Clinical Guideline

BILE-STAINED VOMITING

SETTING	Primary and Secondary Healthcare Institutions in the Western Cape which refer to Red Cross War Memorial Children's Hospital (RCWMCH)
FOR STAFF	Primary and Secondary Doctors and Nurses who refer patients to RCWMCH
PATIENTS	Patients under the age of 13 years old with bile-stained vomiting

Introduction

The presence of bile in the vomits is a concerning feature in children. It is also an indication that the underlying cause is more likely to be of a surgical origin. Bowel obstruction and abdominal sepsis can both lead to bile stained vomiting and will often require management by a surgical team.

The most dangerous cause of bile-stained vomiting is a midgut volvulus secondary to malrotation. This diagnosis is so time sensitive and has such severe long-term implications that there is a universal mantra amongst all paediatric surgeons which goes: "bile-stained vomiting in an otherwise well child is a midgut volvulus, until proven otherwise".

It is the role of the primary clinician to fully assess every child who presents with bile-stained vomiting to ensure that they are systemically stable and then to take a careful history and examination to identify the underlying cause. In cases where the cause is not clear after this assessment, an urgent contrast meal with follow-through is required to exclude a midgut volvulus. Note that an abdominal Xray cannot exclude malrotation and this is not the initial investigation of choice in this case.

Background

The presence of bile-stained vomiting is the source of great concern in surgical clinicians. This is appropriate given that failure to manage the diagnosis of midgut volvulus with a laparotomy within 6 hours of presentation can result in necrosis of the entire midgut. This is incompatible with survival and thus the stakes are extremely high. The majority of bile-stained vomiting will be found to have an alternative diagnosis after investigation, but this should not deter you from doing the appropriate work up.

Other causes of bile-stained vomiting are incarcerated hernias, intussusception, intraabdominal sepsis, bowel obstruction due to any other cause, ileus and idiopathic. It can be difficult to make a decision regarding the underlying cause and, in that situation, surgeons will usually use a combination of clinical acumen, radiological assessment and observation after definitely excluding malrotation to make a decision regarding the best course of action.

Important details on history

When did the vomiting start?
Was the first vomit green, or has the patient been vomiting for a while before the vomit became green?
Is there any pain or distension associated with the vomiting?
Are there any features of infection or fever?
Has the patient every had any abdominal surgery before?

Does the patient have any abnormality of the heart, abdominal wall defect or a congenital diaphragmatic hernia?
Has the patient every had a similar episode of green vomiting?
Has there been any mucous or blood in the stool?

Important details of examination

Careful initial assessment for shock, dehydration or sepsis

Assess for any features of dysmorphism

Abdominal examination:
- Exclude hernias
- Confirm a normal anus and do a PR if there is concern of distal obstruction
- Assess for scars from previous surgery or congenital anomaly
- Is there distension
- Is there peritonism
- Is there a palpable mass

Make a diagnosis

Non-malrotation causes	Clinical features
Neonatal	
Incarcerated inguinal hernia	Inguinal hernia will be clinically evident, unable to reduce, abdomen likely to be distended.
Duodenal atresia	History of bile-stained vomiting since birth, abdomen unlikely to be distended as the obstruction is proximal.
Congenital small bowel obstruction	History of bile-stained vomiting soon after birth, abdomen may be distended and full, palpable loops of bowel may be present.
Congenital distal bowel obstruction	Abdomen will be distended and full. It is important to confirm the presence of an anus and ask about delayed passage of meconium
Necrotising enterocolitis	Preterm infant who has been started on feeds, may have features of sepsis.
Ileus	Evidence of systemic sepsis or significant electrolyte abnormalities. Abdomen distended but soft and not tender.
Infant and toddler	
Incarcerated hernia	Inguinal hernia evident, unable to reduce, abdomen likely to be distended.
Intussusception	Classically seen between 3 months and 3 years of age. Vomiting and redcurrant jelly stools, palpation of the abdomen will show a sausage shaped mass. Patient will have a history of cramping abdominal pain. May have a history of recent viral infection.

Ileus	Evidence of systemic sepsis or significant electrolyte abnormalities. Abdomen distended but soft and not tender.
Children	
Intraabdominal sepsis (appendicitis)	Signs of fever and abdominal pain, peritonism and distension are likely. History of non-bile-stained vomiting which became bile stained over time
Incarcerated inguinal hernia	Inguinal hernia evident, unable to reduce, abdomen likely to be distended.
Adhesive bowel obstruction	History of previous surgery, vomiting and abdominal distension
Intraabdominal mass	Palpation of an abdominal mass on examination with associated abdominal distension and possible palpable loops of bowel
Constipation	A pelvic mass which is impressionable suggests a faecaloma, can be confirmed on PR examination
Ileus	Evidence of systemic sepsis or significant electrolyte abnormalities. Abdomen distended but soft and not tender. Decreased bowel sounds may be evident.

