GUIDELINE

Gastro-Oesophageal Reflux

Scope (Staff):	Nursing and Medical Staff
Scope (Area):	NICU KEMH, NICU PCH, NETS WA

Child Safe Organisation Statement of Commitment

CAHS commits to being a child safe organisation by applying the National Principles for Child Safe Organisations. This is a commitment to a strong culture supported by robust policies and procedures to reduce the likelihood of harm to children and young people.

This document should be read in conjunction with this disclaimer

Aim

This protocol provides information about the common clinical presentation of Gastro-oesophageal reflux and Gastro-oesophageal reflux disease and the principles of its management in the neonatal population.

Risk

A standardised approach to assessment and management of infants with GOR is important to decrease the risks related to unnecessary investigations and medications.

Background

Gastro-oesophageal reflux (GOR) is the passage of stomach contents into the oesophagus. It is a normal physiological process which can be associated with effortless regurgitation.

GOR is most commonly due to the transient lower oesophageal sphincter relaxation (TLESR) and it occurs more frequently in neonates, especially preterm neonates, than in older infants and children.

GOR is usually self-limiting with resolution during the first two years of life. The approach to management will vary in the setting in which it is encountered. Most GOR is non-pathological and does not require any treatment beyond explanation and reassurance to parents. However, GOR can occasionally cause clinical signs in neonates in the Neonatal Unit.

Gastro-oesophageal reflux disease (GORD) is a pathological condition which includes troublesome symptoms and complications such as oesophageal inflammation and upper airway aspiration associated with GOR.

Presentation

- Irritability, regurgitation and disturbed sleep are the most common symptoms.
- Cyanotic episodes - often associated with gagging or choking behaviour. This is common during the first few days of life.
- Apnoea, bradycardia and desaturations with or without obvious vomiting.
- Excessive crying can be a sign of heart burn
- Respiratory symptoms may be mild ‘rattily breathing’ or more significant with wheezing or aspiration.
    - This is often the most contentious problem. GOR (silent or otherwise) can complicate existing respiratory disease such as Chronic Lung Disease, Bronchopulmonary Dysplasia, post diaphragmatic hernia, oesophageal atresia repair or neonates with neurological disorders.
- Back arching or posturing
- Poor growth with excessive vomiting.

Investigation and Diagnosis

GOR is very frequent, usually uncomplicated and does not require investigation or treatment. It is important to be aware of the following red flag signs and associated conditions which may mimic GORD.

- Not all vomiting is due to GOR especially in the newborn. Congenital anomalies can limit gastric emptying or function. Bile-stained vomiting has a completely different connotation.
- Vomiting may be a part of a non-gastroenterological problem e.g., UTI, metabolic disease etc.
- GOR may coexist with the above presentations but not be responsible for them. For example, cyanotic episodes due to seizures, apnoea’s and bradycardias due to prematurity, poor growth due to a UTI, hematemesis and/or melena due to gut problems or respiratory symptoms due to H-type fistulas etc.

Barium Swallow Study

There is insufficient evidence to support the use of a barium contrast study or Ultrasonography for the primary diagnosis of GORD in infants and children. Contrast studies are useful to rule out other structural problems.

The 24-hour pH study

pH probe measurements or multichannel intra-oesophageal impedance may provide information about the quantity and character of reflux. However, those events do not correlate well with clinical symptoms.

Endoscopy, manometry & radionuclide milk scans

Rarely required in a neonatal setting.

Management

The goal of management of gastro-oesophageal reflux disease (GORD) is to reduce symptoms and prevent complications while maintaining normal growth without side effects of the treatment

