

# ADVANCES IN ENDOSCOPY

Current Developments in Diagnostic and Therapeutic Endoscopy

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## Capsule Endoscopy in Patients with Iron Deficiency



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**G&H** Could you outline the treatment algorithm for patients with unexplained iron deficiency and stools that are negative for occult blood?

**RE** Many patients with iron deficiency do not have any evidence of bleeding. Many of these patients are given iron supplements by their primary care physicians. The first step for management of these patients is for the physician to obtain a thorough patient history and to administer a complete physical examination, and both of these tools should be performed with the goal of determining whether there is an obvious cause of blood loss that requires primary therapy. The 3 main causes of iron deficiency are decreased iron intake (particularly in vegetarians), menorrhagia (particularly in young women), and gastrointestinal blood loss.

If no cause of bleeding is evident by the patient's history or physical examination, and the physician is concerned about the possibility of gastrointestinal bleeding, symptom-directed procedures are subsequently performed (which, classically, include colonoscopy and upper endoscopy). Other procedures—such as obtaining small bowel biopsies to rule out malabsorption, particularly celiac disease—are also often performed in appropriate individuals. If these tests yield negative findings and the physician is still concerned about the possibility of gastrointestinal bleeding, then capsule endoscopy is the next step in the investigation of iron deficiency. The primary role of capsule endoscopy in this setting is to assess the small intestine.

The age of the patient may also play a significant role in management, as colonic neoplasia is always a significant concern in patients over 40 years of age.

**G&H** Which patient groups with iron deficiency cause the most concern in this setting?

**RE** The group of iron-deficient patients who cause the most concern for physicians are those with new-onset iron deficiency and evidence of either gastrointestinal symptoms or gastrointestinal bleeding (either evidence of overt bleeding demonstrated by bright red blood per rectum or hematemesis or, alternatively, bleeding with occult blood–positive stools).

**G&H** How common is the use of capsule endoscopy in the investigation of patients with iron deficiency?

**RE** Capsule endoscopy has become increasingly common in this setting. It is estimated that obscure bleeding (defined as patients with overt or occult bleeding with negative findings on endoscopic examinations) occurs in 5–7% of hospitalized patients; however, when iron deficiency is considered along with obscure gastrointestinal bleeding, the numbers increase quite dramatically, and use of capsule endoscopy is becoming extremely common in these cases. When a source of bleeding is not found via upper endoscopy or colonoscopy, it is standard practice to perform capsule endoscopy.

Capsule endoscopy is available in Canada at most tertiary care centers, but many of these centers may have restrictions on its use. Many centers may limit the use of capsule endoscopy in patients with iron deficiency unless there is evidence of bleeding (either overt or occult).

### G&H What are the advantages of capsule endoscopy?

**RE** One advantage is that no sedation is required and no preparation is usually needed to perform capsule endoscopy of the small intestine. Some centers administer a bowel preparation to patients who undergo capsule endoscopy to enhance imaging, particularly of the terminal ileum; however, at least in theory, capsule endoscopy can be performed without a preparation to examine the small intestine.

Another advantage is that the procedure is relatively simple: A patient swallows a capsule that takes images and transmits them for 8–12 hours to a data recorder that is worn around the patient's waist. By the end of the procedure, 80–90% of capsules reach the cecum, and the data recorder has taken approximately 50,000 images, which are downloaded to a computer workstation and reviewed in video format.

Recent advances have extended the battery life of some capsules for up to 14 hours, enabling more capsules to reach the colon. Although the images are of variable quality, capsule endoscopy has a very reasonable sensitivity for assessing the small bowel and detecting abnormalities because of the high number of images.

### G&H What are the disadvantages of this procedure?

**RE** One disadvantage is that capsule endoscopy is an all-day test, although patients do not usually stay in the hospital to complete it. Another disadvantage is the potential for the capsule to become impacted or lodged within a narrow area or stricture in the small intestine. This complication can occur because the capsule is not pliable. Patency capsules, which are dissolvable “dummy” capsules, can be administered in these cases, as the passing of a patency capsule within 24 hours ensures that a regular capsule will pass through without consequence.

In addition, a capsule may occasionally have difficulty exiting the stomach, or it may stay in the stomach for its entire battery life. This problem has been partially alleviated by the use of a real-time viewer, which allows clinicians to see the location of the capsule.

