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Case Report

Use of Video Capsule Endoscopy in the Setting of Recurrent Subacute Small-Bowel Obstruction

Mark Mason, MD,¹ James Swain, MD,¹ Brent D. Matthews, MD,² and Kristi L. Harold, MD¹

Abstract

Hypothesis: Video capsule endoscopy (VCE) can be used to diagnose subacute intestinal obstruction in patients with otherwise negative imaging studies.

Patients and Methods: Nine patients with symptoms consistent with intermittent small-bowel obstruction who received a VCE and ultimately required surgical intervention.

Results: Patients were identified who had symptoms consistent with subacute bowel obstruction and a negative diagnostic work-up prior to VCE. All 9 patients underwent several radiologic and endoscopic examinations with no clear etiology for their symptoms. Ultimately, in every case, a stricture or mass was found to be the cause of the obstruction at either the time of VCE or exploratory laparotomy/laparoscopy.

Conclusions: Patients can have a small-bowel stricture or mass that can cause symptoms of subacute small-bowel obstruction. Diagnosis of the lesion may be difficult in these patients and can often result in multiple nondiagnostic radiologic and endoscopic examinations. VCE can be helpful in finding these lesions, leading to surgical resection of the diseased bowel and a cure for the patient's signs and symptoms.

Introduction

VIDEO CAPSULE ENDOSCOPY (VCE) has been an instrumental tool in the diagnosis of obscure gastrointestinal bleeding. Capsule technology has other potential indications, including hereditary intestinal polyposis and further evaluation of small intestinal inflammatory, absorptive, and infiltrative disorders. As our experience with this imaging modality grows, so do the indications for its use. Historically, patients presenting with signs and symptoms consistent with small-bowel obstruction have been excluded from its use. The most feared complication cited in the literature is capsule impaction necessitating an urgent intervention either endoscopically or surgically. Most of the current literature regarding VCE is from studies where patients with prior abdominal surgery, known or suspected strictures, or abnormal radiographs were excluded. Barkin et al. reviewed the world's experience with VCE and noted that of 937 ingestions, only 7 (0.75%) required a surgical intervention. Of those patients, 6 had an obstruction or stricture, 1 had a bleeding ulcer, and all 7 had a resolution of their symptoms after the operation.^{1,2}

VCE is often used when other imaging modalities fail to delineate the underlying cause of a problem. Patients with a recurrent subacute small-bowel obstruction can present a challenge, because, often, no clear etiology is found on endoscopic or radiologic studies. In this retrospective review of 9 cases, we describe patients who presented with subacute obstructive symptoms and negative imaging, only to be diagnosed through VCE and subsequent surgery.

Patients and Methods

We performed a retrospective chart review from August 2003 to January 2007, identifying patients presenting with symptoms consistent with a small-bowel obstruction and negative imaging who underwent VCE. All patients were then taken for exploratory surgery requiring a small-bowel resection. The Mayo Foundation Institutional Review Board approved this study.

Results

A total of 1205 patients underwent VCE during the study period. Nine patients (0.75%) were identified from

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TABLE 1. ADDITIONAL PATIENT STUDIES

<i>Patients</i>	<i>Work-up/studies prior to VCE</i>	<i>Prior surgery</i>	<i>Capsule passed</i>	<i>Operating room findings</i>	<i>Operation performed</i>
Pt 1 68 y/o F	AXR, enterography, UGI, US, colonoscopy, CT A/P	TAH BSO, open appendectomy	Yes	Small thickened segment with no external findings	Laparoscopy resection of 2 small bowel segments
Pt 2 66 y/o F	AXR, CT A/P, UGI, US, EGD, colonoscopy, enterography	Lap-assisted hysterectomy with postoperative radiation	No	Capsule stuck behind 1 small- bowel stricture	Laparotomy w/small bowel resection
Pt 3 73 y/o F	AXR, colonoscopy, EGD, UGI, CT A/P	TAH BSO	No	Small-bowel adenocarcinoma	Laparoscopic small bowel resection
Pt 4 42 y/o F	AXR, colonoscopy, UGI, CT A/P	None	No	Crohn's disease	Laparoscopic ileocelectomy
Pt 5 80 y/o M	AXR, colonoscopy, UGI, CTA/P, EGD	None (radiation for prostate CA)	No	Radiation enteritis	Laparoscopic ileocelectomy
Pt 6 53 y/o F	AXR, colonoscopy, EGD	TAH BSO, sigmoid colectomy	No	Adhesions, small- bowel stricture	Laparoscopic to open small bowel resection
Pt 7 67 y/o F	AXR, EGD colonoscopy, enterography	Experimental laparoscopy with LOA for obstruction	Yes	Thickened bowel with stricture	Lap to open small bowel resection
Pt 8 73 y/o F	AXR, EGD colonoscopy, CT A/P UGI, enterography	Hysterectomy and radiation, cholecystectomy	No	Small-bowel mass, desmoplastic reaction	Laparotomy, small bowel resection
Pt 9 78 y/o F	AXR, SBFT, colonoscopy,	Cholecystectomy, laparotomy, hysterectomy, radiation	No	Radiation enteritis	Laparotomy, small bowel resection

