Peptic Ulcer Hemorrhage

Description/Etiology
A peptic ulcer is an erosion of the mucosal lining of the esophagus, stomach, or duodenum, whereunder normal conditions a physiologic balance exists between gastric acid secretions and gastroduodenal mucosal defenses. Peptic ulcer occurs when the balance between aggressive factors (e.g., nonsteroidal anti-inflammatory drugs [NSAIDs], Helicobacter pylori infection, alcohol, acid) and defensive mechanisms (e.g., mucus, mucosal blood flow, epithelial renewal) is disrupted, resulting in mucosal injury (for more information, see Quick Lesson About ... Peptic Ulcer: an Overview). The majority of peptic ulcers are caused by H. pylori infection and the most common causes of peptic ulcer hemorrhage (PUH) are oral NSAIDs (e.g., naproxen, aspirin, celecoxib), antiplatelet agents, anticoagulants, and corticosteroids. Because the majority of peptic ulcers develop in the duodenum, most PUHs are secondary to erosion of the gastroduodenal artery and its branches; stomach PUH commonly originates from the left gastric artery and its branches.

Treatment for PUH often requires emergency diagnostic upper endoscopy with possible endoscopic hemostasis (i.e., a technique for hemorrhage control performed through the endoscope) and rarely, surgery. Endoscopic treatment can be divided into injection, thermal, and mechanical techniques. Injection of diluted EPINEPHrine alone is now considered inadequate; instead it is used in combination with a second method to induce thrombosis by injecting thrombin or fibrin glue (sealant) into the artery; this can reduce the rebleeding rate from 18.4% to 10.6%. For monotherapy (i.e., versus a second-look endoscopy, which is indicated based on the outcome of first endoscopy), either thermocoagulation or electrocoagulation should be used. Mechanical therapy includes metallic hemoclips or endoclips applied to both sides of a blood vessel for immediate blockage of bleeding; this method is less effective with chronic ulcers and clips can be dislodged within one day of application. Nonemergent treatment includes antibiotic therapy to treat H. pylori infection and proton pump inhibitors (PPIs) or H2-receptor antagonists to reduce stomach acid. High-dose PPIs have not been shown to be more effective at preventing rebleeding than standard doses. Hematemesis, shock, need for multiple transfusions, family history of peptic ulcer disease, and comorbidities (e.g., respiratory disease, liver disease, cancer, cardiovascular disease) are associated with poor prognosis.

Facts and Figures
Hemorrhage is the most common complication of peptic ulcer disease and accounts for 40–55% of all cases of acute upper GI bleeding. The estimated annual incidence of PUH is 48–160 cases per 100,000 adults. The incidence of peptic ulcer disease has changed from predominance in males, to similar rates in females, where lifetime prevalence is approximately 11–14% in men and 8–11% in women. Up to 20% of patients present with bleeding or other peptic ulcer complications without prior signs or symptoms of peptic ulcer disease. The need for surgical intervention for PUH has declined appreciably over the past two decades with the advent of endoscopic procedures and recognition of H. pylori’s role in peptic ulcer development. Currently, an estimated 8–15% of the patients require surgery after failed endoscopic treatment. Advances in medical and endoscopic treatments have resulted in improved survival in patients with PUH; the current mortality rate for patients with acute upper GI bleeding is 2.4–5%.
Guariso and Gasparetto (2012) indicated that peptic ulcer disease in children is reported worldwide, though the prevalence is relatively rare compared to adults, estimated at 8.1% in Europe and 17.4% in the US. Similar to adults, common causes of peptic ulcers in children are *H. pylori* infection and the use of NSAIDs, resulting in bleeding in an estimated 17.4% cases of the insured pediatric patients.

The modified Forrest classification is often used to categorize endoscopic appearance of bleeding ulcers, and predicts the risk of recurrent bleeding without endoscopic treatment. Level I ulcers are active bleeders, which have an 81% risk of recurrent bleeding. Level IIa and IIb ulcers have visible vessels or clots and a 39% risk of recurrent bleeding. Level III ulcers have a clean base and a 22% risk of recurrent bleeding.

