

# Gastro-oesophageal reflux disease in infants

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## Abstract

Gastro-oesophageal reflux (GOR) is a frequent and common phenomenon in humans, also in normal children and adults. GOR involves the involuntary passage of gastric contents into the oesophagus. Most reflux episodes are physiological and self limiting. Gastro-oesophageal reflux disease (GORD) is reflux associated with mucosal damage or symptoms severe enough to impair quality of life. Clinical presentation varies with age but in infants includes mainly regurgitation, persistent crying, irritability, back-arching, feeding and sleeping difficulties. Complications include oesophagitis, bleeding, stenosis and rarely Barrett's oesophagus or adenocarcinoma. There is no 'gold-standard' diagnostic technique available but available modalities include radiography with barium, scintigraphy, endoscopy with biopsies, pH metry and impedance monitoring. A stepwise approach of treatment options available should be used according to the severity of the disease. Proton pump inhibitors remain the treatment of choice in severe gastro-oesophageal reflux disease.

## Introduction

Gastro-oesophageal reflux (GOR) is a frequent and common phenomenon in humans, also in normal children and adults. It can affect up to 50% of infants from birth to three months of age. It is usually self limiting and the majority of infants outgrow their reflux by 12 months of age.<sup>1</sup> In this article the difference between GOR and gastro-oesophageal reflux disease (GORD), the clinical presentation, special investigations required, complications and treatment implied will be discussed.

## Definitions

GOR involves the involuntary passage of gastric contents into the oesophagus. These physiological events occur several times a day, particularly after meals and most are brief, limited to the distal oesophagus and without symptoms. 'Physiological' GOR is reflux associated with absence of symptoms, or during the first few months of life only with occasional vomiting. It is a normal function that serves a protective role during meals or the immediate postprandial period.

Healthy and sick individuals differ in the frequency, duration and intensity of the episodes and in the association with symptoms or complications. Pathological reflux occurs when reflux episodes happen too often, with poor clearance of the refluxate and symptoms other than regurgitation. GORD is reflux associated with mucosal damage or symptoms severe enough to impair quality of life.

'Regurgitation' is the passive passage of refluxed gastric contents into the oral pharynx and mouth, normally accompanied by gastric contents drooling out of the mouth, as opposed to vomiting where refluxed stomach contents are expelled with force. In healthy thriving babies regurgitation is almost always physiologic. It occurs more frequently in infants due to transient immaturity of the developing oesophagus and stomach, higher fluid intake and the small capacity of the oesophagus (10 ml). Many infants with GORD present with frequent regurgitation, and it should be suspected if it is accompanied by excessive crying, refusal to feed, failure to thrive or haematemesis.

Primary GOR results from a primary disorder of function of the upper gastrointestinal tract or poor function of the lower oesophageal sphincter. Secondary GOR is caused by disease outside the gastrointestinal tract such as cow's milk protein allergy, mechanical factors such as chronic upper airway obstruction, systemic or local infection, food allergy, metabolic disorders, raised intra-cranial pressure etc. Management of these conditions will improve the GOR.

Children at risk for more severe GOR include those with neurological impairment, cystic fibrosis and oesophageal atresia repair.<sup>2</sup>

## Clinical presentation

The symptoms, signs and disorders commonly associated with GORD in children are shown in Table I. It is a spectrum

of disease that can be best described by manifestations of oesophageal or adjacent organ injury secondary to the reflux of gastric contents into the oesophagus, mouth or airways.

**Table 1:** Symptoms, signs and disorders associated with GORD in children

Well documented	Poorly documented
Recurrent regurgitation ("spitting up")	Infant irritability
Poor weight gain	Infant feeding refusal
Heartburn, chest pain, abdominal pain	Infant sleep apnoea
Oesophagitis	Hoarseness
Sandifer syndrome	Sinusitis
Vomiting	Otitis media
Haematemesis	Dental erosions
Anaemia	
Barrett's oesophagus	
Asthma or wheezing	
Chronic cough	
Globus sensation	
Acute life threatening events	
Recurrent pneumonia	

From Walker's Pediatric Gastrointestinal Disease. Kleinman et.al. BC Decker 2008

The symptoms vary according to age. The most common presentation of infant GORD is regurgitation, with occasional projectile vomiting. Infants and young children cannot express symptoms verbally, and therefore can present with persistent crying, irritability, back-arching, feeding and sleeping difficulties, proposed to be the equivalent of heartburn in adults. Due to the associated discomfort with eating, an aversion to food may develop. Severe regurgitation can cause caloric insufficiency and failure to thrive in a minority of infants.

Older children report more regurgitation and vomiting than heartburn, chest pain or dysphagia. They find it difficult to describe these 'unpleasant sensations'. They can present with abnormal posturing (Sandifer syndrome), abdominal pain, feeding difficulties, irritability, chronic respiratory infections or failure to thrive.

