

Diagnostic Yield of Video Capsule Endoscopy for Small Bowel Bleeding: Eight Consecutive Years of Experience at the VA Caribbean Healthcare System

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Objective: To evaluate the diagnostic yield of video capsule endoscopy (VCE) in patients with small bowel gastrointestinal bleeding and examine the impact of this diagnostic technology on the clinical management of this complaint.

Methods: This was a retrospective study in which all patients who underwent VCE (May 7, 2003 – December 31, 2011) were included. Records were reviewed for the type of bleeding (overt vs. occult; when present), demographic data, lab results, and capsule endoscopy findings. Information regarding medical treatment (i.e., endoscopic intervention, surgical therapy, or both) was also recorded.

Results: A total of 229 subjects were included in the study. Most were men; the mean age of all the subjects was 69.8 years. Of the 229 VCEs, 154 (67.3%) were done because of occult bleeding and 75 (32%) because of overt bleeding. VCEs were normal in 34 (14.9%) cases and non-diagnostic in 15 (6.6%). Angiodysplasia, erosions, and ulcers were the most common findings (48.5%, 24.5%, and 10.92% respectively). Active bleeding was reported in 7 cases (3%). Nearly 20% of the 229 cases required either endoscopic or surgical intervention.

Conclusion: In our study, VCE achieved a diagnostic yield of 78.6%. In 1 of every 5 subjects, video capsule endoscopy led to the identification of small bowel lesions that required either endoscopic or surgical resection, rather than conservative treatment with iron replacement. VCE proved to be a very useful investigative tool, not only for establishing the source of bleeding but also, most importantly, for directing the appropriate therapy for lesions that would otherwise have been missed by conventional studies. [*PR Health Sci J* 2016;35:93-96]

Key words: Capsule Endoscopy, Hemorrhage, Gastrointestinal, Diagnostic Techniques, Digestive System

Small bowel video capsule endoscopy (VCE) is a non-invasive technology that allows the visualization of the small bowel mucosa, a portion of the gastrointestinal tract that was difficult to evaluate prior to the introduction of this technology in 2001. Although small bowel imaging, push enteroscopy and deep enteroscopy, are tools that are currently available to examine the small bowel, VCE remains the mainstay in the evaluation of small bowel gastrointestinal bleeding. The noninvasive nature of this procedure and its ability to image the majority of the small bowel mucosa makes VCE the investigative tool of choice (1–4).

Small bowel bleeding is relatively uncommon, representing approximately 5% of all gastrointestinal-bleeding cases (5). The term obscure gastrointestinal bleeding (OGIB) had been used to define bleeding of unknown origin—which included lesions in the esophagus, stomach, or colon overlooked during initial endoscopic examinations—but most commonly referred to lesions in the small bowel. As the technology evolved and additional diagnostic tools became available, it became evident

that nearly 75% of OGIB originates in the small bowel (1,6). For this reason, in 2015 the American College of Gastroenterology proposed using the term small bowel bleeding to substitute what was previously known as OIGB and reserving the OIGB term for only those cases in which, after a thorough evaluation of the entire gastrointestinal tract, the source of bleeding could not be identified (1).

Currently, algorithms that evaluate small bowel bleeding recommend VCE for use in stable patients, that is, in those without evidence of small bowel obstruction and in whom endoscopic studies have excluded upper and lower gastrointestinal lesions (1). This recommendation is based on several published studies demonstrating that VCE is superior to

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push enteroscopy, small bowel follow-through, and computed tomography for the detection of bleeding sources in the small bowel (7–11).

The small bowel video capsule is able to take photographs of the entire small bowel at a rate of 2 frames per second. Its battery lasts for a period of 8 to 12 hours, which allows for the visualization of the entire small bowel in nearly 90% of the studied subjects (12). It is a well-tolerated procedure with very few complications. Capsule retention is the most feared, though rare, adverse event (12). There are very few contraindications for this procedure. These include suspected small bowel obstruction and the presence of implantable cardiac devices. The latter is more of a theoretical supposition than a real likelihood, since there is only 1 study supporting the theory of electromagnetic interference, while a few others demonstrate such interference not harmful (13–15).

