In the name of GOD

Upper GI Bleeding
Etiology -Diagnosis

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Neonates — include:

- ***swallowed maternal blood***.

- ***Vitamin K-deficient bleeding*** – neonates who were not *given vitamin K prophylaxis*.

- ***Stress gastritis or ulcers*** – with critical illness but also may occur spontaneously.

- ***Congenital anomalies*** – intestinal duplications or vascular anomalies .

Duplications containing *gastric mucosa* can ulcerate and bleed. *Antral duplications* have been reported to cause *hypergastrinemia* with ulceration and bleeding.

- ***Coagulopathy*** – may also be caused by infection, liver failure, or a congenital factor deficiency.

Most present with other symptoms, such as a large cephalohematoma , oozing from the umbilical stump, bleeding after circumcision or blood sampling, or intracranial hemorrhage in a term infant .

- ***Food protein intolerance*** – usually involving cow's milk may present with UGI bleeding, although lower gastrointestinal (LGI) bleeding is much more common. Care must be taken to exclude other causes of UGI bleeding, as outlined below, because UGI bleeding or passage of blood per rectum alone is not diagnostic of milk protein intolerance.

- ***Mechanical obstruction*** of the UGI tract can be a cause of hematemesis in this age group *hypertrophic pyloric stenosis*, *duodenal web*, *and antral web* have all been reported as causing UGI bleeding in infants.

Infants, children, and adolescents

- ***Mallory-Weiss syndrome*** – Longitudinal mucosal lacerations in the distal esophagus, after forceful retching, usually small and self-limited , occasionally is severe. is ***likely the most common cause of minor UGI*** bleeding in children

- ***Esophageal or GI foreign body*** - If it is sharp, caustic, and/or lodged in the esophagus. History of choking, rarely ingestion of a button battery has led to severe UGI hemorrhage due to aortoesophageal fistula.

- ***Esophagitis*** –Gastroesophageal reflux disease, eosinophilic esophagitis and occasionally by caustic ingestion.

- *Pill esophagitis* : tetracyclines (doxycycline and minocycline) , NSAIDs .

- ***Infectious esophagitis*** (due to Candida, cytomegalovirus, or herpes simplex).

- ***Peptic ulcers and gastritis*** – occur in all age groups, typically in the setting of critical illness or use of NSAIDs. Drinking of alcohol is an important cause of gastritis in adolescents also may be related to Helicobacter pylori infection or, occasionally, to a viral infection including cytomegalo virus.

- ***Esophageal varices*** – most common cause of *severe acute UGIB* in children, *caused by portal vein hypertension*. Clues include *splenomegaly* and/or a *thrombocytopenia* . Variceal bleeding in children *stops spontaneously in about 50% of patients, with rebleeding 40%.*

  - ✓ *Cirrhosis* due to chronic liver disease (cystic fibrosis, biliary atresia, or intestinal failure-associated liver disease).
  - ✓ *Portal vein thrombosis* with a history of umbilical vein catheterization or sepsis during the neonatal period.
  - ✓ *Hepatic vein obstruction (Budd-Chiari syndrome).*

- ***Arterial bleeding*** – *overlying peptic ulcer* or a *Dieulafoy* lesion.

- ***Unusual causes*** hemangiomas, aortoesophageal fistulas, hereditary hemorrhagic telangiectasia, duplication cysts , parasites, vasculitis, gastric polyps, annular pancreas, antral or duodenal web.

- ***Vascular anomalies*** : *tumors* and *vascular malformations*. *Hemangiomas* are the *most common tumor*, found in *4%-12%* infants .

Symptomatic hemangiomas of the gut are rare, but when they do occur, they are commonly associated with skin lesions. Most hemangiomas require *no treatment* and will spontaneously regress . In *severe, multifocal*, or *large* lesions, *prednisone* may be useful if not respond to *interferon alfa-2b*.

