 2016). Children with chest pain presentation had a low prevalence of cardiac disorders, and should be evaluated by a pediatric gastroenterologist for GERD (Skladzien, J., & Motility, 2016). Some older children may have neck contortions or refuse food with GERD. This is called Sandifer syndrome.

Pathophysiology

Multiple factors determine whether reflux occurs or not; duration of esophageal exposure to reflux episodes, causticity of the reflux material, and the susceptibility of the esophageal tissue to harm (Khan & Orenstein, 2016).

1. The lower esophageal sphincter (LES) is anatomically supported by the crura of the diaphragm and the gastroesophageal junction (GEJ). This with the valve-like junction stop the return of gastric contents. When the LES is relaxed or when hiatal herniation prevent the LES from being proportionately pressurized, reflux is more likely to occur during events of strain. The length of a reflux episode is increased when the swallowing reflex is decreased as in sleep or by any disease state that results in defective esophageal peristalsis. The pathological disease state is cyclical. The more chronic the episodes of reflux are, the more likely esophageal peristalsis will be defective, the greater the decrease in LES tone, and inflammation to the esophagus shortens its structure and induces hiatal herniation (Khan & Orenstein, 2016).

2. TLESR is the mechanism that allows reflux to happen. It is defined as the simultaneous relaxation of both the LES and the surrounding crura, a pressure drop of up to 2 mm Hg and lasts up to a minute in duration. The vagovagal reflex regulates the TLESR mechanism. The interaction between different mechanoreceptors in the proximal stomach, the brainstem, and effector in the LES (Khan & Orenstein, 2016). It is not fully known whether GERD is caused by more TLESRs or by a higher likelihood of having reflux during TLESR, but positions that force the GEJ below the air-fluid interface of the stomach, increased movement, swallowing, obesity, large-volume or hyperosmolar meals, gastroparesis, large sliding hiatal hernias and increased respiratory effort do increase the chance of reflux.

3. Infants with congenital diseases that require surgical management may have long-term sequelae, particularly GER. Though the majority of GER diagnosis are made to patients who do not have a congenital gastrointestinal malformation, GER is most common in infants and children with gastrointestinal malformations (Marinela, et al, 2015). Being mindful of this high risk population can improve the speed of diagnosis and better individualize care.

Treatment

• Antacids: most often used non-prescribed medication treatment for GERD. They are frequently used over the counter and with their acid neutralization action directly affect the physiopathology of GERD. They may reduce symptoms by increasing the pH of the stomach contents temporarily (Bellant, 2016).

• Histamine-2 receptor antagonists (H2RAs): inhibit histamine receptors on the gastric parietal cells. They are very safe for the pediatric population and work well for short to moderate GERD (Qubadete, Ummarino & Staisano, 2016).

• Proton pump inhibitors (PPIs): block the hydrogen-potassium adenosine triphosphatase channels of the final common pathway in gastric acid secretion. Children need larger doses on a dose per weight basis then adults. PPIs are used over H2RAs in the treatment of severe and erosive esophagitis (Khan & Orenstein, 2016).

• Prokinetics: increase LES pressure and improve gastric emptying. Metoclopramide, when used longer then 3 months, has been linked to tardive dyskinesia which can be irreversible (Takemoto, 2015). A recent systemic review gave conflicting evidence; no recommendations could be made (Falk & Vivian, 2016).

Surgery

• Fundoplication, may be necessary when GERD is intractable to medical management and complications of esophagitis, stricture, or risk for morbidity from chronic pulmonary disease is significant (Lightdale & Gremsie, 2013; Khan & Orenstein, 2016). A gastropexy in combination for feeding and vomiting as impaired nutrition is a common complication (Falk & Vivian, 2015).