UPPER GASTROINTESTINAL BLEEDING IN CHILDREN

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INTRODUCTION

Upper gastrointestinal bleeding (UGIB) is a life threatening condition in children. Bleeding may occur anywhere along the gastrointestinal tract. Children who present with hematemesis constitute 10-15% of referrals to pediatric gastroenterologists (Arain and Rossi 1999).

Gastrointestinal bleeding can be roughly divided into three clinical syndromes (1).

a. Upper gastrointestinal bleeding: UGIB is from a source between the pharynx and the ligament of Trietz. This type of bleeding is characterised by hematemesis and melena.

b. Lower gastrointestinal bleeding: Lower gastrointestinal bleeding may be indicated by red blood per rectum, especially in the absence of hematemesis. Isolated melena may originate from anywhere between the stomach and the proximal colon.

c. Bleeding from obscure sources: Defined as bleeding of unknown origin that persists or recurs, that is recurrent or persistent iron deficiency anemia, occult blood test positivity, or visible bleeding, after a negative initial or primary endoscopy (colonoscopy and/or upper endoscopy) result(Roy and Ozden 2003)

Four questions need to be answered by taking history and physical examination(Arora, Mathur et al. 2004). Therefore a complete and thorough history and physical examination is vital (2).

Is it actually blood? A number of substances such as food coloring agents, vegetables such as beetroot, drugs like ampicillin and phenobarbital may mimic hematochezia. Newborns who have swallowed maternal blood can present with significant melena or hematemesis while appearing stable clinically. The Apt Downey test performed on the emesis identifies the source of bleeding (Apt and Downey 1955) *Is the child actually bleeding from the gastrointestinal tract?* There are certain situations in which the source of the blood might not be the gastrointestinal tract, but can actually come from the respiratory tract, oropharyngeal region, nose and nasopharyngeal area. There might be coexisting conditions like bleeding diathesis or malignancy that may predispose the child to mucosal bleeding.

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What is the site of bleeding? Melena is indicative of a significant blood loss (over 2% of blood volume) most likely taking place distal to the ligament of Trietz. Lesions proximal to the ligament of Trietz presents usually as vomiting of bright red or coffee ground blood.

How much blood has been lost? If bleeding is slow, as much as 13% of blood can be lost without any hemodynamic change. The loss of palmer crease erythema may be seen when the hand is hyperextended as a sign of 50% or more blood volume loss(Arain and Rossi 1999) (3).

DIAGNOSIS

Microscopic blood loss in the stool can be confirmed with a faecal occult blood test. For upper GI bleeding, a nasogastric tube is placed to confirm the presence of fresh blood and to evaluate the degree of active bleeding.

***Endoscopy*:** Esophagogastroduodenoscopy (EGD) and colonoscopy are currently considered the first-line diagnostic procedures. The site and the cause of bleeding can be identified in 85 to 90% of the patients(Prolla, Diehl et al. 1983).

Radionuclide studies: (99m)Tc-labeled erythrocytes and (99m)Tc sulfur colloid are 2 commonly used techniques to detect active bleeding. It has a false localization rate of approximately 22%, which limits its value as a diagnostic test(Fallah, Prakash et al. 2000). The diagnostic sensitivity of the scans in a retrospective study was 39.1%(Lee, Lai et al. 2008).

Etiology

Newborns	Infants	One year to 12 years
Swallowed maternal blood	Gastritis	Esophageal varices
Hemorrhagic disease of the newborn	Esophagitis	Peptic ulcer disease
Gastritis	Stress ulcers	Gastritis
Vascular malformations	Mallory Weiss tears	
Idiopathic	Vascular malformation	
	Gastrointestinal duplication	

Conventional angiography: It is particularly useful in the evaluation of difficult to diagnose cases of recurrent UGI bleeding (Cox and Ament 1979). An accurate angiographic diagnosis is more likely in acute GI bleeding than in chronic GI bleeding, (71% vs. 55%) (Arora, Mathur et al. 2004).

CT angiography: CT angiography is an excellent tool for fast and accurate diagnosis and localization of acute GI bleeding.

Capsule endoscopy: A promising new technology introduced to clinical practice in gastroenterology is capsule endoscopy. The capsule is suitable for cases of obscure bleeding from the mouth to the colon. It can successfully image small bowel pathologic features throughout the GI tract. Although this technology cannot be used for biopsy or therapy, it may prove valuable in the assessment of bleeding with negative results on gastroscopy and colonoscopy (4).

Management of gastrointestinal bleeding

The goals of therapy in a child with UGIB are hemodynamic resuscitation, cessation of bleeding source and prevention of future episodes of GI bleeding (5).

