

Gastroesophageal Reflux Disease (GERD): Pediatric

Gastrointestinal

Clinical Decision Tools for RNs with Additional Authorized Practice [RN(AAP)s]

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Background

Gastroesophageal reflux disease (GERD) is the reflux of acidic stomach contents in the esophagus and can be due to laxity of the lower esophageal sphincter (LES), abnormalities in esophageal motility, abnormalities in gastric motility or emptying, and esophageal dysfunction (Fidanza & Sables-Baus, 2019). Due to the lower resting tone or weakness of the LES, conditions or activities that increase abdominal pressure (e.g., obesity, tight clothing, vomiting, large volume feeds, coughing) contribute to the development of reflux esophagitis (Fidanza & Sables-Baus, 2019). Delayed gastric motility contributes to GERD by lengthening the time reflux is possible and increasing the acid content of chyme (Fidanza & Sables-Baus, 2019). Delayed gastric motility is associated with gastroparesis, gastric or duodenal ulcers, and strictures of the pylorus (Fidanza & Sables-Baus, 2019). Esophageal dysfunction refers to impaired clearance of esophageal reflux due to inflammation, the angle of the esophagus into the stomach, and/or mucosal damage (Fidanza & Sables-Baus, 2019).

Both gastroesophageal reflux (GER) and GERD can be present in infants and children (Fidanza & Sables-Baus, 2019). Gastroesophageal reflux is the retrograde movement of gastric contents into the esophagus independent of swallowing (Fidanza & Sables-Baus, 2019). Gastroesophageal reflux is normal and non-pathologic in healthy infants and is the result of incomplete neuromuscular control of the gastroesophageal sphincter.

Gastroesophageal reflux may be asymptomatic or associated with regurgitation and vomiting after feeds (Fidanza & Sables-Baus, 2019). Gastroesophageal reflux is most common among premature infants and decreases during the first six to 12 months of life. Children usually outgrow GER, and no treatment is required (Fidanza & Sables-Baus, 2019). In contrast, GERD occurs in the presence of troublesome symptoms, complications, or both which results in injury to the esophagus and extra-intestinal disease (Fidanza & Sables-Baus, 2019). Gastroesophageal reflux disease is the most common esophageal disorder in children (Grazon-Maaks, Barber, Brady, Gaylord, Driessnack, & Duderstadt, 2019).

Immediate Consultation Requirements

The RN(AAP) should seek immediate consultation from a physician/NP when any of the following circumstances exist:

- bilious vomiting,
- gastrointestinal tract bleeding,
- hematemesis,
- hematochezia,
- consistently forceful vomiting at birth or onset after six months of life,
- failure to thrive,
- fever,
- lethargy,
- hepatosplenomegaly,
- bulging fontanelles,
- macro/microcephaly,
- seizures,
- abdominal tenderness or distension,
- documented or suspected genetic/metabolic syndrome,
- associated chronic disease,
- no response to four weeks of medical therapy in clients \geq the age of 12, or
- no response to two weeks of non-pharmacological measures in clients \leq age 12 (Fidanza & Sables-Baus, 2019; Gazon-Maaks et al., 2019; Interprofessional Advisory Group [IPAG], personal communication, October 2, 2019).

Predisposing and Risk Factors

Predisposing and risk factors for GERD in pediatric clients are influenced by genetic, environmental, anatomic, hormonal, and neurological factors including:

- preterm infants,
- neurologic impairment,
- esophageal atresia,
- obesity,
- hiatal hernia,
- achalasia (failure of LES to open during swallowing),
- chronic lung diseases,
- certain genetic disorders (e.g., cystic fibrosis),
- feeding in supine position (e.g., bottle propping), and/or
- certain foods and medications (Fidanza & Sables-Baus, 2019).

Health History and Physical Exam

Subjective Findings

The circumstances of the presenting complaint should be determined. These include:

- excessive regurgitation or vomiting;
- food refusal;
- poor weight gain;
- unexplained crying or irritability;
- choking or gagging;
- behaviours and/or positioning that suggests abdominal or epigastric pain;
- sleep disturbances;
- frequent coughing or wheezing;
- stridor, laryngitis or hoarseness;
- dental erosions;
- sinusitis;
- recurrent otitis media; or
- history of health conditions including recurrent pneumonia, esophageal atresia with repair, hiatal hernia, bronchopulmonary dysplasia, asthma, or cystic fibrosis (Fidanza & Sables-Baus, 2019).

For older children and adolescents who can articulate their symptoms, refer to the CRNS *Gastroesophageal Reflux Disease Adult Clinical Decision Tool*.

Objective Findings

There are no recognized classic physical signs of GERD in the pediatric population. The physical assessment should include:

- review of height, weight, and head circumference;
- signs of failure to thrive;
- hoarseness, and may have stridor;
- anemia; and
- tooth erosion (Grazon-Maaks et al., 2019; Richardson, 2020).

For older children and adolescents refer to the CRNS *Gastroesophageal Reflux Disease Adult Clinical Decision Tool*.

Differential Diagnosis

The following should be considered as part of the differential diagnosis:

- gastroenteritis,
- overfeeding or food intolerances,

Gastrointestinal | (GERD) –Pediatric

- anatomic obstruction (e.g., pyloric stenosis, Hirschsprung disease, foreign body, incarcerated hernia),
- toxic ingestion of substances,
- gastritis,
- systemic infection (e.g., pneumonia, urinary tract infection),
- pertussis,
- otitis media,
- sinusitis,
- neurologic conditions (e.g., hydrocephalus, brain tumour),
- metabolic conditions (e.g., phenylketonuria, galactosemia),
- renal insufficiency, or
- autonomic dysfunction (Grazon-Maaks et al., 2019).

