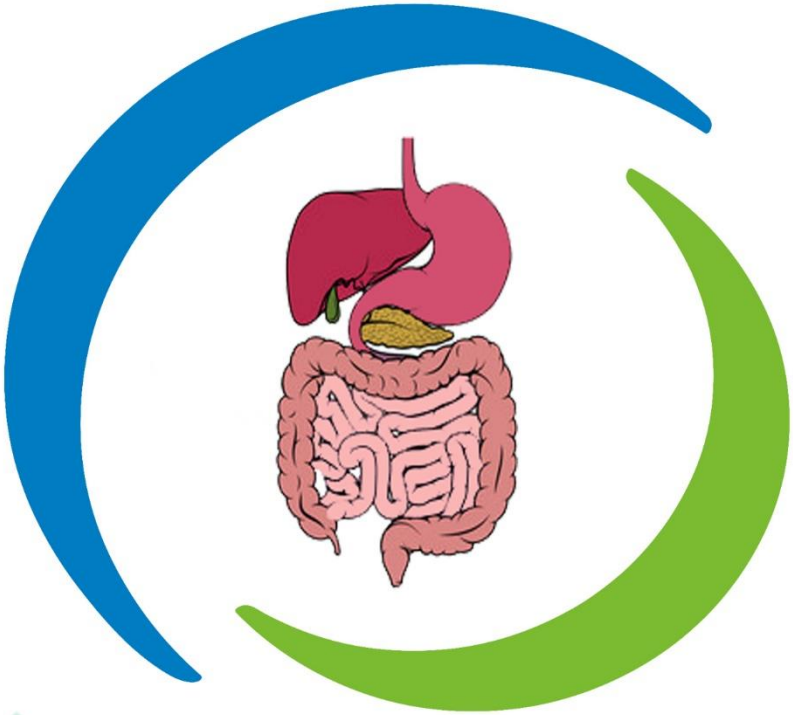
Pediatric Gastroenterology Protocol of EHA



First Edition 2024

Egyptian Clinical Practice Guidelines

in

Pediatric Gastroenterology

for

Egypt Healthcare Authority

First Edition

2024

Prepared By

Working Group for Development of

Egyptian Clinical Practice Guidelines

in

Pediatric Gastroenterology

for

Egypt Healthcare Authority

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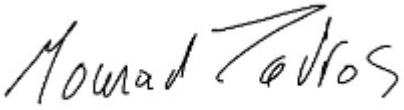

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PREFACE

Recently, there is an increasing need to provide programs with accurate competency-based assessments to ensure the delivery of high-quality healthcare. The aim of developing these Egyptian Clinical Practice Protocols in Gastroenterology is to unify and standardize the delivery of healthcare to all newborns at all health facilities.

The current state of healthcare in which avoidable failures are abound. “We train longer, specialize more, use ever-advancing technologies, and still we fail.” Part of the problem, is that the ever-increasing complexity of medicine makes uniform care delivery impractical or impossible. That is, unless there are protocols, checklists, or care paths that are readily available to providers.

Standard textbooks, journals, and online resources currently available create excellent repositories of detailed information about the etiology, pathogenesis, clinical picture, diagnosis, and treatment of a condition. However, for a busy clinician looking for the best way to manage a sick patient, a standardized path for effective management of the patient may be impossible to discern. So, it would be a lot easier if we all managed simple things in a uniform way using the best available evidence and resources.

In Gastroenterology, busy clinicians have all felt the need for a concise, easy-to-use resource at the bedside for evidence-based protocols, or consensus-driven care paths where high-grade evidence is not available.

In this protocol, we offer comprehensive reviews of selected topics and comprehensive advice about management approaches and procedures based on the highest level of evidence available in each case. Our goal is to provide an authoritative practical medical resource for neonatologists, pediatricians, and other healthcare providers dealing with newborns after birth. This protocol is the product of contributions from numerous neonatologists from all over Egypt.

We hope that such an approach will encourage clinicians to apply available evidence to their practice and also track compliance with desired practices. We hope that practicing neonatologists, fellows and nurse practitioners will find this protocol useful in delivering high-quality clinical care to their patients. We remain open to feedback and suggestions about how to improve this resource and how to make it maximally useful to those delivering care at the bedside in gastroenterology.

Members of the Working Group

For Development of the Egyptian Clinical Practice Guideline

In Pediatric Gastroenterology

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Protocol for Management of Acute Diarrheal illness