VCE, video capsule endoscopy; y/o, year old; F, female; AXR, abdominal X-ray; UGI, upper gastrointestinal; US, ultrasound; CT A/P, computed tomography abdomen and pelvis; EGD, esophagogastroduodenoscopy; SBFT, small bowel follow-through; TAH BSO, total abdominal hysterectomy bilateral salpingo oophorectomy; LOA, lysis of adhesions.



FIG. 1. X-ray with a retained capsule.

the database and included in our series. Eight of 9 patients were women with a mean age of 67 years (range, 42–80). All 9 patients underwent extensive imaging to elucidate the cause of their obstructive symptoms. Every patient had abdominal X-rays, computed tomography (CT) scans, and upper and lower endoscopy without a definitive cause of their problem. Additional studies, such as push enteroscopy, small-bowel follow-through, and CT enterography, were performed on a majority of the patients (see Table 1). Of the 8 female patients, all but 1 had previously undergone an abdominal hysterectomy and radiation therapy.

VCE was performed in each patient. Seven patients failed to pass the capsule, but none required an urgent intervention (see Fig. 1). Two patients passed the capsule completely through the small bowel, and the pictures retrieved from the device demonstrated obvious abnormalities, prompting surgery. The average time frame between capsule ingestion and surgical intervention was 2 weeks.

All 9 patients were taken for an exploratory laparoscopy or laparotomy. Of the 8 females that had a previous hysterectomy with radiation, 5 were found to have radiation enteritis with stricturing of the small bowel (see Fig. 2). Two of the 9 patients had tumors of the small bowel causing their symptoms. Patient 3 had a small-bowel adenocarcinoma and patient 8 had a carcinoid tumor. The retained capsule was found immediately proximal to the obstructing lesion in each case. All patients underwent a small-bowel resection, and there were no significant complications as a consequence of the retained capsule and surgery. No unplanned resections or enterotomies were required due to capsule retention. The duration of follow-up ranged from 3 months to 4 years, with no recurrence of obstructive symptoms within our patient population.

Discussion

Due to its minimally invasive nature and ability to directly examine the entire length of the small bowel, VCE is becoming a standard means to evaluate suspected disease of the small bowel.³ The limited ability of conventional endoscopic techniques to evaluate the mid-small bowel has called for an increasing role for the capsule endoscopy. The most common and best validated indication for using VCE is to localize obscure gastrointestinal bleeding.^{4,5} The diagnostic yield for VCE in this setting ranges from 55 to 81%.^{5,6} A recent meta-analysis also compared the yield of capsule endoscopy to other diagnostic modalities in patients with nonstricturing small-bowel Crohn's disease. The researchers found that VCE was superior to all other modalities for diagnosing nonstricturing small-bowel Crohn's.⁷ Additional studies have also shown its usefulness in evaluating nonsteroidal anti-inflammatory drug enteropathy, hereditary intestinal polyposis, and celiac disease.⁶

VCE is generally well tolerated, and complications are rare. The most cited complication is capsule retention, which is defined as the indefinite presence of the capsule in the small bowel, unless an intervention is initiated.⁸ The International Conference on Capsule Endoscopy (ICCE) consensus for capsule retention states that there are no reports of retention in so-called normal anatomy or anatomic variants. There are also no reports of sequelae of capsule retention other than identifying an area of narrowing.^{3,4} Contraindications for the use of the video capsule have included patients with suspected or documented intestinal obstructions or strictures.⁹ Prior intestinal surgery has been a relative contraindication, and a barium study prior to VCE has been recommended in these patients.² Kornbluth et al. found an 8% incidence of patients with unpassed capsules requiring surgery, despite a normal small-bowel follow-through preceding capsule ingestion in patients with known Crohn's disease.¹⁰ The reported frequency of capsule retention in patients suspected of having a bowel obstruction is as high as 21%.⁸ Sears et al. found that capsule retention in their series



FIG. 2. Intraoperative finding of a retained capsule.

indicated a significant underlying small-bowel abnormality, and the best approach was surgical removal.⁴ This was true as well in our case series. Every patient in this series had an extensive work-up for signs and symptoms of subacute small-bowel obstruction. None of our current imaging modalities identified the underlying cause, with the exception of VCE. All 9 patients benefited from VCE and surgical intervention with complete resolution of their symptoms.