Making the Diagnosis

Diagnosis of GERD can usually be established based on a careful history and physical examination.

Investigations and Diagnostic Tests

- Most infants with vomiting and older children with regurgitation and heartburn can be diagnosed with GERD based on the health history and physical assessment.
- Diagnostic tests should be ordered based on findings in the health history and physical examination and may include:
 - stool for occult blood,
 - complete blood count to assess for anemia or infection,
 - chest x-ray to rule out aspiration or recurrent pneumonia, and/or
 - urinalysis and urine culture (Grazon-Maaks et al., 2019; Richardson, 2020).

Further investigations and referral are usually not required unless the diagnosis is unclear or alarm features of GERD are present (Grazon-Maaks et al., 2019).

Management and Interventions

Goals of Treatment

The primary goals of immediate treatment are to eliminate or reduce symptoms, promote healing of the esophagus, prevent complications such as stricture, bleeding, and failure to thrive, and to prevent recurrence (Richardson, 2020).

Non-Pharmacological Interventions

The RN(AAP) should recommend, as appropriate, the following non-pharmacological options:

Infants

Gastrointestinal | (GERD) –Pediatric

- elevating the head of the crib to at least 30 degrees;
- avoid bottle propping;
- keeping the baby upright for 30 minutes after a feeding;
- referral to a dietitian;
- shorter and more frequent feeds;
- increase burping frequency;
- formula-fed infants with recurrent vomiting may benefit from a two to four-week trial of a lactose free or partially hydrolyzed protein formula, as milk protein sensitivity is sometimes a cause of unexplained crying and vomiting in infants;
- supervised prone positioning when infant is awake decreases the amount of reflux; and
- supine positioning during sleep is recommended due to the risk of sudden infant death syndrome (Richardson, 2020).

In the infant with uncomplicated recurrent regurgitation, it is important to recognize physiologic GER that is effortless, painless, and not affecting growth (Richardson, 2020). In this situation, clinicians should focus on minimal testing and conservative management. Overuse of medications in the so-called “happy spitter” should be avoided.

Older children

- smaller, more frequent meals;
- avoid skipping meals;
- avoid caffeine, carbonated drinks, fatty foods, citrus, chocolate, and peppermint;
- elevating the head of the bed;
- Keeping upright for at least two hours after eating; and
- referral to a dietitian as required (Richardson, 2020).

Pharmacological Interventions

The pharmacological interventions recommended for the treatment of GERD in the pediatric population are in accordance with the *RxFiles: Drug Comparison Charts* (RxFiles Academic Detailing Program, 2021), *Lexi-drugs* (Lexicomp, 2022), and *Pediatric Primary Care* (Richardson, 2020).

Acid Reducing Agents

The medications presented here including antacids (e.g., magnesium-aluminum hydroxide) and histamine 2-receptor antagonists (e.g., famotidine, ranitidine) are for older children and adolescents (≥ 12 years of age) and may be considered if a two-week trial of non-pharmacological interventions alone is not helpful (Richardson, 2020).

Medications for an infant and child < 12 years of age must be ordered by a physician/NP as routine use of medications requires caution because of adverse effects (Fidanza & Sables-Baus, 2019). Proton pump inhibitors may be considered if there is no response after a trial of antacids and/or H2-receptor antagonists but this requires a referral to a physician/NP.

Gastrointestinal | (GERD) –Pediatric

	Drug	Dose	Route	Frequency	Duration
Pediatric (≥ 12 years of age)					
	Magnesium-aluminum hydroxide	0.5-1 mL/kg/dose (maximum dose 3200 mg of aluminum per day)	p.o.	3-6 times per day, after meals and at hs	as needed

Histamine H2-receptor Antagonists

	Drug	Dose	Route	Frequency	Duration
Pediatric (≥ 12 years of age)					
	RaNITidine	5-10 mg/kg/day (maximum 300 mg daily)	p.o.	divided, b.i.d.	2 weeks
OR	Famotidine	0.5-1 mg/kg/dose (available in 10 mg tablets, maximum 40 mg daily)	p.o.	b.i.d.	2 weeks

Client and Caregiver Education

The RN(AAP) provides client and caregiver education as follows:

- Counsel about appropriate use of medications (dose, frequency, compliance, etc.).
- Explain the difference between physiologic conditions and pathologic diseases that cause reflux.
- Advise exposure to tobacco smoke may exacerbate symptoms.
- Review all age-appropriate non-pharmacological options (Grazon-Maaks et al., 2019; Richardson, 2020).

Monitoring and Follow-Up

The RN(AAP) should reassess the client weekly or biweekly for signs of complications (e.g., failure to thrive, recurrent pneumonia, asthma, erosive esophagitis or anemia) and to monitor growth and development.

Complications

The following complications may be associated with GERD in pediatric clients:

- chronic cough,

Gastrointestinal | (GERD) –Pediatric

- failure to thrive,
- irritability,
- malnutrition,
- esophageal injury secondary to reflux (bleeding, stricture formation, Barrett’s esophagus),
- asthma,
- recurrent pneumonia, and
- laryngeal disorders (Grazon-Maaks et al., 2019; Richardson, 2020).

Referral

Refer to a physician/NP if client presentation is consistent with those identified in the *Immediate Consultation Requirements* section; if the client fails to respond to pharmacological treatment in four weeks; or if symptoms return after completing a four- week treatment regime (IPAG, personal communication, October 2, 2019).

References

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