Pharmacologic management of mucosal bleeding

Therapy in these groups of patients is directed at neutralizing and/or preventing the release of acid. The various agents used include:

Antacids: In children more than five years of age, magnesium and aluminum hydroxide in doses of the 30ml/hr for the first 48 hours followed by same dose at one and three hours after meals throughout the remainder of hospitalization.

H2 receptor antagonists: are used in the treatment of gastritis, peptic ulcers and superficial mucosal erosions.

Proton pump inhibitors: Targeting the terminal step in acid production, as well as the irreversible nature of the inhibition, results in their ability to reduce gastric acid secretion by up to 99%.

Sucralfate: It is a sucrose sulfate-aluminum complex which serves as protective barrier at the ulcer surface, preventing further damage from acid, pepsin, and bile (6).

Endoscopic management of mucosal bleeding

A meta-analysis on the role of injection therapies for bleeding ulcers has found no difference between various techniques like thermal therapy, sclerosant therapy, clips, and thrombin/fibrin glue(Laine and McQuaid 2009) (9).

Pharmacologic management of variceal bleeding

Start all patients on H2 receptor blocker drugs or Proton pump inhibitors. A vasoactive drug should also be started to decrease the splanchnic pressures. There is very little to choose between octreotide and somatostatin except that the latter is costlier (8).

Endoscopic Management

Endoscopy should be performed when the patient has been stabilized and preferably within 24 hours of admission or onset of hemorrhage(Cox and Ament 1979). The modalities available for controlling acute variceal bleeding are either variceal ligation or sclerotherapy. Sclerotherapy can control acute variceal bleeding in 70-100% of cases. However, in a meta-analysis endoscopic variceal ligation therapy significantly reduced rebleeding, mortality, frequency of esophageal strictures and the number of sessions required to achieve variceal eradication when compared with injection sclerotherapy (Laine and Cook 1995) (9).

Pharmacologic Therapy of Gastrointestinal Bleeding (8)

Drug	Indication	Dosage(Boyle 2008)
Ranitidine	Control of active bleed and prevention of rebleeds	Continuous infusion, 1 mg/kg followed by infusion of 2 to 4 mg/kg per day Bolus infusions, 3 to 5 mg/kg per day divided every 8 hours
Pantoprazole	Control of active bleed	Children <40 kg: 0.5 to 1 mg/kg per day IV once daily Children >40 kg: 20 to 40 mg once daily (maximum, 40 mg/d)
Octreotide	Control of active bleed	1 mcg/kg IV bolus (maximum, 50 mcg) followed by 1 mcg/kg per hour May increase infusion rate every 8 hours to 4 mcg/kg per hour (maximum, 250 mcg per 8 hours) When bleeding is controlled, taper 50% every 12 hours. May stop when at 25% of starting dose
Somatostatin	Control of active bleed	250 g IV bolus followed by 250 g/hour continuous infusion Can be maintained from 2-5 days, if successful Monitor for hyperglycaemia every 6 hourly Side effects: abdominal discomfort, flushing, nausea, bradycardia, steatorrhoea, dyspepsia
Glypressin (Terlipressin)	Control of active bleed	2 mg IV every 4 hours till a bleeding free interval of 24 – 48 hours is achieved Side effects same as somatostatin
Vasopressin	Control of active bleed	0.002 to 0.005 units/kg per minute X 12 hours, then taper over 24 to 48 hours (maximum, 0.2 units/min)
Sucralfate	Coating of ulcerated mucosa	40 to 80 mg/kg per day in 4 divided doses (maximum, 1,000 mg/dose in 4 divided doses)
Propranolol	prevention of rebleeds	1 mg/kg per day in 2 to 4 divided doses May increase every 3 to 7 days to maximum of 8 mg/kg per day to achieve a 25% reduction from baseline pulse rate

Surgical Management

In cases where conservative management fails with combined pharmacotherapy and endoscopic treatments, shunt and nonshunt surgeries are the definitive treatment. For intrahepatic portal hypertension, transjugular intrahepatic portosystemic shunting (TIPS) provides temporary decompression of the intrahepatic portal vein into the hepatic veins. Surgical portosystemic or portoportal shunts for GI bleeding are now reserved for refractory cases and/or when liver transplantation is not an option (10).

Prognosis

Prognostic factors associated with increased mortality(Cox and Ament 1979) (11)

The coexistence of another severe medical disorder
Coagulation disorder
Failure to identify the bleeding site
Hemoglobin level <7 g/dL, and/or a hematocrit value of <20% at presentation
>85 ml/kg blood loss without surgical intervention

CONFLICT OF INTEREST

The authors declare that they have no competing interests.

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