Differential diagnosis

- ***Swallowed maternal blood*** . Method to distinguish is the Apt test, is *valid for first few months* as fetal hemoglobin decreases .

performed using *emesis or stool. One milliliter of emesis is mixed with 5 mL of water* and centrifuged *One milliliter of supernatant is added to 4 mL of 1% sodium hydroxide*. *After two minutes Fetal* hemoglobin is *resistant to alkaline* remains *red or pink*, while *adult* hemoglobin discolors *to brownish yellow*

- ***Epistaxis*** – *History of epistaxis*. Inspection of the nares for evidence of venous injury of the anterior medial septums.

- ***Substances that resemble blood*** – *Red food* colorings and dyes , as *Jello*, *tomatoes* and *strawberries*, may give the appearance of blood in emesis. *spinach* , *licorice, bismuth , iron* may cause the stool to appear black.

Suspected from history, *and* *fecal occult blood test* detects *different portions of the hemoglobin . The effectiveness* dependent upon *the stability* of these respective components in the intraluminal environment. In a study the *Hemoquant* was found to be most effective, measuring *heme and its product, porphyrin*, whereas the substrates needed *for immunochemical tests and guaiac (antigen sequences and intact heme-iron compound, respectively)* are potentially destroyed by duodenal enzymes causing false negatives.

- ***Medical child abuse*** –Administration of blood or blood-like substance to simulate UGI bleeding, should be considered in patients with unexplained GI bleeding.

TABLE 44.2B-2 Etiologies of Upper Gastrointestinal Bleeding in Children by Age Group, in Relative Order of Frequency

Newborn	Infant	Child–Adolescent
Swallowed maternal blood	Stress gastritis or ulcer	Mallory–Weiss tear
Vitamin K deficiency	Acid-peptic disease	Acid-peptic disease
Stress gastritis or ulcer	Mallory–Weiss tear	Varices
Acid-peptic disease	Vascular anomaly	Caustic ingestion
Vascular anomaly	Gastrointestinal duplications	Vasculitis (Henoch–Schönlein purpura)
Coagulopathy	Gastric/esophageal varices	Crohn disease
Milk-protein sensitivity	Duodenal/gastric webs	Bowel obstruction
	Bowel obstruction	Dieulafoy lesion, hemobilia

CLINICAL PRESENTATION of UGI bleeding

- ***Hematemesis*** – *Bright red* blood usually indicates *brisk* or very *fresh* bleeding. *Coffee ground-like* indicates a slower rate of bleeding because this appearance is caused by the effect of gastric acid on blood.

- ***Stool*** – *UGIB* tends to be associated with *melena* (*dark red or black and sticky stools)*and *LGI* with *hematochezia* (*bright red* in color).

Howeve *melena* can be seen with *proximal LGI* bleeding and hematochezia can be seen with *massive UGI* bleeding. Because of *short intestinal transit time*, *neonates* and infants with UGI bleeding are more likely than adults to present with hematochezia.

The initial evaluation

- ***The initial evaluation*** start with an assessment *of hemodynamic stability* and *resuscitation*. Diagnostic studies follow, with the goal of diagnosing *the cause* of the bleed.

- ***Immediate therapy*** is aimed at correction of *volume loss* and *anemia*, include aggressive fluid and blood resuscitation. If the patient remains unstable after a blood transfusion *of approximately 85 mL/kg or greater*, emergency exploratory *surgery* is indicated.

- ***Surgical consultation*** is mandatory in any case *of severe* UGI bleeding.

- ***in severe UGI bleeding in children*** ,*varices, ulcers penetrating into an artery*, or *mucosal tears into arterial vasculature must* be considered.
- ***overexpansion*** of blood volume may worsen variceal bleeding

Initial assessment and resuscitation

- ***Vital signs***, including the *heart rate*, *blood pressure*, *orthostatic* changes, and *capillary refill*, are used to assess and monitor the hemodynamic state of the patient.

- ***Significant gastrointestinal bleeding*** will be *initially manifest by tachycardia*, whereas *hypotension occurs later*, an ominous signal of impending *cardiovascular collapse*

- ***Patients with hemodynamic instability*** (*shock, orthostatic hypotension*) should be admitted to *an intensive care unit*.