Since being approved by the Food and Drug Administration in 2001, VCE has proven to be superior when compared with other diagnostic modalities, achieving diagnostic yields of 60% or greater (12, 16–17). Several variables have been shown to positively influence VCE diagnostic yield. It is higher when the procedure is done within 2 weeks of a bleeding episode, when there are long-standing preceding symptoms, when there is overt bleeding, and when anemia (hemoglobin level lower than or equal to 10 g/dL) is present (18–19).

Establishing a source of bleeding through VCE may not necessarily translate into improved patient outcomes. Studies have not so far been able to agree on the clinical impact of VCE, with different studies reporting significantly different diagnostic yields, those yields ranging from 30% to 77.3% (20–24); thus, the clinical impact of VCE is still uncertain. The aims of this study were to retrospectively evaluate the diagnostic yield of VCE in a cohort of patients with suspected small bowel bleeding, describe VCE findings according to fecal occult blood results and examine the clinical impact and outcome of VCE on and in the management of these patients.

Methods

This was a retrospective study that included all patients from the VA Caribbean Healthcare System who underwent video capsule endoscopy (PillCam® Capsule Endoscopy, Given Imaging Ltd.) from May 7, 2003, to December 31, 2011. This research proposal was approved by the Institutional Review Board of the VA Caribbean Healthcare System.

The patients' medical records were reviewed to determine the types of small bowel bleeding present. These were classified as falling into either of 2 categories: 1) occult bleeding, i.e., iron deficiency anemia without any clinically evident bleeding episodes, or; 2) overt bleeding, defined as evident bleeding such as melena, hematochezia, or hematemesis.

The patients' demographics, laboratory test results, and prior endoscopic study results were recorded. Patients older than 89 years were excluded from the study. Also excluded were those

in whom the VCE video was incomplete or for whom prior endoscopy and colonoscopy reports were not available for review. Incomplete VCE was defined as the failure to reach the cecum prior to the end of battery life or as an image-capture failure.

The medical records were reviewed to establish whether there was a need for medical, endoscopic, or surgical intervention after the VCE. Medical therapy was defined as the need (of a given patient) for iron supplementation or a blood transfusion.

Results

A total of 247 patients underwent VCE for the evaluation of obscure GI bleeding during the study period. Of these, 18 (7.3%) did not meet inclusion criteria; therefore, only 229 were included in the study. As documented in the medical records, all the study subjects who underwent the procedure had fasted and had had their bowels cleansed with a polyethylene glycol–based oral solution prior to the introduction of the video capsule.

The average age of the patients was 69.8 (range: 27–88). Most patients were male (97.4%). The mean HGB was 10.85 g/dL (range: 3.5–16.3 g/dL). The mean values for MCV, ferritin, and transferrin saturation were 85.7 fL (normal range of values: 81–102 fL), 121.6 ug/L (normal range of values: 30–400 ng/mL), and 19.6%, respectively. Of the 229 procedures using video capsule technology, 154 (67%) were performed because of occult bleeding and 75 (33%) because of overt bleeding. Most of the study population did not have a fecal occult blood test (FOBT) done, but 52% of those who were tested had a positive result.

VCE was normal in 15% of the patients; 7% of the patients had inadequate bowel preparation, precluding the interpretation of their studies. Angioectasia, also known as angiodysplasia or vascular ectasia, was the most common finding (48.5%) (Figure A), followed by nonspecific mucosal changes (24%) and ulcers (11%) (Figure B). Benign results, such as phlebectasia and lymphangiectasia, were commonly found in more than 65% of the video capsule endoscopies but were not included in the analysis. Active bleeding was identified in 7 (3%) of the cases (Figure C). Of these, 5 patients were classified as having overt and 2 as having occult bleeding. Refer to Table 1 for the relevant VCE findings.

