

Early detection of GI bleeding: “starting the clock for the capsule drop”



Detecting the source of GI bleeding (GIB) in patients who present to the emergency department (ED) and deciding on immediate management strategies has challenged clinicians for decades. This process demands an early assessment of the bleeding descriptor, patient comorbidities, prior endoscopic and radiographic evaluation, physical examination, hemodynamics, and laboratory data. Although guidelines¹ and scoring systems^{2,3} exist, they are imperfect, and standard evaluation can be non-diagnostic as frequently as 20% of the time. Recommendations for initial management emphasize volume resuscitation, hemodynamic monitoring, proton pump inhibitor (PPI) therapy, and management of antithrombotic medications, all in preparation for endoscopic evaluation, which generally occurs within 24 hours.⁴⁻⁶

This standard management, although reasonable, can lead to delay of endoscopy, and a delay can obfuscate certain GIB lesions that have intermittent bleeding patterns such as diverticula, Dieulafoy's lesion, angioectasias, or even peptic ulcer disease, which can appear less acute with aggressive PPI therapy before endoscopic evaluation.

Studies have established that emergency video capsule endoscopy (VCE) after negative results from bidirectional endoscopy can produce higher diagnostic yields.⁷ A small study by Shlag et al⁸ showed an alternative approach of using endoscopically placed emergency VCE in patients with acute bleeding after a nondiagnostic emergency EGD, leading to a 75% diagnostic yield of both small bowel and colon sources. Using VCE as the initial emergency investigation in acute GIB, however, has been less commonly studied. Sung et al⁹ performed a 71-patient randomized controlled trial (RCT) feasibility study of patients in hemodynamically stable condition with suspected upper GIB, in which early real-time VCE (PillCam ESO 2, Medtronic, Minneapolis, Minn) was used solely to visualize the upper GI tract. They reported successful reduction in ED admission by 80% for upper GIB without increased risk of recurrent bleeding or 30-day mortality.⁹ Only esophageal video capsules were used, and these assessed upper GI bleeding exclusively.¹⁰

In the current issue of *Gastrointestinal Endoscopy*, the study by Marya et al¹¹ designed an RCT that queried

whether early VCE (EVCE) in patients presenting with nonhematemesis GIB could improve bleeding source localization compared with standard of care (SOC). The investigators hypothesized that EVCE would improve diagnostic efficiency by providing earlier evaluation of the GI tract, with improved proximity to the initial bleeding event. The RCT included 87 patients; the majority were white, and the mean age was 70. The baseline patient characteristics between the 2 cohorts were similar with the exception of higher incidences of congestive heart failure and nonsteroidal anti-inflammatory drug use in the SOC group. The patients were screened

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for retention risk, standard contraindications, signs of infection, and American Society of Anesthesiologists (ASA) score of ≥ 4 and were excluded if necessary.

For those randomized to EVCE, the VCE was swallowed, and a research staff used the real-time viewer to evaluate for blood in the stomach. If bleeding or a suspected bleeding source was visualized, the gastroenterology team was expeditiously notified, and the VCE information was used for decision making. If no blood was seen in the stomach, promotility agents were given, and the capsule was checked 8 hours later. Expert VCE readers interpreted the video within 1 hour and notified the gastroenterology team of the results to guide further patient workup. All patients were treated with standard medical therapy, including PPI, intravenous fluids, and blood transfusion, and were followed up for 30 days.

The study's primary outcome was rate of localization of the bleeding source, categorized as foregut, midgut (ampulla to ileocecal valve), and hindgut (colon). The lesions were labeled as a definitive source (with high-risk stigmata) versus presumptive source of bleeding. Of the variables that were studied, multivariate logistic regression showed the timing of the VCE, with a hazard ratio of 2.77 and an odds ratio (OR) of 5.28, as the only strong predictor of the outcome. The variables of age and blood urea

nitrogen, often seen as useful bedside tools, had limited clinical prognostic value (1%-6% increased yield), despite statistical significance. Bleeding descriptors (hematochezia, melena, and iron deficiency anemia) and comorbidities (cirrhosis) had poor predictive value for bleeding source localization, thus highlighting the limitations of these frequently used clinical variables.