### G&H What is the diagnostic yield of capsule endoscopy in the investigation of patients with iron deficiency?

**RE** There has been considerable controversy regarding the use of capsule endoscopy in the setting of iron deficiency. Thus far, the diagnostic yield for small-bowel abnormalities with capsule endoscopy in patients with

chronic iron deficiency and no evidence of bleeding is relatively low. The diagnostic yield of capsule endoscopy in this setting is certainly lower than that of patients with overt or occult bleeding or patients who have negative findings on standard endoscopic examinations.

However, because the small bowel is difficult to access endoscopically and the detection of abnormalities in this area can lead to relatively dramatic management changes, even low-yield procedures can be justified. Therefore, capsule endoscopy is often still performed for the investigation of iron deficiency, even though its diagnostic yield is relatively low. There are many tests in medicine that are commonly used despite having a low yield; if a test can significantly change management and is cost-effective, it can still be worthwhile.

### G&H Could you discuss the findings of the study you and your colleagues recently conducted in this area?

**RE** My colleagues and I recently conducted a retrospective review of our database of all capsule studies performed from 2001 to 2010. The database had a total of 934 capsules; 101 of these capsules in 97 patients were performed to investigate iron deficiency in patients with negative findings on endoscopic examinations and no evidence of overt bleeding. We divided the results of these capsules into 3 groups. One group consisted of patients with incomplete capsule tests ( $n=3$ ). These capsules did not leave the stomach, did not transmit properly, or provided uninterpretable findings due to inadequate preparation. The second group consisted of 69 capsules that had normal findings, and the third group consisted of 25 capsules that had positive findings (positive yield of approximately 26% out of 97 patients), which, at first glance, is a fairly significant rate.

We then examined these positive studies more thoroughly. It turned out that, even though these 25 positive capsule studies had different findings, only 2 patients required treatment other than supportive therapy (ie, iron supplementation or intermittent blood transfusions). Although 7 of these patients had ulcers and 9 patients had erosions, the vast majority of these patients were managed conservatively, and their lesions were, for the most part, within reach of a standard endoscope (ie, these lesions had been missed on previous endoscopies). The only patients in our database who required more aggressive therapy were 1 patient who had a vascular lesion in the small bowel that eventually required surgery and 1 patient who had evidence of Crohn's disease that required more aggressive medical therapy.

Thus, out of the entire group of 101 capsules in 97 patients, only 2 patients required major changes in their

management due to capsule findings. On the other hand, capsules detected many missed lesions that were within reach of a standard endoscope. This finding can be looked at in 2 ways: The capsule was very useful, or, alternatively, there was a significant number of missed lesions on standard endoscopy, so endoscopists should always consider repeating standard endoscopies and should at least ensure that they were performed in an adequate, ideal fashion. We concluded that the actual benefit of capsule study of the small bowel in patients with chronic iron deficiency is extremely low.

**G&H** Based on these findings, would you recommend modification of the current guidelines for the use of capsule endoscopy in the investigation of iron deficiency?

**RE** The current recommendations state that if a patient has iron deficiency and there is a concern for bleeding, the small bowel should be assessed. I still agree with these recommendations. However, endoscopists should be aware that careful, methodical, and thorough standard endoscopic assessments should be performed in these patients, endoscopists should ensure that the procedures are performed in an appropriate manner, and any abnormalities noted on endoscopy should be treated aggressively. Once these abnormalities are treated, capsule endoscopy studies often provide little benefit in the setting of chronic iron deficiency. Nevertheless, capsule endoscopy can be useful for excluding many other disorders and can reassure

patients that long-term iron supplementation or other management strategies for maintaining iron stores are sufficient for their treatment. Thus, I believe that capsule endoscopy still provides a significant benefit for the investigation of patients with iron deficiency, even though it usually does not detect many abnormalities in the small bowel that require treatment.

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

**RE** An area of particular interest is the development of tests that are more sensitive and specific for assessing blood within the stool. Such tests could help guide the management of patients who are bleeding, although it is likely that these tests may still be more sensitive and specific for the colon than the gastrointestinal tract.

### Suggested Reading

ASGE Standards of Practice Committee; Fisher L, Lee Krinsky M, Anderson MA, et al. The role of endoscopy in the management of obscure GI bleeding. *Gastrointest Endosc.* 2010;72:471-479.

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