VCE findings in patients who were FOBT positive consisted of AVMs (55%), ulcers (15%), and erosions (32%). Thirteen percent of the patients positive for occult blood had negative VCEs. VCE findings in patients who were FOBT negative consisted of AVMs (40%), erosions (23%), and ulcers (7%). Overall, there were no statistical differences between the groups. See Table 2.

Most of the members of the study group required interventions. Two hundred sixteen (216) patients (94%) required medical interventions, which included blood transfusions (31%) and iron supplementation (51%). Forty-one patients (18%) underwent endoscopic therapy (argon, epinephrine/coagulation), and 3 had surgical resections. Only 3 cases of the 229 did not require any kind of intervention.

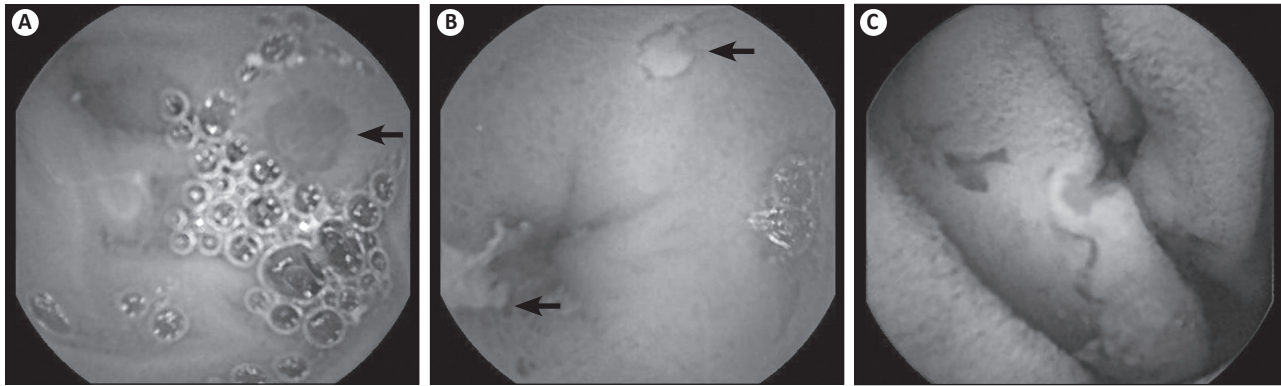


Figure A. Capsule endoscopy image of the small bowel showing a round vascular lesion composed of dilated thin wall vessels compatible with a non-bleeding angiodysplasia. These lesions (arrow) are the most common capsule endoscopy finding in patients with small bowel bleeding. **Figure B.** Capsule endoscopy image of the distal small bowel showing two isolated swallow clean-based ulcers. The surrounding small bowel mucosa appears normal (arrows). These lesions are commonly seen associated to the use of using non-steroidal anti-inflammatory drugs. **Figure C.** Capsule endoscopy image remarkable for active oozing of blood.

Table 1. Video capsule endoscopy findings

Findings	Number	%
Normal	34	14.85
Non-diagnostic	15	6.55
Nonspecific mucosal pathology (erosions)	56	24.45
AVMs	111	48.47
Ulcers	25	10.92
Polyps	5	2.18
Varices	1	0.44
Small bowel stricture	1	0.44

Table 2. VCE findings in patients with positive or negative occult blood tests

Finding	Positive FOBT N = 47	Negative FOBT N = 43
Ulcers+	7 (14.89%)	3 (6.97%)
AVMs*	26 (55.32%)	17 (39.53%)
Non-specific mucosal pathology	18 (38.30%)	12 (27.90%)
Active bleeding	4 (8.51%)	0 (0%)
Others	23 (48.94%)	24 (55%)
Phlebectasia	13 (27.65%)	10 (23.25%)
Lymphangiectasia	9 (19.14%)	12 (27.90%)
Scalded mucosa	1 (2.13%)	0 (0%)
Submucosal nodule	0 (0%)	2 (4.65%)
Normal	6 (12.77%)	9 (20.93%)

+Fisher’s exact test; the value of the statistic was 0.316093. The result is not significant, at p<0.05. *Fisher’s exact test; the value of the statistic is 0.146157. The result is not significant, at p<0.05.