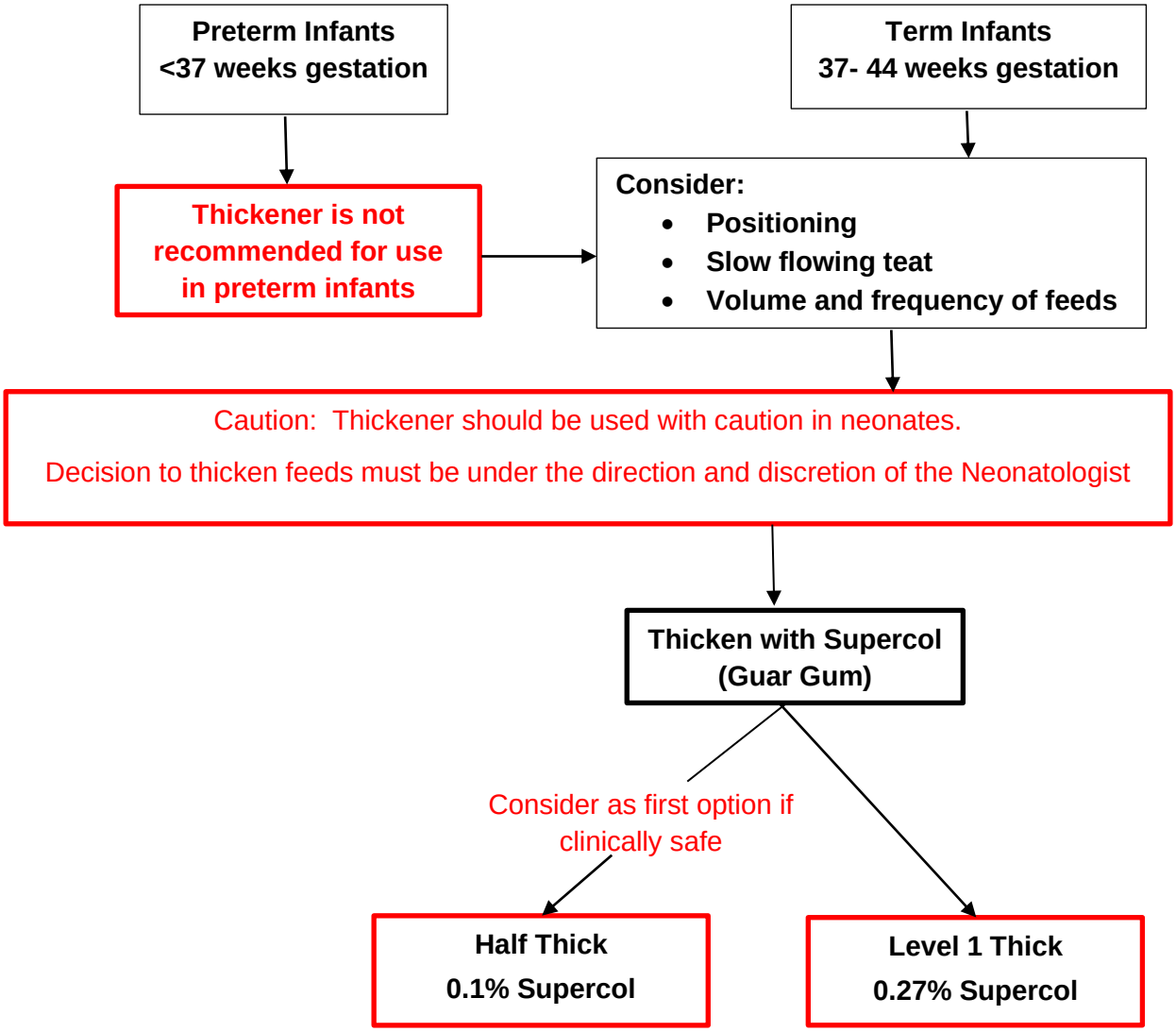
- Reassurance & explanation that GOR is self-limiting and non-pathological.
- Gentle frequent burping throughout the feed, can be helpful. Head elevation is ineffective in reducing acid reflux in older infants.
- Modification of feeding frequency and volume can be helpful. Smaller volume feeds given more frequently may reduce the reflux episodes. Longer feeding duration and slower milk flow rate may also reduce the number of episodes.
- The use of a 'flow-controlled sepal teat' may be helpful for bottle-fed infants. If reduction in fluid volume compromises nutritional status and growth, consideration should be given to increasing the nutrient density of feeds; please contact the neonatal dietician for a review.
- Safe sleep approaches which include supine positioning on a flat and firm surface, avoiding commercial devices designed to elevate head needs to be emphasised to parents prior to discharge. Do not position prone because of the increased risk of Sudden Infant Death Syndrome (SIDS).
- Feed thickeners should only be considered if concerning regurgitation symptoms persist in infants after positioning, use of flow-controlled sepal teats and volume and frequency of feeds have been considered. Thickener use in preterm infants is not recommended. The use of gum-based thickening agents has been associated with late onset Necrotising Enterocolitis, and caution is recommended if prescribing gum-based thickened feeds for neonates, especially those born preterm. Breastfeeding Gel is not suitable for neonates <44 weeks gestation.
    - In KEMH NICU and in PCH NICU (3B), thickened feeds can be ordered under the direction and discretion of a neonatologist.
    - In KEMH NICU only, a commercially prepared, anti-reflux term formula containing modified corn starch is available for formula-fed term infants (TF AR) and can be ordered on iCM under the handover tab in the diet section. The nutrient content of this formula can be modified by the further addition of standard term formula if a more nutrient dense feed is needed for growth. A review by the neonatal dietician is recommended.

- In KEMH NICU and PCH NICU (3B), minimal amounts of a guar gum thickening agent can be used to thicken breast milk, term formula and infant formulas used for medical nutrition therapy. Two levels of guar-gum thickened feeds are available.