It has been reported that CT, when used alone, identifies 81% of patients with high-grade obstruction but only 48% of those with low-grade partial obstruction. Enteroclysis has been reported to be accurate to determine the level of obstruction for all grades in 89% of patients but is uncomfortable for the patient, has a significant exposure to radiation, and is highly dependent on the skill of the radiologist.¹¹ VCE avoids the invasiveness and risk of aspiration inherent in performing enteroclysis, especially in patients with a bowel obstruction.¹¹

We are not advocating that VCE should be used as the initial test in patients who present with obstructive symptoms. Patients with subacute symptoms will need the necessary imaging, including, but not limited to, abdominal X-rays, CT scan, and, possibly, endoscopy. If first-line imaging is negative and symptoms persist, then VCE is not only reasonable, but necessary to further delineate the possible underlying pathology. Obstructive symptoms with negative imaging should favor proceeding with VCE. Retention of the capsule in this patient population should be viewed as a positive finding that can lead to a diagnosis and therapeutic intervention. van Tuyl et al. stated that patients with a stenosis that cannot be passed by the capsule with a diameter of 11 mm will probably need surgery soon, anyway.¹² Important to this process is a full discussion with the patient regarding the possibility of proceeding with surgery if the capsule is retained or its images demonstrate a significant lesion or significant stenosis (10).

Conclusions

VCE is an important diagnostic tool in small-bowel pathology. It has significantly improved our ability to evaluate obscure gastrointestinal bleeding. Clinicians have been reluctant in the past to use VCE in patients with obstructive symptoms. However, our series adds clinical evidence that VCE is safe and extremely accurate in defining anatomic abnormalities in patients with subacute obstructive symptoms and negative imaging studies. Previous hesitance to use VCE in patients with obstructive symptoms or strictures seems unfounded. No patients in our experience required an emergent intervention.

References

1. Barkin JS, Friedman S. Wireless capsule endoscopy requiring surgical intervention: The world's experience. *Am J Gastroenterol* 2002;97:S298.
2. Hara AK, Leighton JA, Sharma VK, Heigh RI, Fleischer, DE. Imaging of small bowel disease: Comparison of capsule endoscopy, standard endoscopy, barium examination, and CT. [Review] *Radiographics* 2005;25:697-711.
3. Cave D, Legnani P, de Franchis R, Lewis BS. ICCE consensus for capsule retention. *Endoscopy* 2005;37:1065-1067.
4. Sears DM, Avots-Avotins A, Culp K, Gavin MW. Frequency and clinical outcome of capsule retention during capsule endoscopy for GI bleeding of obscure origin. *Gastroint Endosc* 2004;60:822-827.
5. Gay G, Delvaux M, Rey JF. The role of video capsule endoscopy in the diagnosis of digestive diseases: A review of current possibilities. [Review] *Endoscopy* 2004;36:913-920.
6. Raju GS, Nath SK. Capsule endoscopy. [Review] *Curr Gastroenterol Rep* 2005;7:358-364.
7. Triester SL, Leighton JA, Leontiadis GI, Gurudu SR, Fleischer DE, Hara AK, Heigh RI, Shiff AD, Sharma VK. A meta-analysis of the yield of capsule endoscopy compared to other diagnostic modalities in patients with nonstricturing small bowel Crohn's disease [see comment]. *Am J Gastroenterol* 2006;101:954-964.
8. Eliakim AR. Video capsule endoscopy of the small bowel (Pill-Cam SB). [Review] *Curr Opin Gastroenterol* 2006;22:124-127.
9. Costamagna G, Shah SK, Riccioni ME, Foschia F, Mutignani M, Perri V, Vecchioli A, Brizi MG, Picciocchi A, Marano P. A prospective trial comparing small bowel radiographs and video capsule endoscopy for suspected small bowel disease.[see comment]. *Gastroenterology* 2002;123:999-1005.
10. Kornbluth A, Legnani P, Lewis BS. Video capsule endoscopy in inflammatory bowel disease: Past, present, and future. [Review] *Inflamm Bowel Dis* 2004;10:278-285.
11. Bender GN, Timmons JH, Williard WC, Carter J. Computed tomographic enteroclysis: One methodology. *Invest Radiol* 1996;31:43-49.
12. van Tuyl SA, Stolk MF, Timmer R. Clinical application of video capsule endoscopy. [Review] *Scand J Gastroenterol Suppl* 2003;239:24-28.

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