GUIDELINES FOR GASTRO-OESOPHAGEAL REFLUX

Introduction
- Gastro-oesophageal reflux (GOR): passage of gastric contents into the oesophagus.
- GOR disease (GORD): symptoms or complications of GOR.

Risk factors contributing to GOR in infants:
- Supine positioning.
- Short abdominal oesophagus (< 1cm).
- Increased number of transient lower oesophageal sphincter relaxations.
- Delayed gastric emptying.
- Volume of fluid/feeds.
- Increases in intra-abdominal pressure.

Features of GOR and GORD:
GOR:
- Regurgitation with normal weight gain.
- No signs or symptoms of oesophagitis.
- No significant respiratory symptoms.
- No neurobehavioural symptoms.

GORD:
- Regurgitation with poor weight gain.
- Recurrent apnoea and bradycardia (not scientifically proven) - apnoea of prematurity to be excluded.
- Irritability, discomfort, back arching after feeds.
- Recurrent pneumonia / microaspirations.
- Failure to thrive, poor weight gain.
- Oesophagitis – Haematemesis or blood in regurgitate.
- Stridor / Wheezing.
- Sandifer's syndrome – anormal neck posturing.

Diagnosis of Reflux:
- History and clinical examination.
- Trial of 48 hour period nil by mouth and comparison with quantity and quality of clinical events before and after stopping feeds.
- Screening for acid reflux: > 2 - 12 acidic reactions < 4 on pH paper from oral secretions in 24 h.
- Formal pH study, ideally combined with impedance measurements and correlated with clinical events: > 5 – 20 % of time pH < 4 in 24 h = abnormal, > 2 – 4 reflux events per hour = abnormal; stop Gaviscon® 24 h, prokinetics 48 h and antacids 72 h before study only in pH study alone.
- Upper gastrointestinal series - should be performed in infants with severe GORD to rule out other pathologies (not to prove GORD - unreliable as performed under non-physiologic conditions).

Differential Diagnosis of Vomiting:
Gastrointestinal obstruction
- Pyloric stenosis, malrotation with intermittent volvulus, intermittent intussusception, intestinal duplication, Hirschsprung disease, antral/duodenal web, foreign body, incarcerated hernia.

Gastrointestinal disorders
- Gastroparesis, gastroenteritis, food allergy or intolerance.

Cardiac
- Congestive cardiac failure.

Renal
- Obstructive uropathy, renal insufficiency.

Metabolic/endocrine
- Galactosemia, hereditary fructose intolerance, urea cycle defects, amino and organic acidemias congenital adrenal hyperplasia, maple syrup urine disease.

Infectious
- Sepsis, meningitis, urinary tract infection, pneumonia.

Neurologic
- Hydrocephalus subdural haematoma, intracranial haemorrhage, mass lesion.

Toxic
- Iron, Vitamin A or D, medications (Digoxin, Theophylline, etc.).

General Management Considerations of Gastroesophageal Reflux Disease

Non-pharmacologic:
- LES tone increases during the first six months so that reflux often improves or resolves with time. Initial treatment for GORD is conservative (see algorithm).
- Position infants with GORD in a flat prone position after feeding. Elevating the head while the infant is prone offers little advantage. Although gastric emptying may be accelerated in the right lateral position, this position also leads to more episodes of GORD.
- Upright supine positioning in an infant seat is not recommended because more reflux may occur than when infants are prone.
- Dietary manipulations such as smaller feeding volumes given more frequently or thickened feedings are not effective in most infants with severe reflux. In general it is unclear whether thickened feedings decrease GORD in infants.
- Thickening the feedings may or may not decrease reflux measured by formal diagnostic testing, but because it increases caloric density, it may be helpful in infants with severe GORD and vomiting associated with failure to thrive.
- Changes in milk formulas not warranted. However, consider cow's milk protein allergy and a limited trial of hypoallergenic formula feeding for 1 - 2 weeks.
- Transpyloric feeding - the technique consists of placement of an unweighted silastic tube in a transpyloric position (c-shaped position on x-ray – tube crosses vertebral spine twice). This type of tube can be used without replacement for as long as 30 days. Milk is administered by slow continuous infusion.