    1. **Half Thick (0.1% Supercol)** should be considered as first option if clinically indicated and ordered by the neonatologist.
    2. **Level 1 Thick (0.27% Supercol)**

Algorithm for Using Guar Gum-Based Thickener (Supercol)

to thicken breast milk and formulas for Neonates <44 weeks Gestation



- Prokinetic agents should not be used in GOR. Many studies have failed to show any clear benefit in the neonatal population. Prokinetic agents have the potential for significant adverse effects.
    - Erythromycin is associated with a higher risk of infantile pyloric stenosis and cardiac arrhythmia
    - Domperidone and Metoclopramide have been associated with neurologic side effects
- Sodium alginate preparations have been found to be effective in decreasing the number of GOR events. However, the long-term safety of these agents in preterm infants is not known.
- Trans pyloric tube feeds have occasionally been useful in the interim for neonates with other conditions who can't tolerate feeds due to significant GOR.
- Proton pump inhibitors (PPI) decrease both basal and stimulated parietal cell acid secretions. There is evidence that they consistently maintain stomach pH>4, however they are ineffective in relieving clinical signs of GOR. Although PPIs seem to be well tolerated during short-term use, evidence supporting the safety of PPIs is lacking. Omeprazole has a role if oesophagitis is thought to be present.
- Fundoplication is occasionally performed in babies with significant GOR and swallowing difficulties (usually neurological) that result in recurrent aspiration. Often a gastrostomy is required in this situation when infants are older. Fundoplication may be required post Diaphragmatic Hernia and Oesophageal Atresia repair as these babies frequently suffer significant GOR.
- Avoid gastric irritants if possible. Medications such as caffeine increase the risk of GOR. Antibiotics like Amoxicillin with Clavulanic Acid and Flucloxacillin are also known to cause GOR.
- Cow's milk protein intolerance can also cause significant vomiting which only settles with a change of formula or the mother's dietary restrictions for dairy.

References and related external legislation, policies, and guidelines
Red Nose Safe Sleeping

1. Kwok TC, Ojha S, Dorling J. Feed thickener for infants up to six months of age with gastro-oesophageal reflux. Cochrane Database Syst Rev. 2017;12(12):CD003211. Published 2017 Dec 5. doi:10.1002/14651858.CD003211.pub2

2. Rosen R, Vandenplas Y, Singendonk M, et al. Pediatric Gastroesophageal Reflux Clinical Practice Guidelines: Joint Recommendations of the North American Society for Pediatric Gastroenterology, Hepatology, and Nutrition and the European Society for Pediatric Gastroenterology, Hepatology, and Nutrition. J Pediatr Gastroenterol Nutr. 2018;66(3):516-554. doi:10.1097/MPG.0000000000001889
3. van der Pol RJ, Smits MJ, van Wijk MP, Omari TI, Tabbers MM, Benninga MA. Efficacy of proton-pump inhibitors in children with gastroesophageal reflux disease: a systematic review. Pediatrics. 2011;127(5):925-935. doi:10.1542/peds.2010-2719
4. Beal J, Silverman B, Bellant J, Young TE, Klontz K. Late Onset Necrotizing Enterocolitis in Infants following Use of a Xanthan Gum-Containing Thickening Agent. J Pediatr. 2012.
5. Clarke P, Robinson MJ. Feed thickeners and NEC: too risky to chance. J Perinatol. 2012; 32(6): 479.
6. Chabra S, Peeples ES. Assessment and Management of Gastroesophageal Reflux in The Newborn. Pediatr Ann. 2020;49(2):e77-e81. doi:10.3928/19382359-20200121-02
7. Eichenwald EC. Diagnosis and management of gastroesophageal reflux in preterm infants. Pediatrics. 2018 Jul 1;142(1).
8. Lopez RN, Lemberg DA. Gastro-oesophageal reflux disease in infancy: a review based on international guidelines. Medical Journal of Australia. 2020 Jan;212(1):40-4.
9. Forbes, D. (2013, April). Mewling and puking: Infantile gastroesophageal reflux in the 21st century. Journal of Paediatrics and Child Health, 49(4), 259-263. https://doi-org.pklibresources.health.wa.gov.au/10.1111/jpc.12038
10. Davies I, Burman-Roy S, Murphy MS; Guideline Development Group. Gastro-oesophageal reflux disease in children: NICE guidance. BMJ. 2015 Jan 14;350:g7703. doi: 10.1136/bmj.g7703. PMID: 25591811; PMCID: PMC4707563
11. Harris, J., Chorath, K., Balar, E., Xu, K., Naik, A., Moreira, A., & Rajasekaran, K. (2022, March). Clinical Practice Guidelines on Pediatric Gastroesophageal Reflux Disease: A Systematic Quality Appraisal of International Guidelines. Pediatric Gastroenterology, Hepatology & Nutrition, 25(2), 109-120. https://doi-org.pklibresources.health.wa.gov.au/10.5223/pghn.2022.25.2.109
12. Salvatore, S., et al. (2021). Cow's Milk Allergy or Gastroesophageal Reflux Disease-Can We Solve the Dilemma in Infants? Nutrients **13**(2).
13. Meunier L, Garthoff JA, Schaafsma A, Krul L, Schrijver J, van Goudoever JB, et al. Locust bean gum safety in neonates and young infants: an integrated review of the toxicological database and clinical evidence. Regul Toxicol Pharmacol. 2014;70(1):155-69.

This document can be made available in alternative formats on request.

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