**Risk Factors**

Risk factors for PUH are the same as for peptic ulcers, including malignant diseases (e.g., mastocytosis, basophilic leukemia), congenital malformations of the stomach or duodenum, and factors that increase gastric acid production and susceptibility to *H. pylori* infection (e.g., drugs; recent major surgery, severe injury, burns, or head trauma; radiation therapy; foods or beverages [e.g., alcohol, caffeine, fruit juice], smoking). Persons > 60 years with peptic ulcer are at higher risk for PUH, in part because of their disproportionate use of NSAIDs (estimated to be responsible for ≥ 50% of peptic ulcers in older persons). Peptic ulcer disease can develop in Zollinger-Ellison syndrome (i.e., a disorder that causes excess gastrin production and subsequent abnormal amounts of gastric acid). Although stress is no longer considered to be a cause for ulcers, some patients complain about increased pain associated with stress. In addition, stress might predispose people to ulcer development or prevent the healing process of an existing ulcer.

Several risk assessment scores have been published to categorized patients with acute upper gastrointestinal bleeding. The Rockall score combines pre-endoscopy clinical parameters (e.g., tachycardia, hypotension, hemoglobin < 8 g/dL, nasogastric aspirate of red blood/coffee ground), and endoscopic findings. The Glasgow Blatchford score is based solely on clinical parameters. Both scores are used to predict the need for intervention, though the Glasgow Blatchford score is superior in accurately identifying patients who do not need hospital admission (i.e., when Glasgow Blatchford score = 0).

**Signs and Symptoms/Clinical Presentation**

PUH is associated with ill appearance, pain (i.e., most common symptom, often localized in the epigastrium and described as a burning sensation), dizziness, syncope, hematemesis, “coffee grounds” vomitus, melena (i.e., black, tarry stool), hematochezia (i.e., maroon-colored stool), weakness, thirst, and sweating. Up to 80% of PUHs resolve spontaneously. Rebleeding occurs in 20–25% of cases; 80–90% of cases of rebleeding occur within 48 hours of hemorrhage resolution.

**Assessment**

› **Patient History**
  • Ask about individual and family history of peptic ulcer disease and gastritis, comorbid conditions, recent use of aspirin or other NSAIDs, smoking, and whether diet includes irritating foods or alcohol

› **Physical Findings of Particular Interest**
  • The initial physical examination aims to rapidly identify patients in hemorrhagic shock. Hemodynamic stability should be determined upon presentation, followed by continuous close monitoring based on patient’s condition. Blood pressure (BP), pulse, and/or oxygen saturation might be labile, depending upon patient’s position (upright vs. supine)
  • Risk assessment should be performed along with initial assessment to categories patients into levels of acuity, and assist crucial decisions such as the timing of endoscopy (i.e., usually within 24 hours from presentation) and level of care

› **Laboratory Tests That May Be Ordered**
  • CBC can indicate anemia
  • Coagulation studies (e.g., PT, PTT) will be ordered to monitor bleeding or for patients taking anticoagulants
  • ↓ mean corpuscular volume (MCV) or ↓ ferritin level can indicate iron deficiency
  • ↑ BUN with normal or ↑ serum creatinine indicates an upper GI bleed
  • Check electrolytes to assess for and monitor imbalances from dehydration. Amylase, lipase, and liver function tests may be ordered if other disorders (e.g., hepatic cirrhosis) are suspected
  • Examination of stool can show gross or occult blood
  • Antibody or urea breath test can diagnose *H. pylori* infection
  • Blood typing and crossmatching will be performed for probable blood transfusion
Other Diagnostic Tests/Studies
• Upper endoscopy (e.g., esophagogastroduodenoscopy [EGD]) can visualize the stomach and duodenum to assess for hemorrhage location, perform biopsy to assess for *H. pylori*, and stop the hemorrhage
• Abdominal CT scan or MRI scan can be ordered to assess for gastric perforation or obstruction
• Chest X-ray might be ordered to detect free abdominal air, when perforation is suspected
• Biopsy or cytology brushing can be performed during endoscopy to distinguish between simple ulceration and cancer