Pharmacologic Therapy
- Gaviscon Infant should not be used when excessive water loss is likely - such as pyrexia, diarrhoea or vomiting or where there is a risk of intestinal obstruction (including preterm infants < 34 weeks or < 2 kg).
- The prescribing and co-administration of alginates and thickening agents should be avoided because of the risk of agglutinated intra-gastric materials forming which can lead to possible intestinal obstruction.
- Erythromycin's effects appear to be dose dependent and side effects can be minimised without diminishing motility at doses of 1 – 3 mg/kg. Adverse effects include GI upset, hepatotoxicity, anaphylaxis, arrhythmias and infantile hypertrophic pyloric stenosis. As with all antibiotics, especially for non-infectious conditions, the potential for resistance should be considered prior to initiating therapy.
- In view of unresolved concerns about the potential risk for domperidone to cause prolongation of the QT interval, it should only be prescribed as a trial for a week as per local formulary and only continued if there is clinical improvement of gastro-
oesophageal reflux associated symptoms without clear evidence of adverse drug effects.

- Oral ranitidine given 2 – 3 times a day provides symptomatic and endoscopic symptom improvement in erosive oesophagitis.
- Tolerance to the antisecretory effect of histamine-2-receptor antagonists develops quickly and the possible occurrence of rebound hypersecretion must be taken into account upon discontinuation of the drug and a reduction in a stepwise manner is recommended.
- \( \text{H}_2 \) blocker therapy has been implicated as a risk factor for the development of NEC. It may also counteract natural defense against gastric bacterial overgrowth.
- Proton pump inhibitors are the most effective acid suppressant medications. Prolonged periods of hypochlorhydria have been identified in neonates as well as adults, resulting in bacterial overgrowth.
- The above mentioned problems are likely to be the case with any other antacids. Its use in babies below 34 weeks or 2 kg should therefore be limited to only newborns with evidence of upper GI bleed or post surgery.

**Surgery**

- Surgical intervention is reserved for infants with severe GORD who have failed aggressive medical management. These patients often have major central nervous system morbidity or have suffered a life-threatening event associated with reflux.
Management of Gastro-Oesophageal Reflux Disease in Neonates and Small Infants

Clinical signs and symptoms:
- Instability +/- backarching
- Recurrent regurgitation of milk + blood
- Recurrent vomiting
- Recurrent coughing
- Recurrent apnoea +/- desaturations
- Recurrent bradycardia
+ Correlation with feeds

Inpatient?

YES

< 34 weeks or < 2 kg?

YES

Consider:
- Caffeine prescription review
- Prone positioning (only with monitoring)
- Reduction of feeding volume AND/OR
- Increased feeding frequency

Improving?

YES

Continue

NO

Pump feeding (maximise)

Improving?

YES

Continue

NO

Domperidone OR Erythromycin

Improving?

YES

Continue

NO

Transpyloric feeding

NO

Breastfeeding?

YES

Breastfeeding assessment and advice

Consider:
- Smaller feeding volumes OR
- More frequent feed

Improving?

YES

Continue

NO

Trial of:
- Thickener (only bottle fed) OR
- Gaviscon Infant AND/OR
- Early introduction of solids

Improving?

YES

Trial for 2-4 weeks of:
- Proton-pump inhibitor AND/OR
- Hypoallergenic formula

NO

Review differential diagnosis with each assessment and consider need for:
- Nil by mouth test
- Simple pH test
- Formal pH (+/- impedance)-study
- Upper G I contrast study
- Referral to Paediatric Surgeon

NO

Department of Neonatology, BSUH, 2016