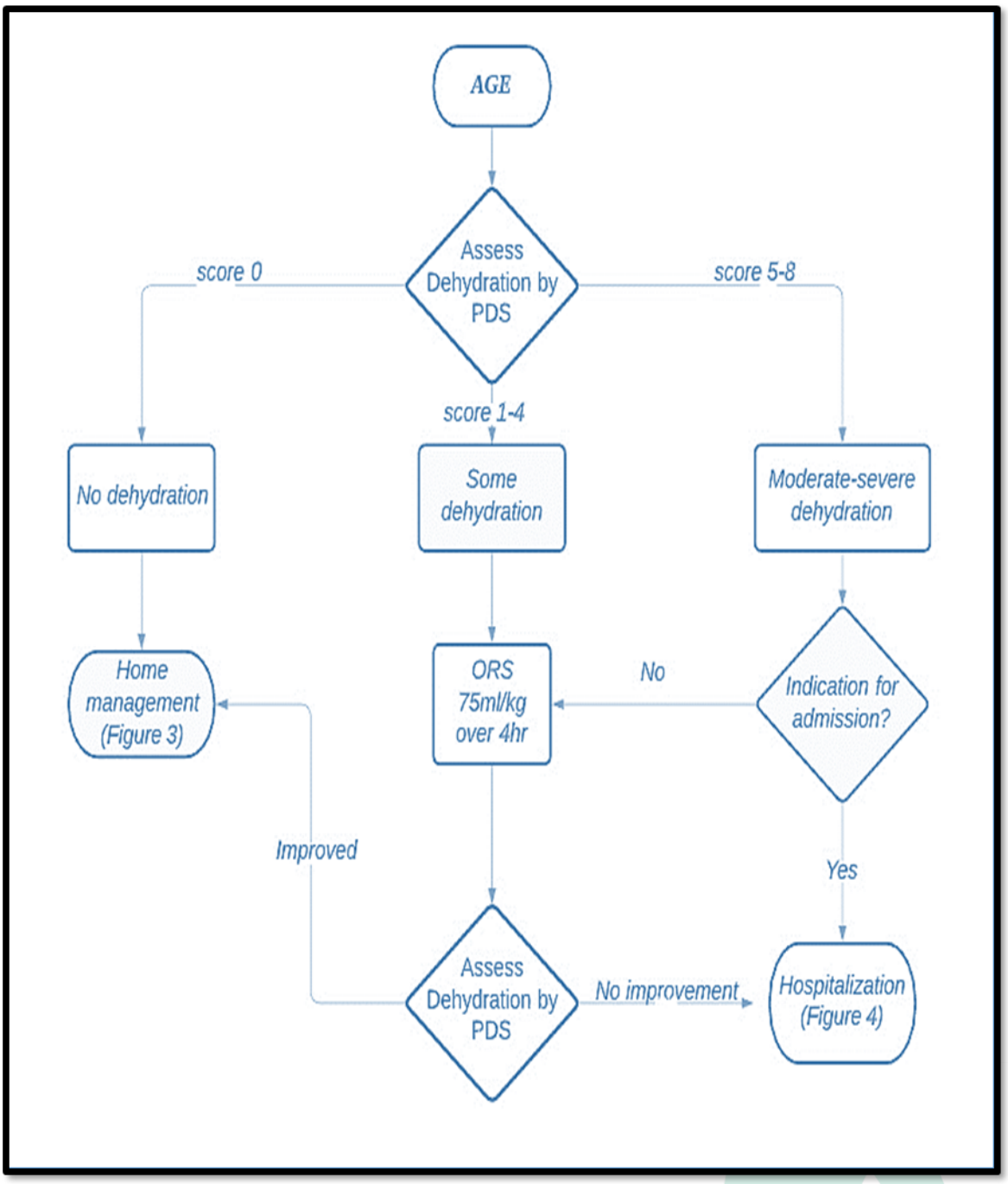


Figure (1) Management of a Case of Age

AGE = Acute gastroenteritis

PDS = Pediatric dehydration scale

ORS = Oral rehydration salts solution

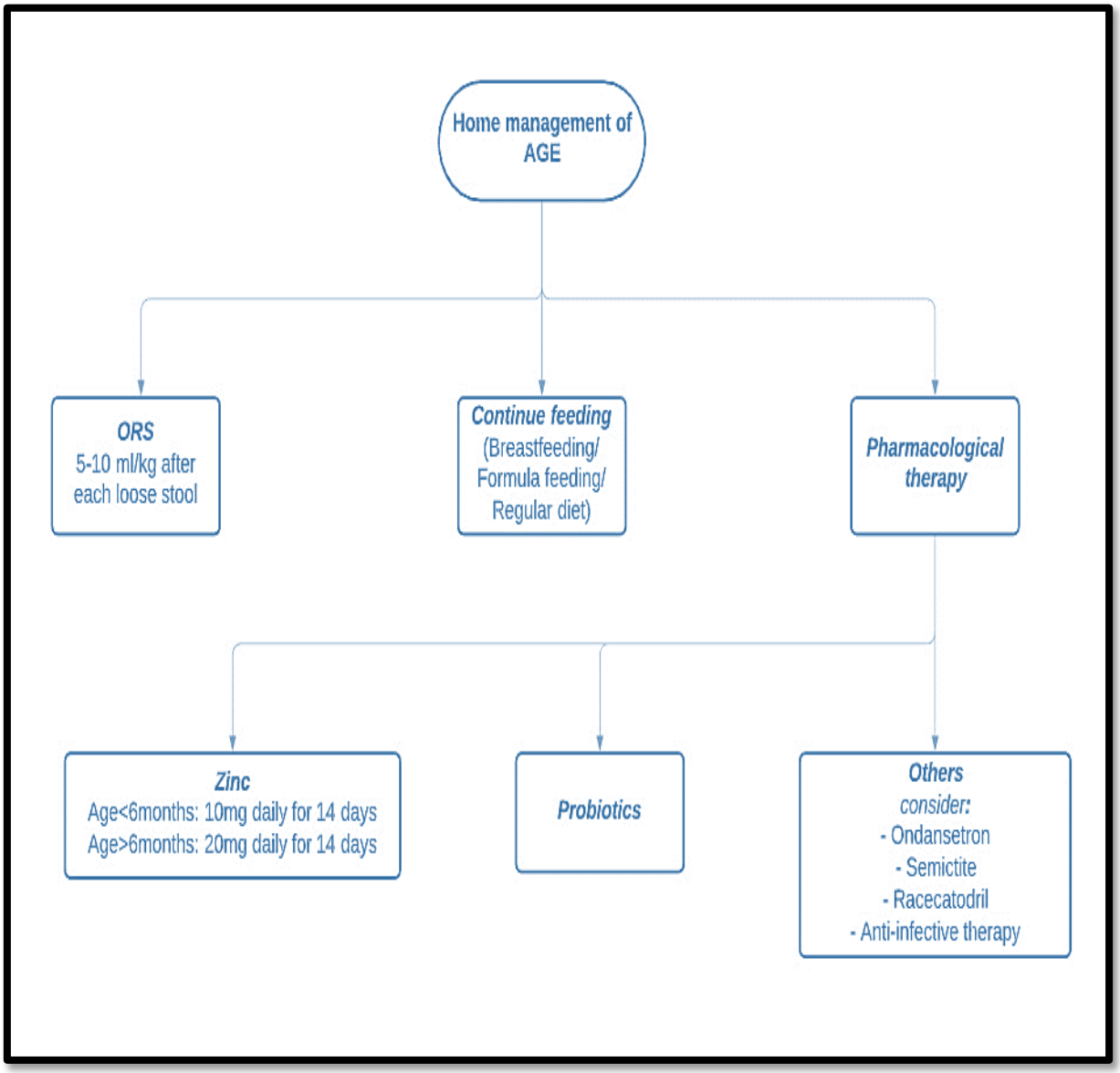


Figure (2) Home Management of a Case of Age

AGE = Acute gastroenteritis

ORS = Oral rehydration salts solution

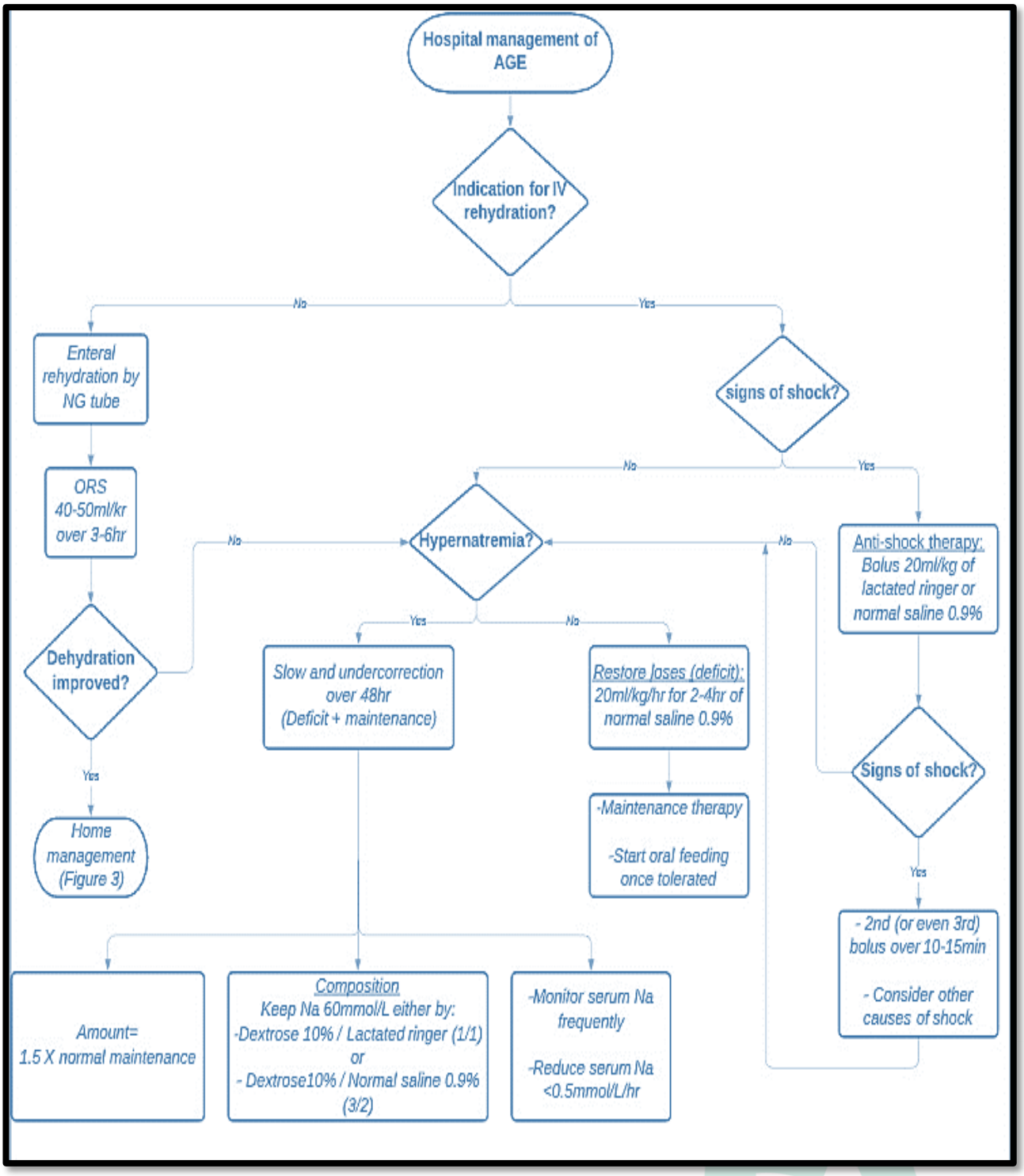


Figure (3) Hospital Management of a Case of Age

AGE = Acute gastroenteritis
IV= Intravenous
Na= Sodium
NG= Nasogastric
ORS = Oral rehydration salts solution

Table (1) Pediatric Dehydration Scale (PDS) for Children

Characteristics	0	1	2
General Appearance	Normal	Thirsty, restless or lethargic but irritable when touched	Drowsy, limp, cold or sweaty ±comatose
Eyes	Normal	Slightly sunken	Extremely sunken
Mucous Membranes (tongue)	Moist	Sticky	Dry
Skin Turgor	Goes back immediately	Delayed (<2sec)	Very delayed (>2sec)

A score of 0 represents no dehydration; a score of 1 to 4, some dehydration; and a score of 5 to 8 moderate/severe dehydration.