Treatment Goals

Resuscitate and Maintain Optimum Physiologic Status
• Intensively monitor vital signs, assess all physiologic systems, and review laboratory/diagnostic study results; immediately report abnormalities and treat, as ordered
• Infuse prescribed normal saline or lactated Ringer’s solution to restore or maintain BP (e.g. systolic BP 100–140 mm Hg and diastolic BP 60–90 mm Hg)
• Administer prescribed blood products if vital signs remain unstable
  – A restrictive transfusion approach is recommended since massive transfusion is associated with dilutional coagulopathy. Thus, the consequences of anemia should be weighed carefully against the risks associated with blood transfusion
• Monitor intake and output and maintain adequate hydration
• Administer I.V. PPI (e.g., omeprazole, pantoprazole), H2-receptorantagonist (e.g., ranitidine), or antibiotics for *H. pylori* infection, as prescribed. Monitor treatment efficacy and for adverse reactions; consult a drug information resource for a complete list
• Assess fall risk due to weakness from hemorrhage, and maintain patient safety (e.g., airway, circulation, injury prevention)
• Follow facility pre- and posttreatment protocols if patient becomes a candidate for surgery or endoscopy; reinforce pre- and post treatment education and verify completion of facility informed consent documents
  – Frequently assess procedure/operative site for bleeding, infection, and edema; change dressings, as ordered
  – Assess for pain and other posttreatment symptoms; provide analgesics and other symptomatic relief, as ordered
  - Postsurgical events can include weight loss, poor digestion, anemia, reactive hypoglycemia, and bilious vomiting
• Assess fall risk due to weakness from hemorrhage, and maintain patient safety (e.g., airway, circulation, injury prevention)

Promote Emotional Well-Being and Educate
• Assess patient’s anxiety level and coping ability; educate and encourage discussion about peptic ulcer-related hemorrhage etiology, risk factors, prevention strategies, treatment risks and benefits, potential complications, ongoing medical surveillance, and individualized prognosis
• Request referral, if appropriate, to a
  – mental health clinician for counseling on strategies for coping with a life-threatening condition
  – social worker for identification of local resources for in-home services and support groups
  - Assess availability of support system, and involve social services, if appropriate

Food for Thought
• Aspirin can damage the gastric mucosa both by direct contact and through systemic prostaglandin inhibition; enteric-coated tablets do not significantly reduce mucosal injury
• Smoking contributes to PUH etiology by slowing tissue repair
• Despite the developments in the treatment of peptic ulcer disease (e.g., advanced endoscopic therapy, improved medical management), the high prevalence of *H. pylori* infection and the increasing use of NSAIDs has resulted in the increased rates of peptic ulcer complications in older adults
• Research suggests a heredity component, which is supported by the reported incidence that > 20% of the patients diagnosed with peptic ulcer disease have a family history of duodenal ulcers

Red Flags
• Unstable vital signs (i.e., orthostatic vital signs may help identify patients with a significant blood loss) can indicate a major hemorrhage and hemorrhagic shock, and are associated with a poor prognosis
• PUH can recur even after surgery
  • Patients with acute coronary syndrome are an especially high risk group, since many of them are receiving antithrombotic drugs (e.g., bivalirudin [Angiomax]), which often cannot be stopped
Late presentation and diagnosis of bleeding upper GI ulcers is not uncommon in older adults, since up to 26% of the patients have a nonspecific or no symptoms. Consequently, a diagnostic tool in the form of questionnaire (e.g., UEGISQUE, a 15-item questionnaire evaluating five groups of symptoms such as abdominal pain, reflux, and bleeding) was developed specifically for the older patients to minimize the risk of misdiagnosis.

**What Do I Need to Tell the Patient/Patient’s Family?**

- Reassure the patient that the vast majority of PUHs resolve spontaneously
- Advise the patient to avoid drugs that can increase risk for GI bleeding, alcohol and tobacco products, and acidic foods/beverages that can irritate the stomach and increase acid production
- Provide the patient with verbal and written information about his or her health status and treatment options; address any questions or concerns that patient/family members may have

### References