NTS Clinical Guideline

Title:	Bowel Obstruction		
Authored by:	Ian Morris	Reviewed date:	13/07/2015
Reviewed by:	Nandiran Ratnavel & Syed Mohinuddin	Next review date:	13/07/2017

Quick reference - **General stabilisation of infants with suspected bowel obstruction.**
Infants presenting in shock should be resuscitated and stabilised in an ABC approach before proceeding to a full assessment.

Note: it is important to recognise that achieving an ideal physiological status may not be possible in an infant severely compromised by bowel obstruction and/or perforation. Following an initial round of aggressive resuscitation measures, it is reasonable to discuss with the NTS and receiving team consultants as to whether to 'scoop and go' in order to get the baby to a surgical unit as promptly as possible for definitive management.

In a more stable child:

- Assess Pain and consider:
  - IV paracetamol
  - IV morphine bolus 100mcg/kg plus continuous infusion 10-40mcg/kg/hour
- Keep nil by mouth
- Insert large NG tube
  - Size 8 or 10 NGT in term infants
  - Keep on free drainage
  - Regular aspirations
  - Confirm position (pH paper and plain X-rays)
- Fluid management
  - Commence maintenance IV fluids of 10% dextrose or 10% dextrose with electrolytes
  - Correct any deficit with boluses of 0.9%Sodium Chloride or 4.5% Human Albumin Solution
  - Replace ongoing losses > 20mls/kg/day with 0.9% or 0.45% NaCl with 20mmol KCL / L
- Investigations
  - Blood gas and lactate
  - Inflammatory markers and blood culture
  - AXR – A left lateral decubitus (fig 1) x-ray may be needed if pneumoperitoneum suspected
  - FBC, U+E, blood group and crossmatch
- Liaise with Paediatric Surgeons +/- Neonatal transfer service
- Ensure any images are uploaded for viewing at receiving unit
- Mother (or married father) to accompany on transfer or have contact details to enable consent to be taken by surgical team where necessary.

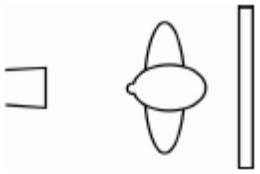
Emergency management:
Airway and breathing:

- Insert large NG and aspirate stomach
- Consider intubation and Ventilation if in severe shock or if abdominal distension compromising respiratory status
- If unable to stabilise due to significant distension due to tense pneumoperitoneum, discuss with surgeons the need for an abdominal drain
- Check blood gas and lactate
- Consider sedation and paralysis in ventilated infants

Circulation:

- Obtain 2 venous access points
- Correct fluid deficits with boluses and commence maintenance fluids
- Consider need for inotropes (dopamine first line)

Figure 1:



Introduction

The scope of this document is to provide guidance on the general management of cases of suspected bowel obstruction. Specific guidelines exist for other surgical emergencies including oesophageal atresia +/- Tracheoesophageal fistula, gastroschisis, exomphalos, and necrotising enterocolitis.
All cases of suspected bowel obstruction should be discussed with a Paediatric Surgeon and with NTS where a transfer is deemed necessary. Cases of intestinal perforation are regarded as time critical emergencies. For such calls, the transfer team aims to depart from base or from a previous call within 30 minutes from the start of the referring call. Bilious vomiting is not considered to be of a time critical nature nationally, however NTS *do* regard these as time critical emergencies and again aim to depart within 30 minutes of the start of the referring call.

Background

Bowel obstruction is one of the most common surgical emergencies in the newborn with an incidence of around 1:2000 live births. Presentation is highly variable. In acute cases, obvious features of obstruction with vomiting, pain, features of peritonism, and severe systemic upset due to shock may be present. Neonates however, may present more subtly, and cases of unrecognized intestinal obstruction can deteriorate rapidly increasing morbidity and mortality. Management will almost always be surgical and prompt identification of problems, early instigation of general resuscitation measures, accurate interpretation of radiographic and clinical findings, and timely surgical referrals will improve outcome.

Causes

This list is not exhaustive but comprises the majority of neonatal presentations

- Intestinal atresia and stenosis
    - Duodenal atresia
    - Jejunoileal atresia
    - Colonic atresia – rare, associated with Hirschprung's disease
    - Anorectal (imperforate anus)
- Malrotation
- Volvulus (with or without malrotation)
- Meconium ileus – intestinal
- Hernia
- Necrotising enterocolitis
- Hirschprung disease
- Sepsis

Presenting features

Although presentation is variable, there are some cardinal features of intestinal obstruction in the newborn which should prompt further investigation and assessment:

- History of Polyhydramnios during pregnancy
- Failure to pass meconium within 24 hours of birth
- Abdominal distension
- Bilious vomiting

It is important to be aware that some proximal obstructions may have no signs other than vomiting initially. Other possible findings include:

- Abnormal bowel sounds (absent or hyperactive)
- Peristalsis – visible / palpable
- Abdominal tenderness (crying, tachycardia, withdrawing to pain on palpation)
- Rectal bleeding
- Shock – poor perfusion, pallor, tachycardia, hypotension
- Herniae
- Imperforate anus +/- rectovaginal fistula

Specific conditions

Duodenal atresia	Most commonly due to complete atresia of postampullary segment of duodenum. 1:2500-1:5000 livebirths. ~1/3 associated with Trisomy 21.	▪ Vomiting – bilious in 85% ▪ "double-bubble" appearance on AXR ▪ Dilated or scaphoid abdomen
Jejunoileal atresia	Closure anywhere from ligament of Treitz to caecum. May be multiple atretic segments. 1:1000 live births.	▪ Bilious vomiting ▪ Abdominal distension ▪ "Triple-bubble" appearance on AXR
Malrotaion + volvulus	Result of abnormal rotation of the gut as it returns to the abdominal cavity during embryogenesis. 1:6000 live births. 50% associated with other GI anomalies.	▪ Bilious vomiting ▪ AXR often non-specificin absence of volvulus. May show right sided jejunal markings, absence of stool filled colon in right lower quadrant ▪ Abdominal distension, pain, shock develop as ischaemia ensues
Distal obstruction	Obstruction of ileum or colon, atresia and stenosis of colon are rare.	▪ Abdominal distension ▪ Constipation / failure to pass meconium ▪ Vomiting less common
Meconium ileus	Sticky, inspissated intraluminal meconium. Can be due to intestinal and pancreatic dysfunction, often due to cystic fibrosis. Meconium plugs are relatively benign and usually occur in healthy term infants.	▪ Abdominal distension ▪ Failure to pass meconium in first 24 hours of life
Hirschprung disease	Absence of ganglion cells in distal bowel. Associated with sensorineural deafness and trisomy 21. Diagnosis by rectal biopsy.	▪ Failure of pass meconium in first 24 hours of life ▪ Infrequent stooling in more indolent course
Anorectal malformations	Range from anteriorly displaced anus to a complete imperforate anus. A fistula may be seen between rectum and genitourinary tract.	▪ Noted on routine postnatal check ▪ Meconium may be noted in urine if fistula present

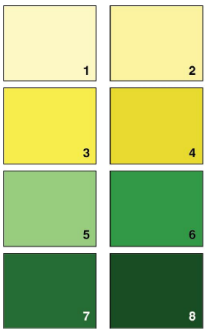
Bilious vomiting

Bilious vomiting may be the only presenting sign of intestinal obstruction and can easily be missed. Malrotation and midgut volvulus need to be excluded in any such infant as their presence may result in significant gut compromise. Early surgical intervention may be the difference between intestinal salvage and substantial morbidity or death.

Around 50% of cases of malrotation present within the first month of life, with 30% in the first week. Abdominal distension is usually absent initially, but may occur if volvulus and subsequent bowel ischaemia develops. Infants can rapidly become haemodynamically compromised and develop a profound metabolic acidosis.

In cases of bilious vomiting, the baby should receive an urgent review and where malrotation is suspected, should be referred urgently to a Paediatric Surgeon. For infants outside of a surgical centre, timely referral for transfer is imperative. NTS treats bilious vomiting as a 'time critical' transfer, and as such aim to dispatch within 30 minutes from the start of referral.

Figure 1: Colour chart. BMJ 2006



Approach to infant with bilious vomiting

- Is the vomiting bilious? There should be prompt assessment of any infant with green vomiting (5-8 on chart in figure 1).

  Yellow vomiting does not exclude mechanical obstruction
- Is the baby in shock?
  - Yes, proceed to ABC management
  - No, admit baby to Neonatal unit for full assessment and investigation.
- Clinical examination
  - Abdominal tenderness, distension, bowel sounds, herniae, anus patency
  - Cardiovascular assessment
    - Heart rate, BP, CRT
    - Oxygen saturations, respiratory rate and effort
    - Temperature
- Imaging: AXR +/- upper GI contrast study if services available
- Paediatric Surgical referral
- Refer to Neonatal transport service asap where transfer if potentially needed
- Management as per main algorithm (see 'quick reference')

References

- Juang D, Snyder CL. Neonatal Bowel Obstruction. *Surg Clin North America*. 2012;92(3):685-711
- Walker GM, Neilson A, Young D, Raine PA. Colour of bile vomiting in intestinal obstruction in the newborn: questionnaire study. *BMJ*. 2006;332(7554):1363
- Hajivassiliou CA.Intestinal Obstruction in Neonatal/Pediatric Surgery *Seminars in Pediatric Surgery*, 2003;12(4):241-253