Gastro-oesophageal reflux in infancy

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Abstract

Gastro-oesophageal reflux is very common in infancy. It is important to differentiate benign physiological reflux from gastro-oesophageal reflux disease, which is associated with significant morbidity. This review summarises the approach to infants with symptoms and signs of reflux, differential diagnosis and investigations. We also discuss available treatment options including non-pharmacological, pharmacological and surgical treatments. Most infants with gastro-oesophageal reflux do not require any treatment providing the infant is thriving. Severe cases require a careful diagnostic work up, treatment of associated conditions and aggressive medical management of the reflux. Involvement of the multidisciplinary team is essential and in reflux resistant to standard medical management with significant morbidity surgical intervention needs to be considered.

Keywords gastro-oesophageal reflux; infancy; oesophagitis; reflux; vomiting

Gastro-oesophageal reflux

Gastro-oesophageal reflux (GOR) is the involuntary passage of the gastric contents into the oesophagus. It is a normal physiological phenomenon, particularly common in infancy. Most episodes in healthy individuals last less than 3 minutes, occur in the postprandial period, and cause few or no symptoms. Symptomatic GOR is a very common presentation to paediatricians and general practitioners as it can affect approximately 50% of infants less than three months old. It is especially pronounced in infants because of dependence on large amount of milk to maintain nutrition, posture and the functional immaturity of the lower oesophageal sphincter. The natural history of GOR is generally one of improvement with age, with less than 5% of children with vomiting or regurgitation in infancy continuing to have symptoms after the age of 14 months.

Gastro-oesophageal reflux disease (GORD)

Gastro-oesophageal reflux disease (GORD) is defined as 'gastro-oesophageal reflux' associated with complications including oesophagitis, acute life-threatening events and apnoea, chronic otitis media, sinusitis, secondary anaemia, and chronic respiratory disease (chronic wheezing/coughing or aspiration), as well as faltering growth (Figure 1).

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Oesophagitis presents with symptoms of crying and irritability in infants and can lead to food aversion. This is likely to be a significant factor in the faltering growth seen in some children with reflux.

Epidemiology

GORD is a significant problem for infants in community and hospital settings. It can be difficult to differentiate GOR from GORD as there is no simple, reliable and accurate diagnostic test to differentiate between the two and this is complicated by unreliable reporting and lack of specific symptoms in infants. Determination of exact prevalence of GORD at any age is difficult but approximately 33% of infants seek medical attention for symptoms suggestive of reflux disease. Of these up to 20% of infants would require further diagnostic evaluation. The nature of disease has been changing over the years with increasing prevalence as well as change in presenting features from mainly regurgitant type to more pain related type of symptoms. The problem is more pronounced in certain groups. Infants born prematurely have evidence of reflux in up to 85%. It is also more common in infants with neurodisability, those with repaired oesophageal atresia or congenital diaphragmatic hernia, and those with chronic lung disease. Over 50% of children with neurodisability have GORD, due to oesophageal dysmotility and a poorly functioning lower oesophageal sphincter. They have trouble expressing their symptoms, and may also have co-morbidities which may impact on the ability to perform investigations.

Pathophysiology

The physical barrier between the oesophagus and stomach is provided by the lower oesophageal sphincter (LOS), which is a specialised part of the circular smooth muscle of the distal oesophagus and the diaphragm. Both components work together to stop refluxing of gastric contents into the oesophagus. The major mechanism of gastro-esophageal reflux in children is transient lower oesophageal sphincter relaxation (TLOSR). Relaxation of LOS occurs in response to swallowing but this is brief and lasts less than 10 seconds. In contrast in infants with GORD TLOSR is prolonged (more than 10 seconds) and accounts for 75–90% episodes of reflux in infants and children. The other causes for GORD include abnormal position of LOS as seen in hiatus hernia. This results in inability of diaphragm to contribute to lower oesophageal tone and contraction to prevent reflux. Delayed gastric emptying is felt to be a contributing factor in worsening of reflux and is especially seen in children with neurodisability when it may exacerbate GOR by prolonging gastric distension and increasing the frequency of TLOSRs. There is also a delayed clearance of reflux contents from oesophagus in these children. Oesophageal volume clearance is facilitated by oesophageal body peristalsis. This is usually initiated in response to the abrupt sustained increase in intraoesophageal pressure as a result of reflux. As a result of the delayed clearance there is prolonged exposure of gastric contents to the oesophageal mucosa causing oesophagitis.

Symptoms

Gastro-oesophageal reflux disease can be oesophageal or extra-oesophageal depending on the presenting symptoms.

