

Capsule Endoscopy: Moving Further Forward



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Over the past two years, we have seen significant advances in the science and applications of capsule endoscopy. PillCam[®] COLON capsule is currently being evaluated in various clinical trials and is awaiting clearance by the FDA for commercial use in the United States. PillCam ESO 2, an improved version of the esophageal capsule, will be available soon. Its wider angle of view, enhanced optics, and new ingestion protocol are expected to enhance the visualization of the distal esophagus. There is also now a much better understanding of the appropriate uses of small bowel capsule endoscopy with the availability of larger studies and long-term outcome reports, which allowed the formulation of consensus guidelines and algorithms

on the various applications of small bowel capsule endoscopy. Capsule endoscopy is a rapidly evolving technology in Gastroenterology, and there is more to look forward to in the coming years.

Colon Capsule Endoscopy

Given Imaging's PillCam COLON capsule is now available in Europe and Australia for commercial use, and is awaiting FDA clearance for marketing in the US. Multicenter clinical trials are ongoing. Initial studies directly comparing colon capsule endoscopy (CCE) with conventional colonoscopy (CCE) showed great promise. The sensitivity and specificity of CCE was over 70% for polyps >6 mm and for those with 3 or more polyps of any size (Endoscopy 2006;38(10): 963-977).

Various protocols which incorporate the use of prokinetic agents and laxatives are being evaluated. Their goal is to achieve complete visualization of the colon.

Although the efficacy of CCE in colorectal cancer screening is not yet known, its ability to directly visualize

the colon mucosa in the absence of intubation, air insufflation, sedation, or radiation is certainly appealing to potential patients and hopefully, this will help improve compliance with colon cancer screening recommendations.

PILLCAM COLON CAPSULE

- ◆ Video cameras on both ends; 2 frames per second per camera
- ◆ Diameter: same as small bowel capsule (11mm)
- ◆ Length: 5 mm longer than small bowel capsule (31mm)
- ◆ Battery operating time: 8 to 10 hours.



The International Conference on Capsule Endoscopy (ICCE) is the leading forum for the latest developments in capsule endoscopy. Its recently published updated consensus guidelines and algorithms on capsule endoscopy can be found in *Endoscopy 2007 Oct;39(10):895-909.*

SAMPLE PILLCAM COLON IMAGES:



A. Transverse colon



B. Pedunculated polyp



C. Colitis

SELECTED HIGHLIGHTS FROM THE UPDATED ICCE 2006 CONSENSUS GUIDELINES AND ALGORITHMS

SUSPECTED CROHN'S DISEASE

- ◆ Small bowel capsule endoscopy has a higher sensitivity for assessing mucosal lesions compared to other imaging techniques. It is useful and safe in patients with suspected Crohn's disease who had negative endoscopic and small bowel imaging studies.
- ◆ This indication is covered by most health insurance companies.
- ◆ As defined by the ICCE Consensus, patients with suspected Crohn's disease include those who have one of the following **"characteristic GI symptoms"** (chronic abdominal pain, chronic diarrhea, significant weight loss, or growth failure, and have a negative tissue transglutaminase antibody) **AND** at least one of the following criteria in A, B, or C:

A. Extra-intestinal symptoms

(Unexplained recurrent fever, arthritis/arthralgias, pyoderma/erythema nodosum, aphthous stomatitis, perianal disease, or PSC/recurrent cholangitis)