Table (2) Indications for Hospitalization

Indications for Hospitalization:
✓ Shock ✓ Severe dehydration (>9% of body weight) ✓ Neurological abnormalities (lethargy, seizures, etc) ✓ Intractable or bilious vomiting ✓ Failure of oral rehydration ✓ Suspected surgical condition ✓ Conditions for a safe follow-up and home management are not met ✓ Complicated Age (electrolyte imbalance, DIC)

Table (3) Indications for Discharge

Indications for Discharge:
✓ Sufficient rehydration is achieved as indicated by weight gain and/or clinical status ✓ IV fluids are no longer required ✓ Oral intake equals or exceeds losses ✓ Medical follow-up is available via telephone or office visit

Table (4) Indications for IV Rehydration

Indications for IV Rehydration:
✓ Shock ✓ Dehydration with altered level of consciousness or severe acidosis ✓ Worsening of dehydration or lack of improvement despite oral or enteral rehydration therapy ✓ Persistent vomiting despite appropriate fluid administration orally or via an NG tube **(Nasogastric)** ✓ Severe abdominal distension and ileus

Table (5) Holliday–Segar Method to Calculate Maintenance Fluid

Child's Weight (Kilogram)	Baseline Daily Fluid Requirement (Milliliter / Kilogram)
1–10 kg	**100 ml/kg**
10–20 kg	**1000 ml + 50 ml/kg for each kg >10 kg**
>20 kg	**1500 ml + 20 ml/kg for each kg >20 kg**

Table (6) Signs of Shock

Signs of Compensated Shock:
✓ Tachycardia ✓ Cool extremities ✓ Prolonged capillary refill (despite warm ambient temperature) ✓ Weak peripheral pulses compared with central pulses ✓ Normal blood pressure
Signs of Decompensated Shock:
✓ In addition to the above, these signs include: ✓ Depressed mental status ✓ Decreased urine output ✓ Metabolic acidosis ✓ Tachypnea ✓ Weak central pulses
Signs of decompensated shock include the signs listed above plus hypotension. In the absence of blood pressure measurement, decompensated shock is indicated by the non- detectable distal pulses with weak central pulses in an infant or child with other signs and symptoms consistent with inadequate tissue oxygen delivery.

علاج النزلات المعوية في المنزل

1. محلول معالجة الجفاف:

- **طريقة الإعداد:**

✓ يتم إضافة محتويات الكيس على 200 سم ماء في كوب نظيف.

✓ يتم إعطاء المحلول للأطفال باستخدام ملعقة صغيرة نظيفة(للأطفال اقل من عامين) او عن طريق اخذ رشفات مباشرة من الكوب.

✓ الأطفال اقل من 6 أشهر يمكن إعطائهم المحلول عن طريق حقنة منزوعة السن ويتم تقطير المحلول في فم الطفل(لا يتم إعطاء المحلول في زجاجات الرضاعة) .

- **الجرعة المناسبة:**

✓ يتم إعطاء الطفل 5 – 10 مل (1 – 2 ملعقة صغيرة) لكل كيلوجرام من وزن الطفل بعد كل حركة إسهال.

- **طريقة إعطاء محلول معالجة الجفاف:**

✓ يتم إعطاء ملعقة صغيرة أو رشفة من الكوب للطفل كل 1 – 2 دقيقة.

✓ إذا حدث قيء يتم الانتظار لمدة 10 دقائق ثم نعيد إعطاء المحلول للطفل ببطء أكثر(ملعقة صغيرة او رشفة من الكوب للطفل كل 2 – 3 دقيقة) .

2. تغذية الطفل:

✓ لا يجب إيقاف التغذية للطفل سواء كانت رضاعة طبيعية أو صناعية أو غذاء اعتيادي.

✓ يجب الإكثار من إعطاء السوائل للطفل قدر المستطاع إلى حين توقف الإسهال.

✓ السوائل التي **لا** يجب إعطائها للطفل هي:

- **المشروبات الغازية**
- **العصائر التجارية المعلبة**
- **المشروبات المحلاة بالسكر**
- **المشروبات التي تحتوي على مادة الكافيين**

3. الزنك:

✓ يتم إعطاء شراب الزنك للأطفال الذين يعانون من النزلات المعوية لمدة 14 يوما وتكون الجرعة:

- **مجم يوميا للأطفال أقل من 6 أشهر.**
- **مجم يوميا للأطفال أكبر من 6 أشهر.**

4. البروبيوتيك

❖ ***يجب زيارة الطبيب في الحالات الآتية:***

✓ ***القيء المستمر***

✓ ***قيام الطفل بتمرير العديد من البراز المائي***

✓ ***ارتفاع درجة الحرا ة***

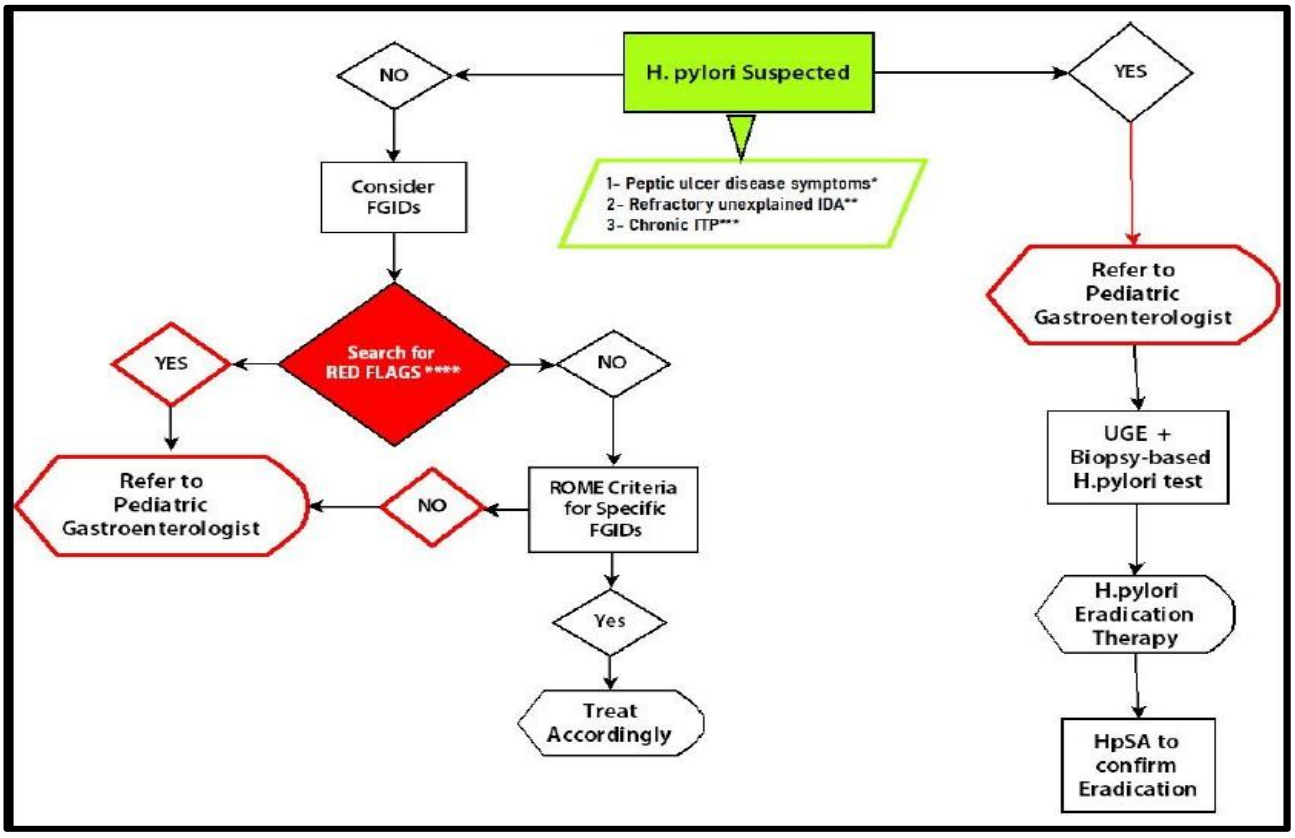
✓ ***الأكل أو الشرب القليل***

✓ ***العطش الشديد***

✓ ***وجود دم بالبراز***

✓ ***عدم تحسن الطفل خلال 3 أيام.***

Protocol for Management of H.pylori Related Diseases



- Alarm signs include persistent right upper or right lower quadrant pain, dysphagia, odynophagia, persistent vomiting, gastrointestinal blood loss, involuntary weight loss, deceleration of linear growth, delayed puberty, unexplained fever, and a family history (Jones NL et al., 2017)
- Refractoriness to oral iron is defined as failure to respond to treatment at a dose of at least 100 mg of elemental iron per day after 4 to 6 weeks of therapy (Hershko C and Camaschella C.2014)
- Chronic ITP is defined by ITP persistence beyond 12 months, with spontaneous recovery occurring in less than 10% of adults (William B and Mitchell MD, 2019)
- Functional bowel disorders are heterogeneous group of disorder, the most prevalent of which is irritable bowel syndrome (IBS) and functional abdominal pain (FAP) syndrome. FAP characterized by frequent or continuous abdominal pain associated with a degree of loss of daily activity, in the absence in change in bowel habits (Farmer AD and Aziz Q.2014)

Principles of Management of Constipation

Infrequent passage of stool for whatever reason often leads to constipation and faecal impaction with secondary problems of faecal soiling, anorexia, abdominal pain, behavioral problems and low self-esteem. The management of constipation involves:

1. Education and explanation.
2. High fibre diet and high fluid intake (consider dietician review during admission).
3. Retraining children to sit regularly on the toilet after meals.
4. Laxative medications to soften the stool (e.g. Lactulose) and increase stool expulsion (e.g. Senokot® - Note: non-formulary at Auckland DHB - suggest use docusate / senna combination). Other options include MgOH 8%, or movicol.
5. Faecal disimpaction (e.g. colonic lavage or phosphate enema). Note the former should be used with caution under the age of 1 year and the latter is contraindicated under the age of 3 years.

Faecal Disimpaction:

- Some consultants will recommend a trial of Picoprep (sodium picosulphate) at home in order to try and prevent an admission to hospital for Klean-Prep™ **(if available)**

Picoprep Dose	
<2 yr olds	**¼ sachet BD for 2/7 or 0.25mg\kg Max 5mg**
2-4 yr olds	**½ sachet BD for 2/7 or 2.5mg -5mg**
>4 yrs	**1 sachet BD for 2/7 or 5mg-10mg**

- This is may prevent an admission. Adequate fluid intake during treatment is very important. Restarting laxatives after treatment course is vital, this treatment should only be instituted by an authorizing consultant and the caregivers have the ability to phone for advice if required.
- Lactulose 2gm\kg\day in 1-2 doses.
- Movicol has also been used as a disimpaction agent in the outpatient setting. **(if available)** The dose for this is 1-1.5g/kg/day for 3 days (1 packet of movicol contains 13g). The limitation of this treatment is the volume of fluid (125mL/packet) to be used. Special authority required.

Colonic lavage (age > 1 year):

- Poor response to outpatient therapy may necessitate an admission in selected cases for colonic washouts. Large volumes (5-10L) of a balanced electrolyte solution, Klean-Prep™ **(if available)**, is given orally to 'dissolve' the faecal lump.
- Most children will require a nasogastric tube to achieve the desired intake per hour. Involve the Play Therapists. Oral Midazolam 0.5mg/kg to a maximum of 15mg may be required. Abdominal x-rays are at the discretion of the admitting consultant. All patients should be seen and assessed by a paediatric consultant prior to admission. That individual is responsible for outpatient follow up following discharge.
- Once the child is admitted to the ward, a large nasogastric tube should be inserted and vital signs and weight recorded. Begin the nasogastric infusion at the lowest rate and increase by 100ml/hour until the desired rate is reached or symptoms develop. Most children need 10-40ml/kg/hr. Normal diet should continue if tolerated.
- An input/output fluid balance chart is required, adequate fluid intake is required to prevent dehydration and/or hypo/hypernatraemia, for young children (i.e. <24 months) daily electrolytes testing may be required.

Suggested Flow Rates for Klean-Prep™

Age (Years)	Weight (kg)	Initial (ml/hr)	Maximum (ml/hr)
1-5	*10-20*	*100*	*500*
6-9	*20-30*	*200*	*800*
9-12	*30-40*	*300*	*1000*
Over 12	*40+*	*400*	*1200*

- If symptoms develop (usually nausea &/or vomiting), reduce the flow rate to the previous rate at which the child was asymptomatic. Metoclopramide may be given to reduce nausea and reduce transit time. Discontinue at 8pm at night to allow rest as'catharsis' may continue late into the evening. Restart at 6am.

Important: Success of treatment is judged by a clear effluent (SOMEONE NEEDS TO LOOK IN THE PAN!). The commonest reason for failure of treatment is insufficient volume of Klean-Prep™. Abdominal x-ray and rectal examination at the end of treatment are unnecessary (frequently uninterpretable) if clear effluent is achieved.

Phosphate enemas (age > 3 years):

- Phosphate enemas can be used in the outpatient or Emergency Care setting to disimpact the rectum, they should not be administered by parents and are contra-indicated in children < 3 years, if there is no result they should not be repeated on the same day, **Dosage:** 30-60mls. One to three enemas may be required, ideally 48 hours apart, refer to the Paediatric Nursing Service.

Discharge and Follow-up:

- A discharge plan should be discussed with the patient's primary paediatrician, with outpatient follow-up needs arranged within one month.

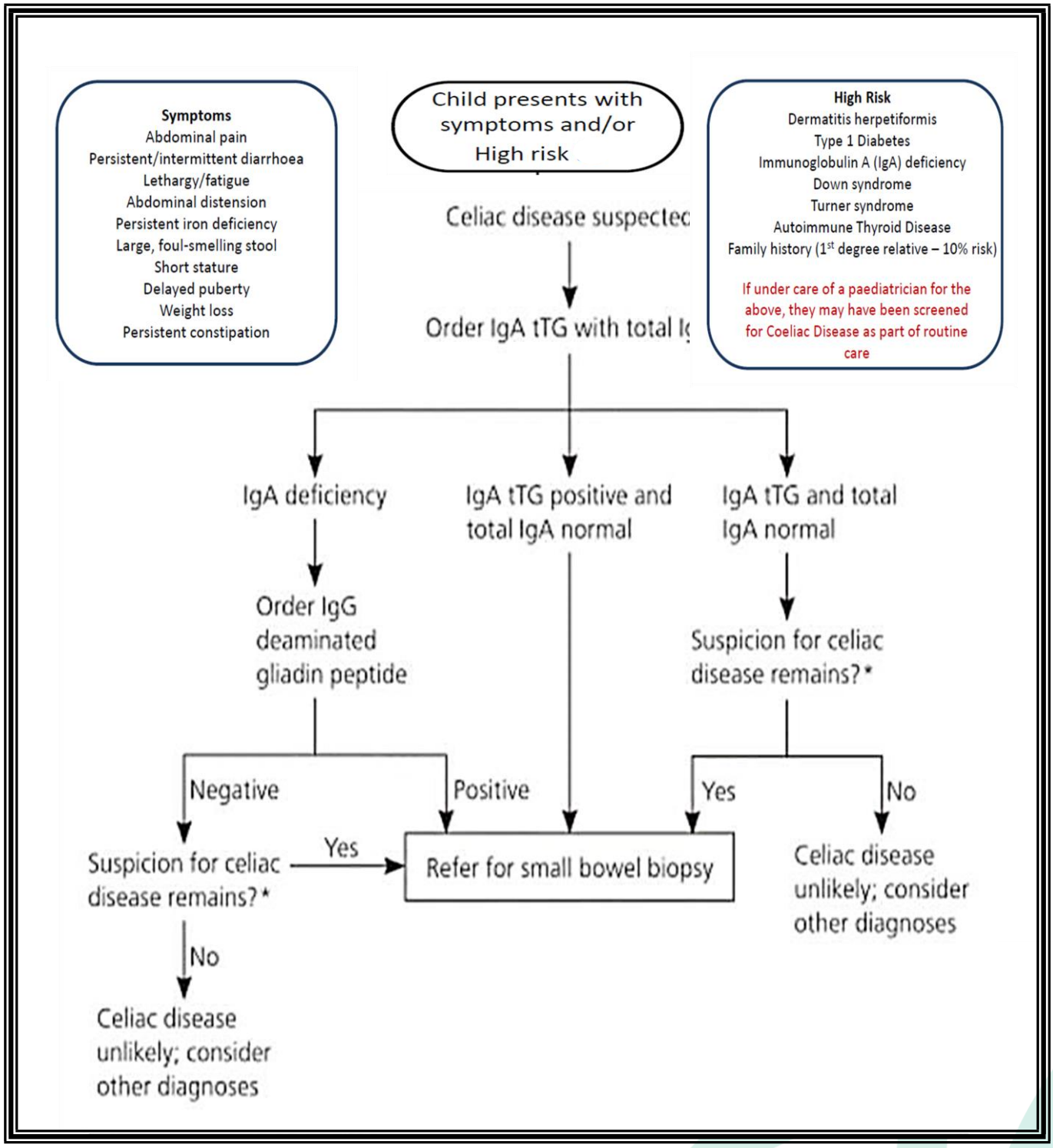
- All children need to go home on laxative therapy, options include:

  ✓ Lactulose - 1-3ml/kg/day in two divided doses (softener only)
  ✓ Need to brush teeth after dose.
  ✓ Senokot - 1 tablet OD for <5 yrs, 2 tablets daily for > 5yrs. Not funded. Stimulant laxative.
  ✓ Magnesium Hydroxide 8% - 1ml/kg/day in two divided doses. Advantage of low dose for young children and palatability. Stool softener and stimulant. Has been used in children under <18 months old with caution (usually recommended for older children)
  ✓ Macrogol 3350 (Lax-Sachets/Molaxole/Movicol/etc) - 1g/kg/day. One packet contains 13g. Not as well tolerated in children <4yrs because of palatability (bitter) and volumes required for dilution (125mL/packet). Stool softener and stimulant.

- For children with very difficult to manage constipation or significant behavioural problems associated with this, referral to consult liaison may be indicated.

- Consideration and investigation where appropriate for organic disease (ie hypothyroidism, spinal dysraphism, Hirschprung's disease etc) always required, especially in difficult to treat constipation.

Protocol for Management of Suspected Celiac Disease



Protocol for Management of Ingested Foreign Body

History and Details Specific to Ingestion:

- Witnessed or Suspected? Are there concerns surrounding supervision or possible NAI?
- Choking episode?
- Time of ingestion?
- Size and quantity (if width >2cm, length >5cm less likely to pass pylorus/duodenum)?
- Does it have a sharp end?
- Last ate/drank?
- Any history of pain, vomiting and/or anorexia?
- Do family have similar object with them or know what it's made from?

Hazardous objects include button batteries, multiple magnets, sharp objects and objects larger than 5cm length or x2cm width- these warrant radiography if emergent management not necessary.

Clinical examination:

- Signs of respiratory distress (i.e stridor, wheeze, dysphonia, unequal air entry, suprasternal or subcostal recession)
- Assess for choking or gagging
- Odynophagia (pain on swallowing)
- Tripod positioning
- Neck pain or crepitus on palpation
- Chest pain
- Drooling, pooling of secretions
- Abdominal tenderness or diminished bowel sounds
- Altered neurological status
- Check ears & nostrils for other FBs

Radiography:

- Consider AP & lateral neck, chest abdomen
- If button battery – look for narrower end (negative side)
- If non-radiopaque – consider endoscopy if symptomatic,avoid contrast studies

AND/OR

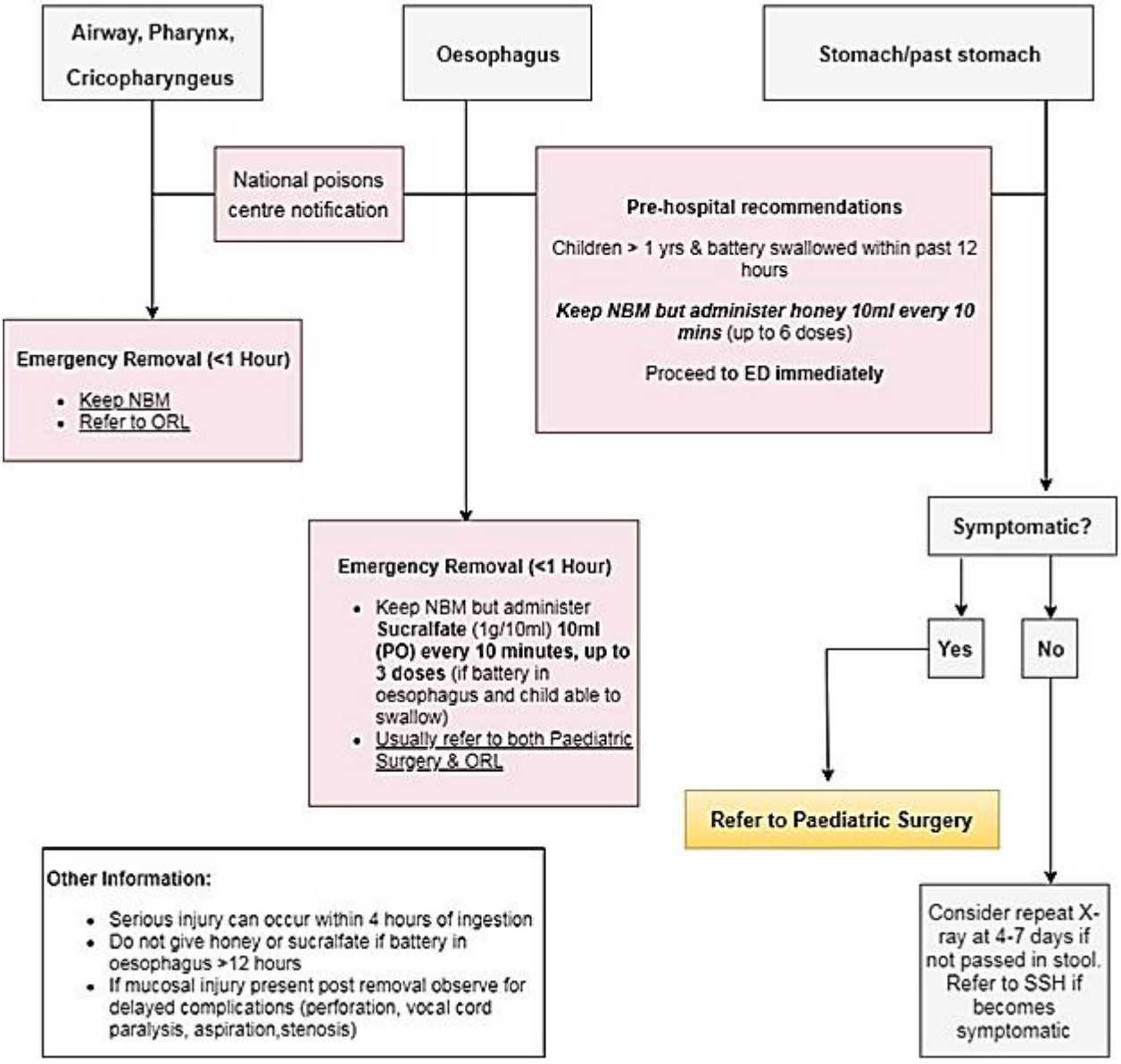
Handheld metal detector for metallic objects (if available):

- **Refer to metal detector guide below**
- **Non-hazardous, asymptomatic ingestion:** Beep >2cm below xyphisternum indicates no need for x-ray - discharge with appropriate advice. X-ray needed if beeps above mid-high epigastrium or no beep at all.
- **Hazardous or symptomatic ingestion:** may be used to mobilise appropriate team early as adjunct to normal management and imaging.

Never use to rule out a significant hazardous object.