The authors confirm that timing was the most significant variable driving the higher likelihood of endoscopic localization in the EVCE group (15 hours earlier than in the SOC group). The >10 OR for vascular lesion diagnosis with EVCE versus SOC also supports timing as a factor in detecting lesions, which can bleed intermittently, and suggests that earlier endoscopy may increase the likelihood of success.

It is important to spotlight the high rates of nondiagnostic evaluation in both groups. The EVCE group had roughly 30% nondiagnostic workup in patients presenting with melena or hematochezia; furthermore, the nondiagnostic rate was even higher for patients presenting with occult bleeding and iron deficiency anemia. The EVCE group, however, had more than 2.7 odds of achieving diagnostic localization compared with the SOC group—a statistic that endorses early VCE evaluation in this context. This finding is also supported by the literature on small-bowel bleeding, which consistently shows a higher diagnostic yield with earlier use of VCE.^{12,13} Future studies of this intervention might include a broader range of high-risk GI bleeding populations, such as patients with recurrent obscure overt GIB, congestive heart failure, postsurgical anatomy, and left ventricular assist devices.

There were several surprising findings: only 3 patients of 87 patients received diagnoses of midgut bleeding, which was less than an expected 5% to 10% of GI bleeding originating in the small bowel. Another unexpected finding was the significantly increased colonic source of bleeding visualized in the EVCE: 13 versus 4 patients in the SOC group (OR 4.09; $P = .03$). It is not clear whether these findings reflect different visualization patterns in studies performed without prior bowel preparation, or a variation on the expected location of lesions in patients presenting with melena. Of the group presenting with melena, 27% had either midgut or colonic bleeding in the EVCE compared with 6% in the SOC group. This interesting finding does not support the common assumption that 90% of melena is from an upper GI source. Given the significant number of colonic bleeding sources in both groups, future investigations may consider the adaptation of a pan-GI capsule after rapid preparation in the ED.

A few practical considerations limit generalized implementation of this ED protocol. In some EDs, the availability of trained capsule readers who can view a video capsule immediately or within 1 hour of video upload is limited, and delay in reading can eliminate the advantage of early capsule intervention. Inexperienced readers are more prone to reading errors. Transit abnormalities and signifi-

cant retrograde peristalsis, for example, are common clinically challenging scenarios for advanced VCE readers, and novice readers may misinterpret the results and request an incorrect endoscopic approach based on faulty localization. The current study was performed in a tertiary referral center with readily available expertise in VCE and small-bowel bleeding.

Concerns about increased costs and off-label use of the VCE are also potentially problematic. Previous authors have suggested that VCE may be cost effective in patients with acute upper GI bleeding.¹⁴ The authors did address the healthcare cost but found no statistically significant difference between the groups. The cost effectiveness of VCE use in the ED for upper GI bleeding in low-risk to moderate-risk patients has been previously been studied; however, data for all types of GI bleeding are lacking. From a practical standpoint, reimbursements from third-party payers or Medicare/Medicaid may not be immediately forthcoming.

Overall, the authors of this study should be applauded for their well-designed trial in researching a common clinical scenario using VCE in an extended indication. In current practice, the capacity to perform endoscopy in the timeliest fashion will certainly increase the yield, especially when we consider intermittent bleeding from transiently visible vascular lesions. With emerging technology and newer capabilities of the VCE to image the entire GI tract, this innovative approach to the evaluation of emergency GI bleeding will benefit from future studies to test noninvasive endoscopy as a first-line algorithm in the diagnostic evaluation of GIB.

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Abbreviations: ED, emergency department; EVCE, early video capsule endoscopy; GIB, GI bleeding; PPI, proton pump inhibitor; RCT, randomized controlled trial; SOC, standard of care; VCE, video capsule endoscopy.

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