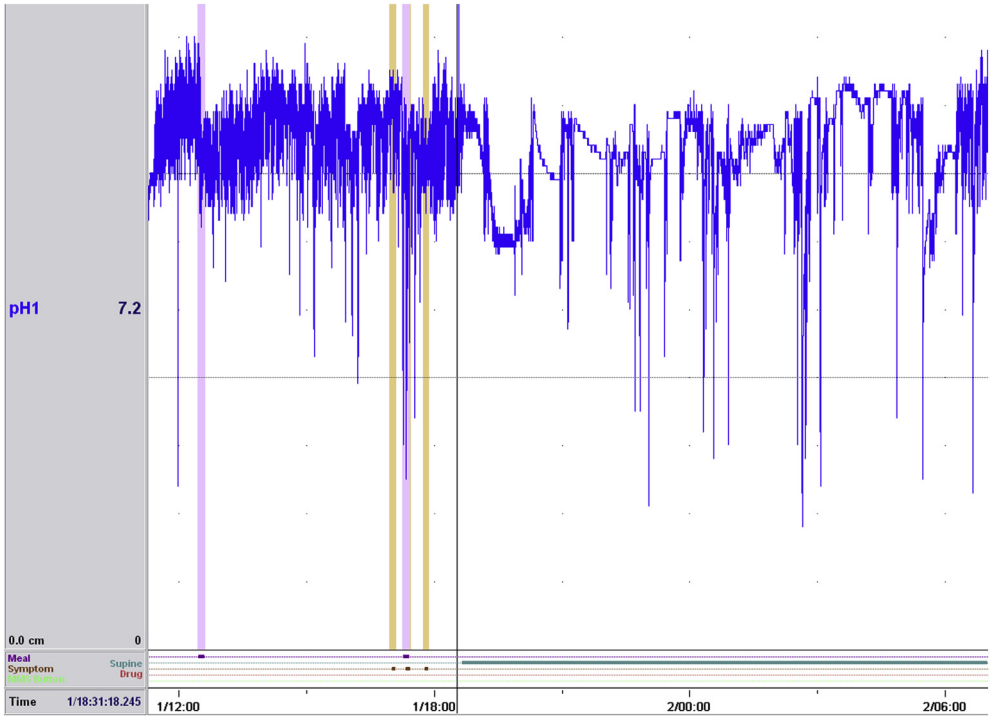

Figure 1 This illustrates a pH study performed in a 1 year old who presented with discomfort and back arching after feeds. There were multiple episodes of oesophageal reflux (pH $<$ 4) see. The reflux index (Vanderplas) of 20% was calculated confirming the diagnosis of GORD.

Symptoms can be variable and are described in Box 1. The commonest reported symptom is vomiting followed by sleep disturbances and irritability. A careful history looking for features of GORD and its complications is important. Box 2 outlines the points to be covered in history to target investigations and treatment appropriately. There are no specific features that can be seen on examination but assessment of growth and dental hygiene is important.

Differential diagnosis

Following conditions should be considered and ruled out before diagnosis of GORD is made.

- Infection, e.g. urinary tract infection, gastroenteritis.
- Intestinal obstruction e.g. pyloric stenosis, malrotation, intestinal atresia.
- Food allergy and intolerances e.g. cow's milk allergy, soy allergy, coeliac disease.
- Eosinophilic oesophagitis.
- Metabolic disorders e.g. diabetes, inborn errors of metabolism.
- Intestinal dysmotility.
- Drug induced vomiting e.g. cytotoxic agents.
- Primary respiratory disease e.g. asthma, cystic fibrosis.

Management

Physiological reflux is common in infancy and is a clinical diagnosis. For most parents reassurance that the condition will resolve without treatment is all that is needed.

Full assessment of infants is essential including a full feeding history to explore possibility of overfeeding or difficulty with feeding. Careful attention needs to be paid to severity of symptoms, faltering growth and relevant social factors, e.g. parental anxiety and stress. Difficult cases require assessment by multidisciplinary team including dietician, speech and language therapist, paediatric gastroenterologist and paediatric surgeon.

Investigations

Oesophageal pH monitoring: acid reflux into the oesophagus occurs in all infants as a physiological phenomenon and is only significant when it occurs in excess. The pH probe is designed to measure acidity in the lower oesophagus and measures the frequency and duration of reflux into the oesophagus. A continuous period of recording usually unto 24 hours is performed and a reflux episode is defined as the drop in oesophageal pH $<$ 4. Common parameters obtained from pH monitoring include the total number of reflux episodes, the number of reflux episodes lasting more than 5 minutes, the duration of the longest reflux episode, and the reflux index which is the percentage of time when pH was less than 4.

Specific Indications for undertaking a pH study include diagnostic uncertainty, poor response to medical treatment, or a need to quantify the degree of reflux and presence of extra-oesophageal symptoms.

There are various scoring systems to quantify the degree of reflux against normal values. The normal values for all scoring systems are based on total reflux time, number of reflux periods, number of long reflux periods (more than 5 minutes), and for the duration of the longest reflux period.

The commonly used scores in children are

- The DeMeester score is based on the percentage of total reflux time, percentage total reflux time upright and supine along with the above mentioned values.