

# ADVANCES IN ENDOSCOPY

Current Developments in Diagnostic and Therapeutic Endoscopy

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## Immediate Unprepared Hydroflush Colonoscopy for Management of Severe Lower Gastrointestinal Bleeding



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### **G&H** How common is severe lower gastrointestinal bleeding?

**RW** Lower gastrointestinal (GI) bleeding, which has traditionally been defined as bleeding distal to the ligament of Treitz, is common, accounting for one quarter to one third of all hospital admissions for overall GI bleeding. Severe lower GI bleeding is less common, with an annual incidence of 20–30 cases per 100,000 individuals. Moreover, the estimated incidence of severe lower GI bleeding may be overly conservative because of increasing patient comorbidity and more widespread use of anti-coagulants and potent antiplatelet medications. Patients with severe GI bleeding are admitted to the intensive care unit (ICU) with signs of hemodynamic instability and major GI blood loss. In 2001, diverticular bleeding, the most common etiology of acute lower GI bleeding, accounted for approximately \$1.3 billion in healthcare costs in the United States, and this figure will likely be even larger in 2013.

### **G&H** How is lower GI bleeding usually managed?

**RW** When patients present with mild-to-moderate lower GI bleeding, they are usually admitted to a general medical ward in the hospital, where they are resuscitated with blood/blood products and are given a standard oral bowel preparation (usually 4–6 L of polyethylene glycol solution) in preparation for elective colonoscopy the following day. The goals of this colonoscopy are to examine the colon and to identify and treat the source of bleeding.

On the other hand, for patients with severe acute lower GI bleeding, current guidelines recommend urgent colonoscopy as soon as possible after ICU admission and after resuscitation. Several studies have shown that urgent colonoscopy increases diagnostic yield, reduces the patient's hospital stay, and, potentially, decreases the cost of hospitalization (due to faster diagnosis and treatment). One nonrandomized study also demonstrated that urgent colonoscopy decreased the incidence of recurrent bleeding and need for surgery. Urgent colonoscopy traditionally involves a rapid bowel preparation (rapid purge), in which 1 L of polyethylene glycol solution is administered every 30–45 minutes. The median volume of polyethylene glycol solution used for rapid purge is 5.5 L (range, 4–14 L). Drinking such a large volume of fluid in a short time is often difficult for patients with severe lower GI bleeding, particularly since many of these patients are elderly. In fact, up to one half of these patients require a nasogastric tube for the administration of the bowel preparation because they start vomiting and cannot drink fast enough. After several hours of drinking this bowel preparation, the bowel has been cleaned and the blood has been evacuated from the colon; subsequently, the endoscopist can perform an urgent colonoscopy to find and treat the source of bleeding.

### **G&H** What is the role of radiologic studies in the management of these patients?

**RW** In clinical practice, urgent colonoscopy following a rapid purge is not widely utilized and remains controversial. Often, when patients present with severe acute lower

GI bleeding, radiologists are asked to perform studies such as tagged red blood cell bleeding scans, computed tomography angiograms, or mesenteric angiography.

However, if patients are not actively bleeding at the precise time of a radiologic study (regardless of the type), it will yield a negative result. Often, many hours pass from the patient's initial presentation to resuscitation and to the radiologic study; by this time, the patient may no longer be bleeding. In this respect, colonoscopy has an advantage because it does not require active bleeding at the time of the study for diagnosing patients. As long as the endoscopist finds stigmata of a recent hemorrhage (eg, an ulcer, visible vessel, adherent clot, colitis, mass, or angioectasia), a definitive diagnosis can be made and location of bleeding established.

### **G&H** What is immediate unprepared hydroflush colonoscopy, and how can it potentially help manage severe acute lower GI bleeding?