Foreign Body Specifics:

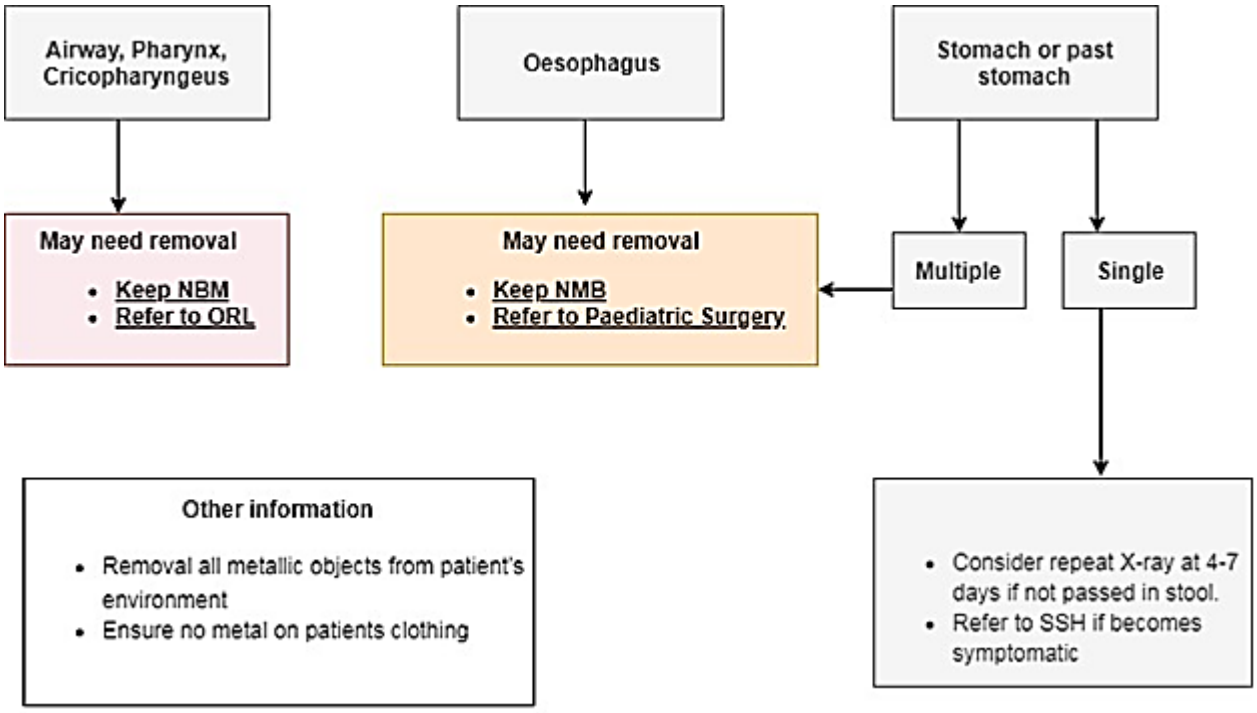
Button battery suspected by history or confirmed on X-ray



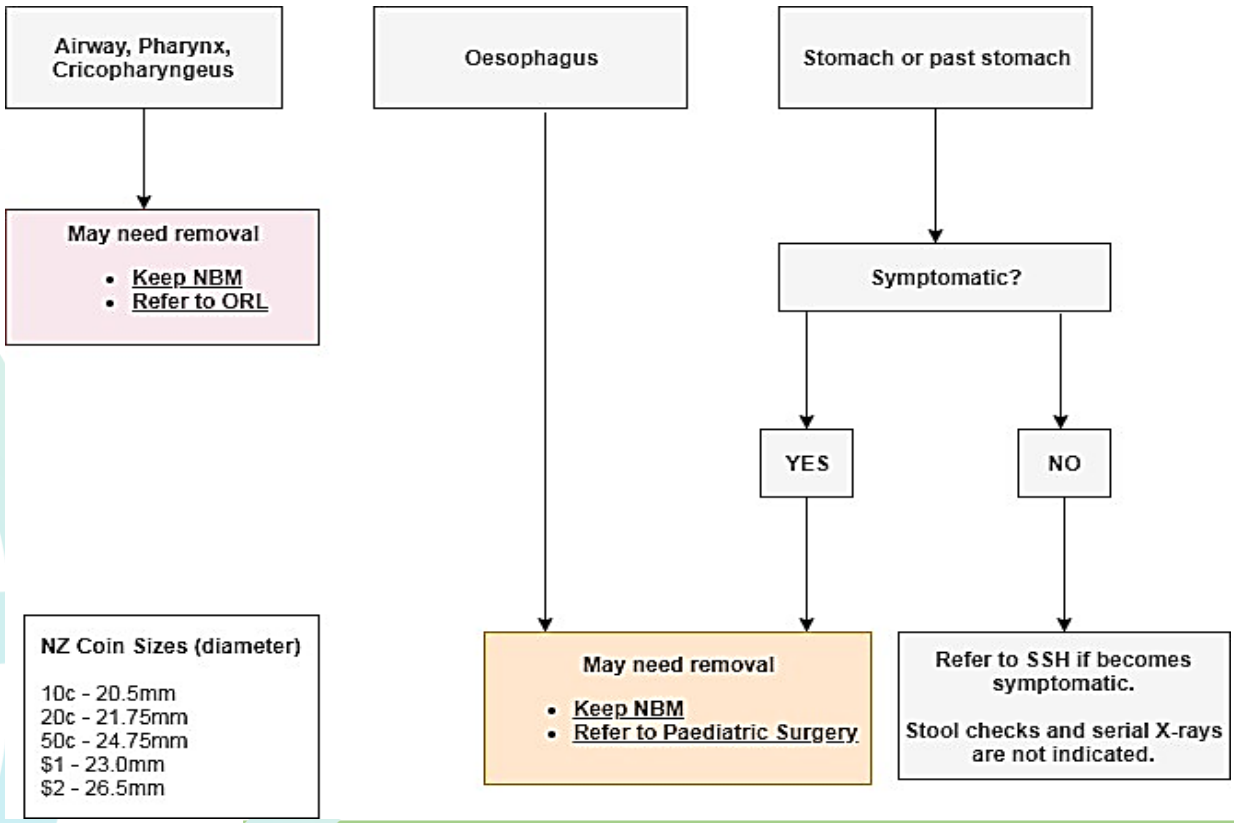
Important recommendations for the surgical team removing button battery:

- ✓ Removal of an oesophageal button battery under general anaesthetic is a time critical emergency.
- ✓ In theatre, as soon as the button battery is removed, it is recommended to gently irrigate the oesophagus with 120-150ml of 0.25% acetic acid.
- ✓ This can be done using a luer-lock syringe attached to a 5 French suction catheter introduced via the lumen of the oesophagoscope, Simultaneously, a rigid suction can be used to continuously remove excess irrigant.

Magnets (single or multiple): suspected from history or confirmed on X-ray



Other hard objects: suspected from history or confirmed by X-ray (eg Lego® coins, beads)



FBs Located in Ear or Nose:

Button Battery in Nose or Ear:

- Emergency removal in ED (or ORL referral if unable to retrieve)
- If successful removal in ED, ORL referral still required (to assess severity of burn)
- Even if removed - Keep NBM until ORL review

Other FBs in nose or ear (Eg: Single magnet, Lego®, coins, beads):

- Removal in ED (or ORL referral if unable to retrieve)
- If otitis externa present treat accordingly

Tips for Using the Handheld Metal Detector:

- May not be accurate in children >50kg (false negatives) or children with known metallic implants (false positives)
- Very good at picking up coins- presence and absence of beep strongly corresponds to presence/absence and location of coin.
- Less reliable with small metallic objects, button batteries etc- This means if it beeps, you can be confident of position, but absence of beep should never be interpreted as absence of a hazardous metallic object. In these situations, a prompt positive metal detector result may be useful at triage to mobilise teams early, but should not slow down the timeliness of your usual management.
- Can be useful in identifying location of aluminium objects (e.g. ringpulls), which won't show up on X-ray.
- Safe (no radiation) and will not adversely affect function of pacemakers, medical devices or bank cards.
- Can be used to avoid serial X-rays in children who have a previously proven ingested metallic object.
- To use the metal detector:
  - ✓ Test it's working against a metal object
  - ✓ Remove stethoscope/metallic interference from near you and child
  - ✓ Position child standing upright or lying flat on bed
  - ✓ Sweep from nose to pubis, horizontally across hypocondrium and posteriorly from occiput to sacrum
  - ✓ If beep is more than 2cm below the Xiphisternum, indicates that object is beyond gastro-oesophageal junction.
  - ✓ If beep is at level of umbilicus or on right side of abdomen, indicates that object is beyond the stomach.