Although this table is intended to assist in identifying non-malrotation causes of bile-stained vomiting, should there be any doubt, a clinical assessment by a surgical team member is appropriate.

The urgency of the case does not relax until an alternative diagnosis is made or malrotation has been excluded as a cause of bile-stained vomiting– patients should be managed very aggressively and transferred to an unit with capacity to do a contrast study and laparotomy with the fastest transport available at the time.

Management and referral guidance

Any patient without a clear cause for their vomiting should be urgently referred for a contrast meal and follow-through. If it is possible to have this study done at the referring hospital then that is appropriate, provide this will not cause a delay in transfer.

The ultimate goal is to exclude malrotation as fast as possible and to get patients with midgut volvulus to a centre which has the capacity to do a Ladd's procedure in less than 6 hours from presentation. **In some cases, long transfer time may dictate that an emergency life-saving operation by the local general surgeon is the most appropriate course of action.**

Non-malrotation causes	Management and referral guidance
Neonatal	
Incarcerated inguinal hernia	Please see inguinal pathology guideline for management and referral guidance
Duodenal atresia	Stabilise and rehydrate, ivi access and initiation of appropriate maintenance fluid, NGT on free drainage, replace NGT losses ml:ml

	with ivi fluid, stop all feeds, baseline bloods (FBC, U&E, CRP, clotting). Arrange urgent transfer to paediatric surgeon on call.
Congenital small bowel obstruction	Stabilise and rehydrate, ivi access and initiation of appropriate maintenance fluid, NGT on free drainage, replace NGT losses ml:ml with ivi fluid, stop all feeds, baseline bloods (FBC, U&E, CRP, clotting). Arrange urgent transfer to paediatric surgeon on call.
Congenital distal bowel obstruction	Stabilise and rehydrate, ivi access and initiation of appropriate maintenance fluid, NGT on free drainage, replace NGT losses ml:ml with ivi fluid, stop all feeds, baseline bloods (FBC, U&E, CRP, clotting). Arrange urgent transfer to paediatric surgeon on call.
Necrotising enterocolitis	Any neonate suspected to have NEC should be under the care of a neonatal service. Concerns of complications of NEC requiring surgical input should be discussed directly with the surgeon by the neonatologist caring for the neonate.
Ileus	Initiate management of the underlying sepsis and electrolyte abnormalities. Surgical assessment may be needed to differentiate ileus from other cases of bowel obstruction in the neonatal period.
Infant and toddler	
Incarcerated hernia	Please see inguinal pathology guideline for management and referral guidance
Intussusception	Stabilise and rehydrate, ivi access and initiation of appropriate maintenance fluid, NGT on free drainage, replace NGT losses ml:ml with ivi fluid, stop all feeds, baseline bloods (FBC, U&E, CRP, clotting). Arrange urgent transfer to paediatric surgeon on call.
Ileus	Initiate management of the underlying sepsis and electrolyte abnormalities. Surgical assessment may be needed to differentiate ileus from other cases of bowel obstruction in infants and toddlers.
Children	
Intraabdominal sepsis (appendicitis)	Stabilise and rehydrate, ivi access and initiation of appropriate maintenance fluid, NGT on free drainage, replace NGT losses ml:ml with ivi fluid, stop all feeds, baseline bloods (FBC, U&E, CRP, clotting). Arrange urgent transfer to paediatric surgeon on call.
Incarcerated inguinal hernia	Please see inguinal pathology guideline for management and referral guidance
Adhesive bowel obstruction	Stabilise and rehydrate, ivi access and initiation of appropriate maintenance fluid, NGT on free drainage, replace NGT losses ml:ml with ivi fluid, stop all feeds, baseline bloods (FBC, U&E, CRP, clotting). Arrange urgent transfer to paediatric surgeon on call.
Intraabdominal mass	Stabilise and rehydrate, ivi access and initiation of appropriate maintenance fluid, NGT on free drainage, replace NGT losses ml:ml with ivi fluid, stop all feeds, baseline bloods (FBC, U&E, CRP, clotting). Arrange urgent transfer to paediatric surgeon on call.

Constipation	Please see constipation guideline for management and referral guidance
Ileus	Management of the underlying sepsis and electrolyte abnormalities should be initiated, usually under the general paediatrician. Surgical assessment may be needed to differentiate ileus from other cases of bowel obstruction in children.

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