**RW** Immediate unprepared hydroflush colonoscopy should be considered in patients admitted to the ICU with severe acute lower GI bleeding. In this select group of patients with severe acute bleeding, the large volume of blood in the GI tract acts as a cathartic to clean the colon from stool and debris. Our technique of hydroflush colonoscopy uses endoscopic power-jet water irrigators, which have been more frequently used in endoscopy units in the United States only for the past 5 years or so. Tubing from a small electric pump is attached to the handle of an endoscope to provide high-powered water irrigation to clear away debris, blood, and stool in the colon. The pump is set at the maximum flow rate, which in our study was 500 mL per minute. Before the development of these pumps, water had to be flushed manually with a syringe, which was very tedious.

On an as-needed basis, high-powered mechanical suction devices may also be used to suck debris, blood, and blood clots through the endoscope at a much faster rate than that of standard wall suction. Like the pumps, these mechanical devices have only been available for approximately the past 5 years.

In addition, adult colonoscopes are used; in contrast to pediatric colonoscopes, adult colonoscopes have a larger diameter suction channel that allows for enhanced suctioning of blood and debris.

With hydroflush colonoscopy, no oral bowel preparation is needed; instead, three 1-L tap water enemas are administered per rectum every 20 minutes for a total time of approximately 1 hour. This is in contrast to urgent colonoscopy, which uses a much larger volume bowel preparation that has to be administered

orally (or via nasogastric tube) and that takes several hours to complete; thus, hydroflush colonoscopy can reduce the time between admission and diagnosis. Theoretically, the closer the time between the onset of bleeding and endoscopy, the higher the diagnostic yield of endoscopy. While patients receive enema bowel preparation, they are also resuscitated with blood products and intravenous crystalloid. Following the tap water enemas and resuscitation, an unprepared (ie, without oral preparation) colonoscopy is performed at the patient's bedside in the ICU in order to find and treat the source of bleeding.

Finding the bleeding site allows the endoscopist to determine the cause of bleeding (eg, diverticular disease, angioectasia, ulcer, colitis, or cancer), localize the source of bleeding, and immediately treat the site with standard endoscopic therapy, such as epinephrine injection, clipping, and thermal therapies. Moreover, the endoscopist tattoos the site with a sterile suspension of carbon particles, so it is easy to find the bleeding site if the patient starts to rebleed. In addition, if the patient needs surgery, the surgeon might be able to limit resection of the colon (such as segmental colectomy) to only the tattooed area instead of performing an almost complete subtotal colectomy. The latter is a major surgery, particularly in older patients, which comprise many patients with severe lower GI bleeding. If clips have been placed and angiography is needed, the location of the clips on radiograph can indicate where the radiologist should focus, particularly if active bleeding is absent. In this regard, the endoscopist may wish to consider both tattooing and clipping the bleeding site.

### **G&H** Could you discuss the findings of your study on this technique?

**RW** My colleagues and I recently conducted an uncontrolled, nonrandomized, feasibility study at our tertiary care institution. We performed 13 unprepared hydroflush colonoscopies in 12 patients with severe acute lower GI bleeding. These patients had severe blood loss; their mean blood transfusion requirement was 6.7 units of packed red blood cells transfused per patient (range, 2–20 units transfused). This is in contrast to patients with mild-to-moderate lower GI bleeding, who may only require transfusion of 1 or 2 units of blood or none at all if bleeding is limited. An esophagogastroduodenoscopy was performed prior to colonoscopy if there was clinical suspicion of acute upper GI bleeding.

A definite bleeding source was found in 5 of the 13 procedures (38.5%). The median length of ICU stay was 1.5 days, and the median length of hospital stay was 4.3 days. Twenty-five percent of patients (3/12)

experienced recurrent bleeding during the same hospitalization that required repeat endoscopy, surgery, or angiography. This rebleeding rate is similar to that of urgent colonoscopy in published randomized studies. In all 12 patients, the endoscopist was satisfied with the colonoscopy and no procedure had to be repeated due to inadequate bowel preparation.