Protocol for Management of GI Bleeding

- Tachycardia is an important sign of hypovolaemia in paediatric patients with blood loss
- There are many causes of GI bleeding in children.
- Important factors that help determine aetiology and focus interventions include:

  ✓ Site of bleeding
  ✓ Age of onset
  ✓ Presence of abdominal pain
  ✓ Presence of diarrhoea

Site of Bleeding:

Non-GI mimics of GI blood loss:

- Epistaxis, maternal blood, dental work, haemoptysis Substances such as iron, beetroot, spinach and blueberries can mimic melaena

Upper GI:

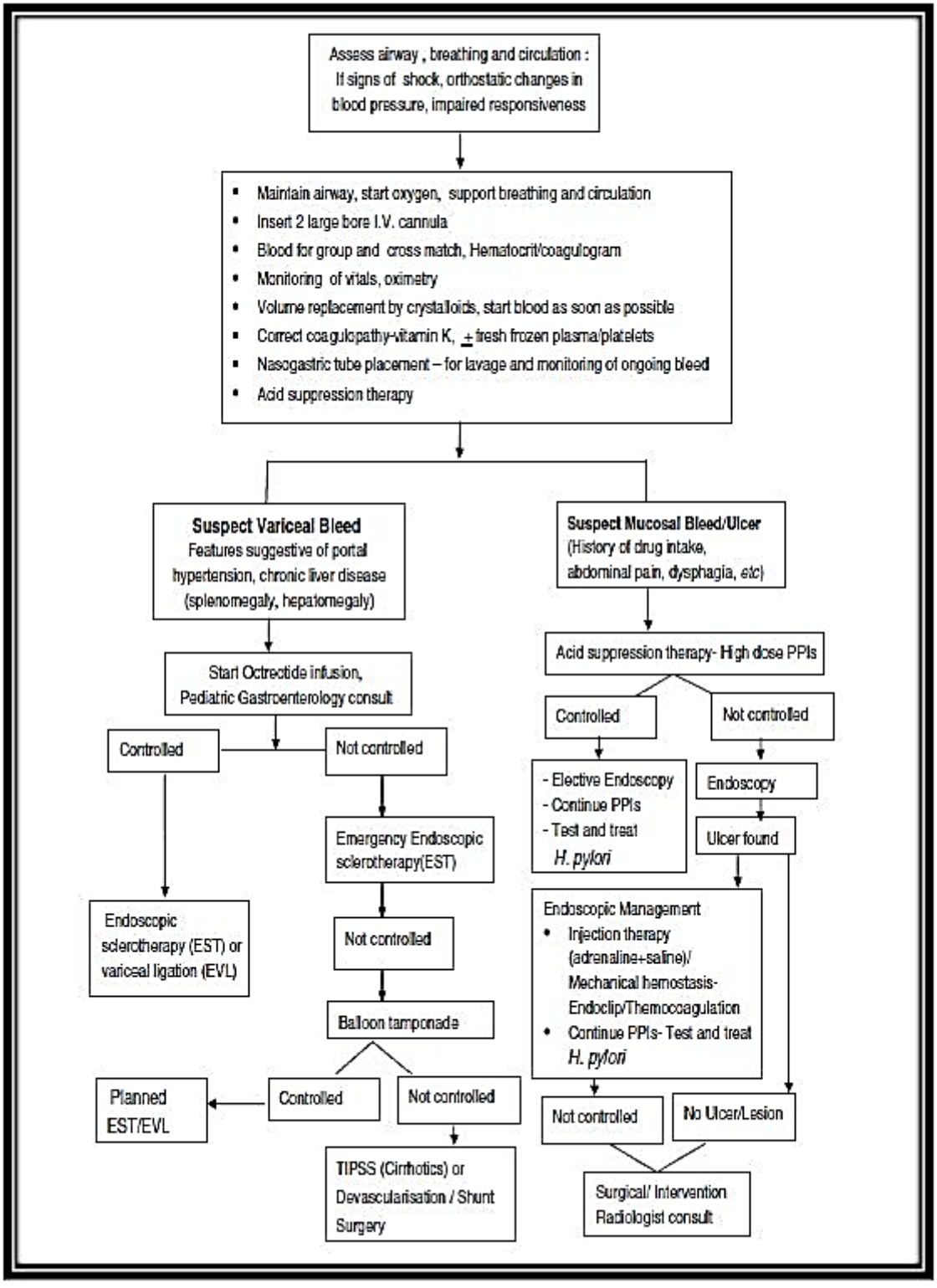
"mouth to the ligament of Treitz, the 2nd part of the duodenum"

Haematemesis (vomited blood)

✓ Bright red suggests active bleeding
✓ Altered blood - may be black (resembling coffee ground) suggests less active bleeding

Upper GI blood loss may present as melaena

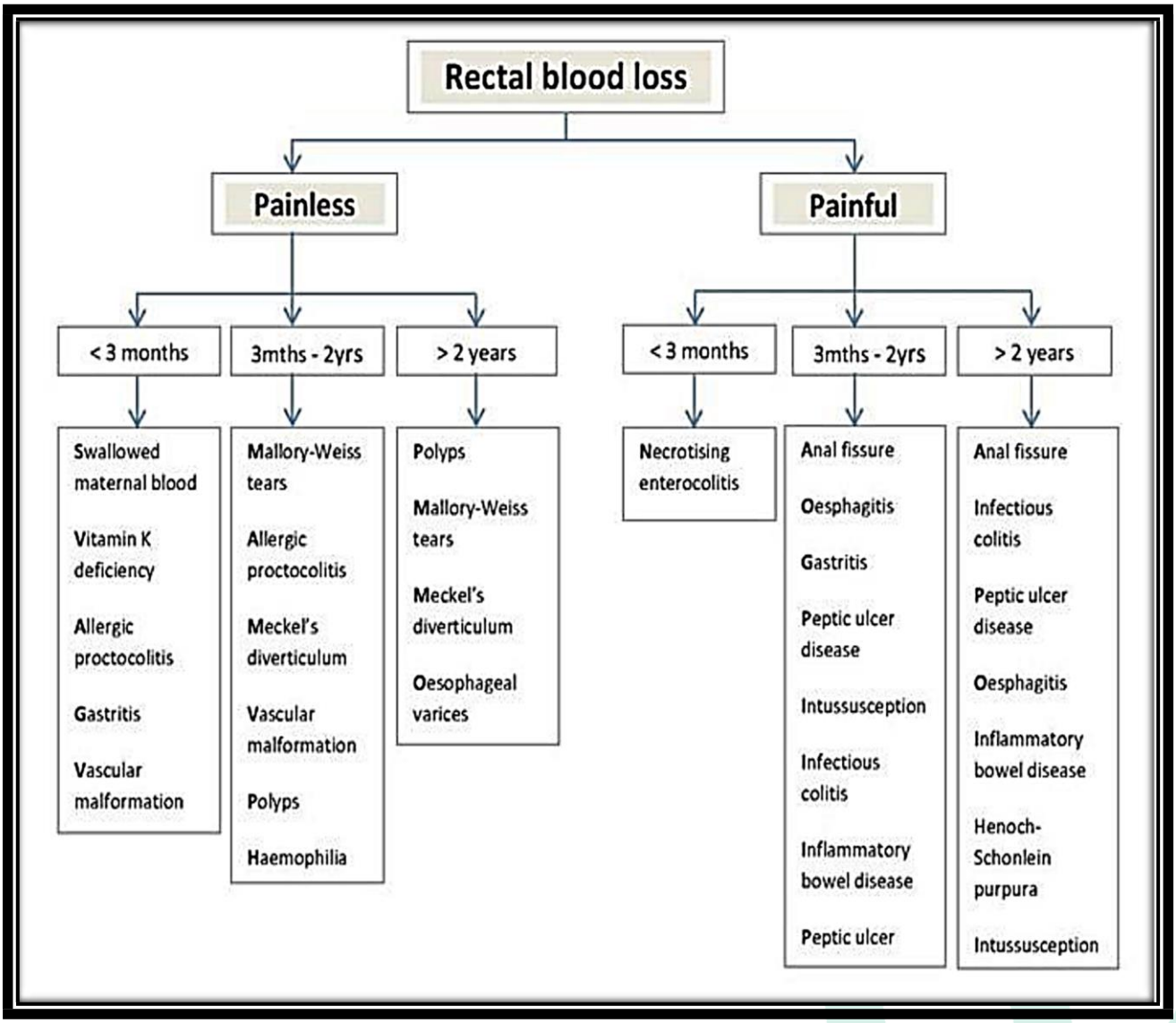
Haematemesis		
Oesophagus	Mallory-Weiss tear	Repeated vomiting
	Oesophageal varices	Stigmata of chronic liver disease or portal hypertension
	Oesophagitis	Reflux symptoms
	Foreign body	Including possible button battery ingestion
Stomach	H. pylori peptic ulcer	
	Non-helicobacter gastritis	Non-steroidal anti-inflammatory use
Small Intestine	H. pylori/peptic ulcer	
	Haemolytic uraemic syndrome	Elevated urea
	Henoch-Schoenlein purpura	Rash
	Arteriovenous malformation	Cutaneous A-V malformations
	Crohn's disease	Weight loss, diarrhoea
	Haemangioma	Cutaneous haemangiomata
	Intestinal necrosis	