- Such patients *should be stabilized prior to endoscopy*.

- ***Gastroenterologist and a surgeon*** should be notified promptly of all patients with *severe acute* UGI bleeding.

Clinical features suggesting a severe UGI bleed

- ***Melena*** or ***hematochezia***.
- ***Heart rate >20 beats*** per minute above the mean heart rate for age.
- ***Prolonged capillary refill time***.
- ***Decrease in hemoglobin of more than 2 g/dL***.
- ***Need for fluid bolus***.
- Need for ***blood transfusion*** (given if **hemoglobin <8 g/dL**).

Obtaining intravenous (IV) access can be difficult, especially in severely volume-depleted patients. ***Intraosseous fluids*** *or* ***central venous*** access may be required in this setting

History —

- ***Time course*** of the bleeding episode, ***estimated blood loss***, and ***any associated symptoms*** .

- ***Hematemesis***, ***melena*** *or* ***hematochezia*** should be documented; these provide clues about *the source and rate of bleeding*.*Melena produced by 50–100 mL of blood in the stomach, may persist for three to five days*.

- ***GI symptoms*** including dyspepsia, heartburn, abdominal pain, dysphagia, and weight loss. In infants, these features may be reflected *in poor feeding and irritability*.

- ***liver disease symptoms*** Recent onset of jaundice, easy bruising, or change in stool color

- ***Epistaxis***, to investigate the possibility of a nasopharyngeal source of bleeding

- ***Bruising or bleeding***, disorder of coagulation, platelet dysfunction, or thrombocytopenia

- ***Personal or family history*** of liver, kidney, or heart disease, or coagulation disorders

- ***Drug history*** NSAIDs and corticosteroids , ibuprofen can cause gastric ulcers and hematemesis. Alcohol , tobacco , caffeine can promote acid secretion and dyspepsia

- ***Cardiac condition*** that affects homeostatic responses (such as beta-adrenergic antagonists) because these may *mask tachycardia associated with life-threatening hypovolemia and shock*.

Physical examination

- ***Skin and mucus membranes*** for *bruising*, *petechiae*, or mucosal bleeding ,*vascular malformations*. suggest a bleeding disorder ,ITP, trauma, or liver disease. The presence of cutaneous hemangiomas (*especially five or more*) suggests the possibility of GI hemangiomatosis

- ●***Abdominal examination*** for evidence of *portal hypertension*, splenomegaly or prominent cutaneous *abdominal and hemorrhoidal vessels* and a *protruding abdomen*

- ***Nasopharynx*** for evidence of *disrupted mucosa* or inflamed tonsils suggesting the possibility of a nasopharyngeal rather than UGI bleed.

- ***In unexplained GI bleeding*** , *nasogastric* or *orogastric tube* lavage is *indicator of UGIB* and the *bleeding is ongoing .*

A clear aspirate does not eliminate a duodenal bleeding source. *saline lavage is no longer recommended. It has been shown to be ineffective in slowing UGI bleeding in animal models and has the theoretic* potential of causing *hypothermia and electrolyte abnormalities in infants.*

Laboratory evaluation

- ***CBC*, coagulation studies, *LFT*, *BUN*, and *creatinine*, *Type and cross-match*.** For patients with epigastric abdominal pain, pancreatitis also should be ruled out with screening ***amylase and lipase***.

- *BUN* can be helpful for confirming the ***source of bleeding***. An increase in BUN in the absence of kidney disease is consistent with a UGI rather than LGIB source of because blood in the proximal GI tract has relatively more time to be absorbe***. However, a normal or low BUN does not rule out a UGI bleed***.

Abdominal ultrasound

- Evaluate ***splenomegaly*** and ***portal hypertension***.

- Should be performed in patients with severe acute UGI bleed suggestive of ***variceal bleeding***, known or suspected *liver disease*, or those with signs of ***portal hypertension*** on examination (eg, splenomegaly, prominent abdominal wall vessels).