#### **G&H** How receptive were the patients to this technique?

**RW** At the end of the study, the patients were asked if they preferred bowel preparation with tap water enemas or oral polyethylene glycol solutions, which many of the patients had used to prepare for screening and surveillance colonoscopies. All patients that experienced both types of bowel preparation said that they preferred tap water enemas because the large-volume oral preparations often made them sick.

#### **G&H** Thus far, have there been any other studies examining this technique?

**RW** My colleagues and I were the first to describe this particular technique and to coin the name “hydroflush colonoscopy.” There have been prior publications over a decade ago describing the use of colonoscopy in an unprepared colon for management of acute lower GI bleeding. However, the prior technique had not been accepted, as it utilized manual flushing with syringes that could only hold 60 mL of water, which was very time-consuming and exhausting. In addition, high-powered mechanical suction devices were also not available at that time.

#### **G&H** Are there any other advantages associated with the use of the hydroflush technique over other methods of managing severe lower GI bleeding?

**RW** The hydroflush technique also helps endoscopists locate what we have termed as a “demarcation zone.” For example, if bleeding originates from the splenic flexure, the endoscopist may find blood distal to this area and stool proximal to it. The so-called demarcation zone thus represents the border between the bleeding site (below or distal) and areas that are not bleeding (above or proximal). The demarcation zone may not always be present, but if it is present, it allows the endoscopist to focus on the segment of colon distal to it. Demarcation zones do not occur with standard oral bowel preparations, which involve such a large volume that the entire colon is cleaned.

#### **G&H** What risks and limitations are associated with hydroflush colonoscopy?

**RW** My colleagues and I currently use the hydroflush technique in many ICU patients who present with severe acute lower GI bleeding. Based on our experiences, this technique does not appear to add any additional risks to those associated with urgent colonoscopy. There were no procedure-related complications in our study.

The main limitation with hydroflush colonoscopy is that it does not completely clean the bowel, although this can also be beneficial, as it can lead to the development of a demarcation zone, as discussed above. Endoscopists must be selective when deciding which patients should undergo this technique (ie, selected patients should have severe bleeding, be in the ICU, have hemodynamic compromise, and require the transfusion of multiple units of blood). That explains why patients in our study had a mean of 6.7 units of blood transfused. In this selected patient population with severe bleeding, hydroflush colonoscopy is adequate for locating the bleeding site. This technique should not be used in patients who have only mild-to-moderate bleeding because there would not be enough blood to act as a cathartic to clean the colon; thus, the colon would be full of stool, which would make it difficult to perform a colonoscopy. If the hydroflush technique is used in selected patients with severe acute lower GI bleeding in the ICU, there is a good chance that the endoscopist will be able to identify and treat the site of bleeding.

#### **G&H** How difficult is it to perform hydroflush colonoscopy?

**RW** It is not a difficult technique to master. Although there is a learning curve with hydroflush colonoscopy, endoscopists who are experienced in managing acute GI bleeding should not have much difficulty performing this procedure. The most challenging part for endoscopists may be adjusting their expectations for bowel preparation. That is, endoscopists are generally used to performing screening and surveillance colonoscopies for colon polyps and cancer, in which the colon is expected to be thoroughly cleansed of stool and debris. With the hydroflush technique, the goal is different—to identify and treat a bleeding site—which does not require having a completely clean bowel. In our study, the colonoscopy reached the cecum in approximately 69% of procedures (9/13) because the endoscopist went only as far into the colon as needed in order to identify and treat the source of bleeding.

#### **G&H** What are the next steps for research in this area?

**RW** The next step is to conduct a large, prospective, multicenter, randomized, controlled study comparing

the hydroflush technique to more traditional methods of managing severe acute lower GI bleeding (eg, urgent colonoscopy and radiologic methods).

### Suggested Reading

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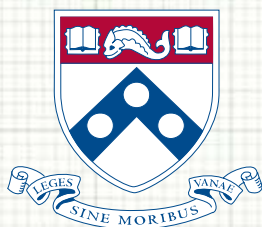
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