Assess airway , breathing and circulation : If signs of shock, orthostatic changes in blood pressure, impaired responsiveness
Maintain airway, start oxygen, support breathing and circulation
Insert 2 large bore I.V. cannula
Blood for group and cross match, Hematocrit/coagulogram
Monitoring of vitals, oximetry
Volume replacement by crystalloids, start blood as soon as possible
Correct coagulopathy-vitamin K, ± fresh frozen plasma/platelets
Nasogastric tube placement – for lavage and monitoring of ongoing bleed
Acid suppression therapy
Suspect Variceal Bleed
Features suggestive of portal hypertension, chronic liver disease (splenomegaly, hepatomegaly)
Start Octrectide infusion, Pediatric Gastroenterology consult
Controlled
Not controlled
Endoscopic sclerotherapy (EST) or variceal ligation (EVL)
Emergency Endoscopic sclerotherapy(EST)
Not controlled
Balloon tamponade
Controlled
Not controlled
Planned EST/EVL
TIPSS (Cirrhotics) or Devascularisation / Shunt Surgery
Suspect Mucosal Bleed/Ulcer
(History of drug intake, abdominal pain, dysphagia, etc)
Acid suppression therapy- High dose PPIs
Controlled
Not controlled
- Elective Endoscopy
- Continue PPIs
- Test and treat H. pylori
Endoscopy
Ulcer found
Endoscopic Management
Injection therapy (adrenaline+saline)/ Mechanical hemostasis- Endoclip/Thermocoagulation
Continue PPIs- Test and treat H. pylori
Not controlled
No Ulcer/Lesion
Surgical/ Intervention Radiologist consult

Lower GI:

"Distal to the Ligament of Treitz"

- Melaena (black, tarry odiferous stool) suggests blood proximal to ileo-caecal valve
- Haematochezia (bright red blood per rectum) generally indicates a colonic site of bleeding. Occasionally red blood in the stool may originate from the small intestine as a result of rapid gut transit.



History:

- Constipation (possible anal fissure)
- Diarrhoea (inflammatory bowel disease/ infectious causes Salmonella, Campylobacter, Shigella, entero-invasive E.coli and Yersinia)
- Recent antibiotic exposure (clostridium difficile)
- In infants with a personal or family history of atopy or food allergy (breast and formula fed) (allergic proctocolitis)
- Liver disease (oesophageal varices and vitamin K deficiency)
- Bleeding disorders
- Cystic fibrosis (oesophageal varices and vitamin K deficiency)
- Medication exposure NSAIDs (gastritis) and prior antibiotic exposure (pseudomembranous colitis)
- Overseas travel (infectious)
- Family medical history (peptic ulcer disease, bleeding disorders, inflammatory bowel disease, polyposis syndrome. Other sick contacts may indicate an infectious cause)

Physical Examination:

Look for:

- Tachycardia
- Hypotension is a late and ominous sign in GI bleeding
- Orthostatic hypotension (a rise in the pulse rate by 20 beats per minute or a fall in the systolic blood pressure of more than 10mmHg indicates significant volume depletion, usually > 20%).
- Abdominal tenderness suggesting a surgical cause of pain, haemolytic uraemic syndrome, gastric/ duodenal ulceration
- Anal fissure - constipation
- Anal skin tags suggesting Crohn's disease.
- "Haemorrhoids" are an uncommon in paediatric and adolescent patients. Anal skin tags are a common mimic of "haemorrhoids". Presence of true anal varicosities suggest portal hypertension.
- Stigmata of liver disease (hepatosplenomegaly, jaundice, cutaneous purpura, spider naevi, clubbing, ascites)
- Cutaneous haemangiomata may indicate the presence of GI mucosal haemangiomata.
- Pigmentation of the lips and buccal mucosa may suggest Peutz-Jeghers syndrome.
- Purpura on the buttocks and lower extremities are characteristic of Henoch

  Schonlein Purpura.

Laboratory Tests:

- **CBC --A** recent bleed may not initially alter the haemoglobin or haematocrit . The MCV can be low in chronic low-grade bleeding. Raised eosinophils may signify an allergic colitis. Low platelets suggest hypersplenism or idiopathic thrombocytopaenia.
- **ESR/ CRP -** may indicate inflammatory bowel disease or sepsis
- **Coagulation profile** to rule out a liver disease, bleeding disorder or disseminated intravascular coagulopathy.
- **Liver function tests** if there are signs of portal hypertension or chronic liver disease.
- **Stool cultures** and **a C-difficile toxin assay** if there are loose stools.
- **Renal function tests**
  - ✓ A high urea may be a clue for haemolytic uraemic syndrome or may indicate the presence of dehydration.
  - ✓ A high urea may also be due to resorbed blood in the upper GI tract
- **H.pylori** stool antigen is not recommended as H.pylori is prevalent in the general paediatric population and is not usually associated with morbidity. H.pylori complications are diagnosed endoscopically.

Investigation:

Fibreoptic endoscopy and biopsy has increased the rate of positive diagnosis. The yield decreases if endoscopy is delayed, so it is important that endoscopy occurs promptly. Preparation of the patient is critically important. In emergency situations where bleeding is severe, resuscitation of the patient is paramount. Endoscopy should not be performed hastily if the patient is unstable.

Upper GI Bleeding

- Significant upper GI bleeding requires endoscopy for investigation.
- Contrast studies should not be the initial study to rule out oesophagitis, gastritis or peptic ulcers because of the lack of sensitivity. Contrast studies may be indicated in patients with dysphagia or odynophagia.
- Ultrasound should be requested if there is evidence of liver disease or splenomegaly.
- Chest xray should be considered in cases of suspected upper GI bleeding to look for an oesophageal foreign body.

Lower GI Bleeding

- Colonoscopy is the best test for significant lower GI bleeding. An exception is suspected intussusception, where ultrasound should be requested (and if confirmed, an enema for reduction).

Painless rectal bleeding

- A Meckel scan is the procedure of choice. CT angiography may also help localize bleeding for AV malformations

Obscure bleeding in the GI tract

- Capsule endoscopy may provide a diagnosis in some cases.

Treatment:

1. If there is significant bleeding:

- ✓ Large bore IV lines
- ✓ Re-Establish blood volume (rapid infusion of 0.9% NaCl +- by red cells).

2. Acid suppression: Omeprazole (2mg/kg/day). Patients < 7 years should receive q12hourly dosing.

3. Urgent referral to appropriate teams PICU/ Surgery/ General Paediatrics/ Gastroenterology

4. Significant GI bleeding requires admission for observation +/- ongoing investigation and treatment.

5. Never discharge a patient with liver disease and GI bleeding unless discussed with on-call Paediatric Gastroenterologist/Hepatologist.

Pediatric Gastroenterology

"We offer comprehensive reviews of selected topics and comprehensive advice about management approaches based on the highest level of evidence available in each case. Our goal is to provide an authoritative practical medical resource for pediatricians.

We hope that such an approach will encourage clinicians to apply available evidence to their practice and also track compliance with desired practices."

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