GORD in the adolescent presents with more adult-like symptoms, with heartburn as the predominant symptom. Atypical symptoms such as epigastric pain, nausea, flatulence, hiccups, chronic cough, asthma, chest pain, hoarseness and ear ache account for 30–60% of GORD complaints.

Alarm symptoms include weight loss, anaemia, bleeding, chest pain, choking, failure to thrive, irritability, feeding or sleeping difficulties, apnoea and apparent life-threatening events.

Quality of life is impaired in both adults and children (and their parents) with GOR. The infant oesophagus exposed to acid seems to be hypersensitive to pain stimuli, even with no tissue damage, similar to non-erosive reflux disease (NERD) in adults.

GORD can be associated with severe complications such as oesophagitis, Barrett's oesophagus, strictures and adenocarcinoma, although the last three are rare in children. An undesirable endpoint of GORD is strictures that can present with dysphagia. Barrett's oesophagus is not uncommon in adolescents, especially if *H. pylori* is present.

## Diagnostic investigations

There are no 'gold-standard' diagnostic techniques and each investigation focusses on a different aspect of the disease. History plays an important role in making the diagnosis. A barium meal would have value to exclude any anatomical abnormalities such as malrotation, duodenal web stenosis or achalasia, whereas scintigraphy would identify pulmonary aspiration. Endoscopy may show anatomic abnormalities, a sliding hernia or oesophagitis. Ambulatory 24 h-pH metry measures the incidence and duration of acid reflux in a 24 hour period. It is the best method to show the presence of acid in the oesophagus, but not all reflux episodes are acid. It is helpful to measure the effect of treatment. From this point of view oesophageal impedance monitoring, a method where electrical potential differences are measured, is of value to indicate both the acid and non-acid reflux episodes and between liquid and gas reflux episodes. Interpretation is however laborious. There is no universal optimal investigation, and the therapeutic approach should be adapted to the spectrum of symptoms in the given patient.

## Treatment options

Symptoms of GORD are frequent and non-specific during infancy, and due to the lack of a 'gold standard' diagnostic technique, many infants receive anti-reflux treatments. Physiologic GOR does not need treatment, 'frequent regurgitation' may respond to dietary treatment such as thickened feeds, whereas established GORD necessitates proton pump inhibitors. Failed medical therapy would make surgical therapy such as Nissen fundoplication a consideration. Stepwise treatment options are summarised in Table II.<sup>2</sup>

## Conclusion

GOR and GORD occur commonly in children. Symptomatology varies with age and also in severity. Appropriate application of diagnostic techniques available will aid in judicious use of available treatment modalities. PPIs remain the treatment of choice in severe GORD. Laparoscopic Nissen fundoplication is the surgical option of choice where indicated.

**Table II:** Schematic therapeutic approach

Phase	Treatment
1	Parental reassurance. Observation. Lifestyle changes. Exclude overfeeding
2	Dietary treatment (decrease regurgitation, no decrease in GOR) Thickened formula, thickening agents, hydrolysates in cow's milk protein allergy
3	Alginate (some efficacy in moderate GORD, relatively safe)
4	Prokinetics (products available vary from country to country) Treats pathophysiologic mechanism of GORD, but no commercialised drug can be recommended
5	Proton pump inhibitors (drug of choice in severe GORD) H2 receptor blockers less effective than PPIs
6	Laparoscopic surgery (endoscopic procedures under evaluation)

From Pediatric Gastrointestinal and Liver Disease, 3<sup>rd</sup> ed. Wyllie R, Hyams JS. Elsevier, 2006

## Conflict of interest

The author has no conflict of interest to declare.

## References

1. Carvalho RS, Michail S, Ashai-Khan F, Mezzoff AG. An update on Pediatric Gastroenterology and Nutrition: A Review of oSome Recent Advances. *Curr Probl Pediatr Adolesc Health Care*. 2008;Aug:204–228.
2. Vandenplas Y. Gastroesophageal reflux. In *Pediatric Gastrointestinal and Liver Disease*, 3<sup>rd</sup> ed. Wyllie R, Hyams JS. Saunders Elsevier, Philadelphia 2006:305–325.
3. Rudolph CD, Hassall E. Gastroesophageal Reflux. In *Walker's Pediatric Gastrointestinal Disease*. Kleinman RE, Sanderson IR, Goulet O, Sherman PM, Mielì Vergani G, Schneider BL. BC Decker, Hamilton, 2008:59–71.
4. Keady S. Update on drugs for gastro-oesophageal reflux disease. *Arch Dis Child Educ Pract Ed* 2007;92:ep114–ep118.
5. Vandenplas Y, Salvatore S, Haser B. The diagnosis and management of gastro-esophageal reflux in infants. *Early Human Development* 2005;81:1011–1024.