Conclusion

Video capsule endoscopy is recognized nowadays in the medical literature as the investigative tool of choice for the evaluation of patients with small bowel bleeding (1). In our study, VCE achieved a diagnostic yield of 78.6%, which is comparable to the diagnostic yield reported in the medical literature. Vascular

ectasia, also known as angioectasia or angiodysplasia, is the most common vascular anomaly encountered in the gastrointestinal tract and the most common finding (using VCE) in patients older than 40 years with OIGB (1). Small bowel ulcers and erosions were also common in our studied population. The distal small bowel is particularly susceptible to non-steroidal anti-inflammatory drugs, which are the most common of the culprits leading to lesions in the gastrointestinal tract. This kind of adverse drug event tends to affect adults older than 40 and those on long-term therapy (26). The high diagnostic yield achieved in our study sample was probably influenced by the demographic characteristics of our population. There are several factors that have been associated with such a high diagnostic yield, specifically, the presence of anemia (a hemoglobin level less than or equal to 10 g/dL), of long-standing symptoms, and of overt bleeding, all of which were present in our population (1).

Our study demonstrates the impact of video capsule endoscopy on the management of patients with suspected small bowel bleeding. VCE led to appropriate medical treatment in most patients, with iron replacement, a conservative treatment, being the most commonly recommended therapeutic strategy. In one fifth of the cases, VCE findings led to endoscopic treatment or surgical resection, resulting in timely diagnoses and improved outcomes. Active bleeding, though uncommon, was identified in 3% of the cases, which identification led to prompt intervention and successful resolution of said bleeding.

In our study, VCE proved to be the investigative tool of choice, not only for establishing the source of bleeding but also, most importantly, for directing the appropriate therapy for lesions that would have been otherwise missed by conventional studies.

Resumen

Objetivos: Evaluar el rendimiento diagnóstico de la capsula endoscópica (CE) en pacientes con sangrado gastrointestinal del intestino delgado y examinar el impacto de esta en el manejo

clínico. Métodos: Estudio retrospectivo en el cual se incluyeron todos los pacientes a los que se les realizó una CE desde el 7 de mayo de 2003 al 31 de diciembre del 2011. Se revisaron expedientes para tipo de sangrado (evidente vs. oculto), datos demográficos, laboratorios y resultados endoscópicos. También se registró información acerca de tratamientos médicos (i.e., intervenciones endoscópicas, quirúrgicas, o ambas). Resultados: Se incluyeron 229 sujetos en el estudio. La mayoría fueron hombres; la edad promedio de todos los sujetos fue de c 69.8 años. De los 229 CE, 154 (67.3%) fueron realizadas debido a sangrado oculto y 75 (32%) a sangrado evidente. La capsula endoscópica era normal en 34 (14.9%) casos y no diagnóstica en 15 (6.6%). Los hallazgos más comunes fueron angiodisplasias, erosiones de la mucosa y úlceras (48.5%, 24.5% y 10.92%, respectivamente). Se identificó sangrado activo en siete casos (3%). Aproximadamente el 20% de los casos requirieron intervención endoscópica o quirúrgica. Conclusión: En nuestro estudio, la CE obtuvo un rendimiento diagnóstico de 78.6%. En uno de cada 5 sujetos, la video capsula endoscópica identificó lesiones en el intestino delgado que requirieron tratamiento endoscópico o quirúrgico, más allá del tratamiento conservativo con reemplazo de hierro. La CE probó ser una herramienta muy útil, no solo para establecer la causa del sangrado, si no para instituir el tratamiento apropiado para aquellas lesiones que de otra forma se hubieran fallado.

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