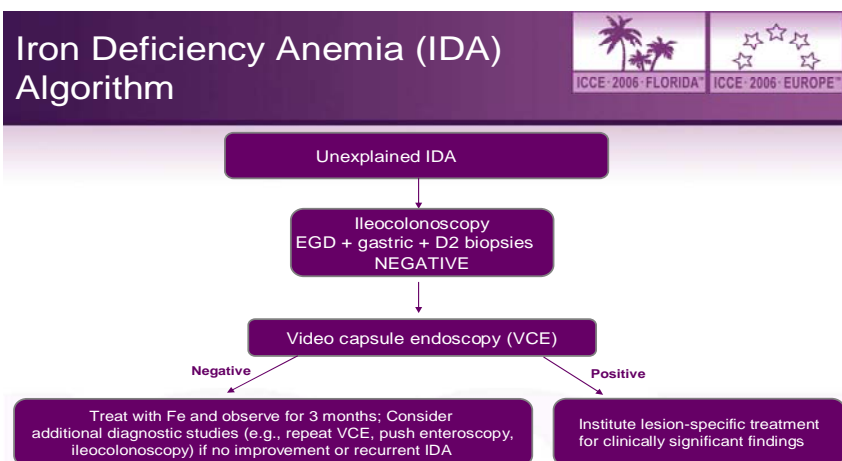
B. Inflammatory markers

(Iron-deficiency anemia, thrombocytosis/leukocytosis, elevated ESR or CRP, hypoalbuminemia, positive IBD serology, or positive fecal markers such as lactoferrin, alpha-1-antitrypsin, calprotectin, heme +, leucocyte +)

C. Abnormal, non-diagnostic imaging

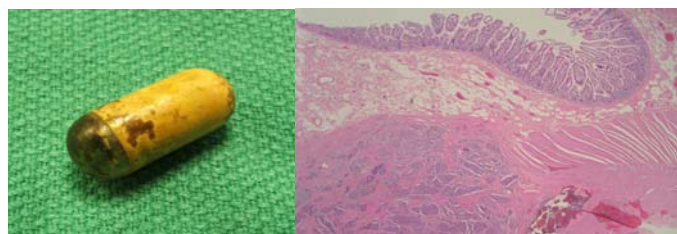
IRON-DEFICIENCY ANEMIA

- ◆ Small bowel capsule endoscopy has a high diagnostic yield in patients with unexplained iron-deficiency anemia (IDA).
- ◆ Small bowel capsule endoscopy is the recommended next step after a negative ileocolonoscopy and EGD with gastric and duodenal biopsies.
- ◆ Note: small bowel x-ray prior to capsule endoscopy is only recommended in patients with suspected small bowel Crohn's disease with possible or known obstruction.
- ◆ This indication is covered by most health insurance companies.



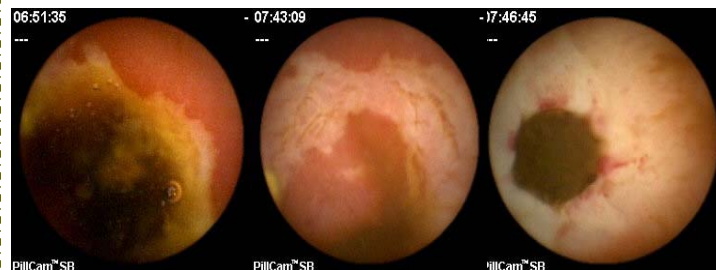
LRDC ARCHIVES CASE STUDIES:

Case #1: Capsule Retention Up To 15.5 months – Safe and Saved a Life



- ◆ 73-year-old female with iron-deficiency anemia
- ◆ Retained capsule retrieved intact after 15.5 months
 - * Longest duration of capsule retention reported so far is 2.5 years (Endoscopy 2005;37:1065-1067).
- ◆ Retained capsule did not cause obstruction symptom
 - * To date, there is no reported case of acute small-bowel obstruction caused by a retained capsule.
- ◆ Enteroclysis prior to capsule endoscopy was normal
 - * Majority of capsule retentions occurred in patients with normal small bowel x-rays (Digestive and Liver Dis 2006;38:326-30).
- ◆ Diagnosis: multifocal carcinoid tumor of the ileum

Case #2: Consider Thinking Outside the Box in Diagnosing Crohn's Disease



- ◆ 53-year-old male with iron-deficiency anemia
- ◆ Multiple, circumferential, small bowel ulcers and strictures in proximal, middle, and distal small bowel
 - * Two small bowel follow-through x-rays were normal
- ◆ No history of NSAID use
- ◆ ASCA antibody negative
- ◆ Obese, no weight loss, no diarrhea, no abdominal pain
- ◆ Could this be Crohn's disease?