Pediatric Gastroesophageal Reflux Disease

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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 when the physiological barrier of the esophageal sphincter opens during a transient lower esophageal sphincter relaxation (TLESR) period (Rimsma et al., 2016), resulting in complications like mucosal erosion, bleeding, dysphagia or failure to thrive (Quittard, Ummarino, Salamo, 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 aids 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 esophagitis. It has also been linked to reactive airway disease and otitis media with effusion (Gorecka-Tuguta, Jastrzebska, Sidziak, Fyderek, 2016).

**Epidemiology and Etiology**

- Infant reflux shows up in the first few months of life, peaks at four months and resolves in almost 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 decreased frequent symptoms of GERD (Khan & Orenstein, 2016).
- Physiologic GER is the regurgitation that occurs without effort or pain while pathologic GERD in infants and children have frequent and/or 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 feeds 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 or other esophageal conditions. Some older children may have neck contortions or refuse food with GERD. This is called Sandifer syndrome.

Respiratory symptoms are also age specific. Infants can present with obstructive sleep apnea, stridor or lower airway disease where reflux has worsened primary airway disease like laryngomalacia or bronchopulmonary dysplasia (Khan & Orenstein, 2016). Older children may have additional asthma or allergic/asthmatic issues like laryngitis or sputulosis related to GERD.

**Management**

- Lifestyle modifications along with non-pharmaceutical therapies can be the first line of treatment. Infants may require thickening of feeds. These feeds should be used with caution in pre-term infants due to the association with necrotizing enterocolitis (Beal, Silverman, & Belsito, 2016). A hypocaloric diet may be trialered prior to medications. Over half of infants will have improved symptoms with prone positioning or uprights carrying after feeding. Avoid use of milk substitutes for infants. Children should avoid high acid foods or reflux-inducing foods and beverages. A flat side position or head elevated during sleep after infancy may be helpful. Any obese patient should reduce their weight.

**Medications**

- **Antacids:** Most often used non-prescribed medication treatment for GERD. They act on the cellular lining and counter with their acid neutralization action directly affect the pathophysiology of GERD (Khan & Orenstein, 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 the treatment of moderate GERD (Qubadme, Ummarino & Salamo, 2010).
- **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 for the treatment of severe and erosive esophagitis (Khan & Orenstein, 2016).
- **Prokinetics:** Increase LES pressure and improve gastric emptying. Metoclopramide, when used longer than 3 months, has been linked to tardive dyskinesia which can be irreversible (Takemoto, 2015). A recent systematic review gave conflicting evidence; no recommendations could be made (Falk & Vivian, 2015).

**Surgery**

- **Fundoplication:** May be necessary when GERD is intractable to medical management and complications of esophagitis, strictures, or risk for morbidity from chronic pulmonary disease is significant (Lichtblau & Grome, 2013; Khan & Orenstein, 2016). A combination in posturing for feeding and venting as impared nutrition is a common complication (Falk & Vivian, 2015).