Imagin

- ***Plain radiographs*** helpful to identify ***a foreign body*** .

- Evaluate for ***bowel obstruction, perforation*** in patients with significant abdominal pain, distension, or tenderness.

UGI barium studies

- ***should not be performed*** in the setting of UGI bleeding, *because the contrast will interfere with subsequent endoscopy, angiography, or surgery.*

Endoscopy

- For both ***diagnostic*** *and* ***therapeutic purposes***.
- ***preferred method*** to evaluate the ***source*** of bleeding in ***90% of cases***.
- ***Indicated*** for assessment of ***Brisk bleeding*** is suggested by *grossly bloody emesis* or *large volumes of blood in NGT,* or *drop in hemoglobin, requiring transfusion* *or* ***unexplained recurrent bleeding***.
- ***Diagnosis*** **of mucosal lesions** *such as gastritis, esophagitis, peptic ulcers, and Mallory-Weiss*
- *In some cases, the source of the bleeding can be treated through the endoscopic procedure.*
- Generally *after* the patient is ***stabilized*** *and within* ***24 to 48 hours*** of GI bleeding.
- *Most UGIB* in ***children stops spontaneously***; thus, ***emergency endoscopy*** is indicated only when the *findings will influence a clinical decision*, such as the need ***for medical or surgical*** therapy.
- ***contraindicated*** if the patient is *clinically unstable,* such as *in shock, hypovolemia, myocardial ischemia, or profound anemia*
- *Endoscopy is also an important diagnostic tool in neonates. These devices allow for endoscopy to be performed in neonates as small as 0.9 kg.*

Angiography

- An alternative ***to endoscopy*** to find ***a source*** in patients with *massive* ***bleeding*** in whom ***endoscopy is unsuccessful*** for both ***diagnosis and treatment***.

- The rule of thumb is that the bleeding must ***be at least 0.5 mL/min*** to be detected by angiography.

- ***Hemobilia*** is a very unusual although appropriate indication for angiography over upper endoscopy.

- ***Therapeutic purposes , embolization of the bleeding vessel, vascular anomalies, some ulcers***

Embolization may also serve as an alternative to surgery after failed endoscopic measures, particularly in patient who are considered poor surgical candidates.

- ***Transjugular intrahepatic portosystemic (TIPS) shunts offer an alternative to surgical therapy in some children with variceal bleeding***

Radionuclide imaging

- ***Tagged red blood cell scan*** also can be used to detect an obscure bleeding *source* for patients with very *brisk bleeding*.

- ***Technetium-labeled bleeding scans*** and ***sulfur colloid scans*** are helpful in the diagnosis of *obscure bleeding in the small bowel*.

- ***Technetium 99 m-labeled red blood cell scans*** detects active bleeding at a rate of 0.20 mL/min. This scan is *noninvasive*, detects both *arterial and venous* bleeding, and allows for imaging over *a prolonged period* of time, making this helpful for detecting *intermittent bleeding*.

- However, it may give ***an imprecise anatomic location*** of the bleeding and *is not appropriate in the acute setting*, limiting its usefulness. Therefore, in UGI bleeding, *upper endoscopy is far superior for evaluation of bleeding above the ligament of Treitz.*

CT Angiography

- ***Multidetector CT Angiography*** can be used during an *active episode* of gastrointestinal bleeding.Its threshold for detecting bleeding has been reported as low at *0.35 mL/min*. Its *sensitivity for detecting active bleeding is 91%-92%* whereas its sensitivity for *obscure bleeding is 45%-47%.*

- Ability to evaluate the *location of bleeding*, its *vascular supply*, and *surrounding vascular anatomy* prior to intervention. One advantage of CT angiography over endoscopy is *its ability to evaluate the extraluminal vasculature associated with the bleeding vessel*.

- ***It is limited*** in detecting *intermittent hemorrhages* as well as other limitations such as requiring *intravenous contrast* and *high doses of radiation*.

THANK YOU