

# Tiny Camera In a Pill Gives a Big Picture of the Small Intestine



Matthew W. Karowe, MD

## Non-surgical method for direct visualization of the entire small bowel now available in Boulder

**By Matthew W. Karowe, MD  
Gastroenterology of the Rockies**

A patient swallows a digital video camera the size of a pill. Moments later, it's carried smoothly and painlessly through the digestive system via peristaltic movements. Once reaching its final destination – the 20 feet of small bowel – the tiny camera rapidly captures images, about 50,000 of them, revealing problems deep within.

Though this might sound like a science fiction movie, it's actually a powerful, new tool for diagnosing small bowel disorders. Capsule Endoscopy shows areas of the small intestine beyond the reach of traditional endoscopy or colonoscopy. Historically, these hard-to-reach areas could only be seen through exploratory surgery and more recently with push and pull enteroscopy. As a non-invasive visualization tool, Capsule Endoscopy significantly improves chances of accurate diagnosis for a variety of disorders, such as obscure gastrointestinal bleeding, Crohn's Disease, Celiac Disease, malignant tumors and vascular disorders. Previously, many of these conditions went undiagnosed or were treated with trial and error.

Thirty-two independent clinical studies of nearly 700 patients have compared Capsule Endoscopy with other modalities, including gastroscopy, colonoscopy, enteroscopy, CT scan and abdominal x-ray. Based on results, Capsule Endoscopy offers a diagnostic yield of 71%, whereas all the other modalities together have a total diagnostic yield of only 41%.

Capsule Endoscopy's yield isn't 100% because the small camera can only capture a 70% view of the digestive tract at any one point. Still, if you compare that with what we had before, we're almost doubling our success in diagnosing small bowel pathology.

In addition to being more effective, Capsule Endoscopy entails far less risk and discomfort than other modalities.

The patient swallows the vitamin-sized capsule (11 mm x 27 mm) with a sip of water. The capsule then begins transmitting two

pictures per second to a Walkman-sized recording device strapped around the patient's waist. Eight hours later, after the capsule has progressed through the small intestine, the patient returns the recording device. Data is downloaded onto a computer where proprietary software creates a high-resolution video clip of the patient's small intestine.

The procedure is quite painless and patients can go to work and about their normal activities. It requires no sedation and carries none of the complications of the more invasive use of an endoscope.

The capsule passes from the body about three days after ingestion. Should the integrity of its watertight, acid-resistant polymer outer casing become compromised, patients will not experience adverse effects.

Capsule Endoscopy is one of the most revolutionary advances in the GI field. It offers hope to patients who don't want to undergo surgery but are receiving inconclusive diagnoses for their debilitating symptoms.

*Dr. Karowe offers Capsule Endoscopy at Gastroenterology of the Rockies' Endoscopy Center, located in the Table Mesa Medical Building, Boulder Community Foothills Hospital. For additional information, call 303-444-4066.*



### Inside the Capsule

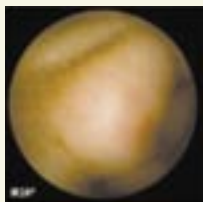
- |   |   |
|---|---|
| 1. Optical Dome                             | 5. CMOS (Complementary Metal Oxide Semiconductor) imager      |
| 2. Lens Holder                              | 6. Battery  |
| 3. Lens                                     | 7. ASIC (Application Specific Integrated Circuit) transmitter |
| 4. Illuminating LEDs (Light Emitting Diode) | 8. Antenna  |



Crohn's Disease



Celiac Disease



Carcinoid tumor



Active duodenal bleeding



Nematodes



NSAID stricture

## Indications

- Indicated for patients with suspected small bowel disease, presenting symptoms such as chronic diarrhea, unexplained abdominal pain, weight loss, iron deficiency anemia and obscure gastrointestinal bleeding.
- Recommended only after endoscopy and colonoscopy of the uppermost small intestine and the colon. About 85% of unexplained bleeding occurs in these areas, where endoscopy and colonoscopy are still effective tools.
- Contraindicated for patients known or suspected to have gastrointestinal obstruction, strictures, or fistulas; with a cardiac pacemaker or another implanted electromedical device; or with a swallowing disorder.

## Capsule Endoscopy helps diagnose:

- Obscure gastrointestinal bleeding
- Inflammatory bowel disease
- Chronic abdominal pain
- Chronic diarrhea
- Malabsorption
- Small bowel neoplasm
- Iron deficiency anemia

## Preparation:

- 12-hour fast the night before
- Capsule ingested in the a.m.
- Liquid diet after 2 hours
- Light meal 4 hours after ingestion
- Disconnect recorder after 8 hours
- Capsule passes naturally

## Insurance coverage:

- Medicare requires preauthorization
- Coverage by many insurance companies, including Aetna, Blue Cross & Blue Shield, Oxford Health and United Healthcare

# At the Forefront of Treatment for Abdominal Aortic Aneurysm

## Stent-graft repair offers a minimally invasive alternative to open surgery

By Jie Mao, MD  
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Abdominal aortic aneurysm (AAA) is a relatively common disease in the aging population. It affects five to seven percent of Americans over the age of 60, with more than 200,000 newly diagnosed each year.

When an aneurysm reaches a certain size (about 5.5 cm) there is a danger that it will rupture. The traditional treatment has been to operate. A surgical incision is made in the abdomen. The aneurysmal portion of the aorta is removed, and a synthetic (Dacron) tube is replaced. In-hospital recovery from the operation, which is performed under general anesthesia, typically requires 8 to 10 days. Many of these patients present with multiple other medical problems, which often deem them poor candidates for such surgery.

Endovascular repair was first introduced by Parodi et al in 1991<sup>1</sup> and has more recently gained widespread dissemination of acceptance. It was developed in an effort to treat patients who are at high risk for complications after standard surgical repair.<sup>2</sup> Since the U.S. Food and Drug Administration approval of commercial devices three years ago, more than 50,000 patients have undergone this procedure in the United States.<sup>3</sup> It is an interventional radiology procedure that has been shown to decrease operative morbidity, patient discomfort, hospital stay, intensive care unit stay, blood loss, and the time needed to return to normal activities.<sup>4,5</sup>

## Endovascular Repair

The standard technique of endovascular AAA repair involves bilateral groin cut-downs performed by a surgeon, who exposes and closes the incisions at the beginning and the end of the case respectively. Through the groin accesses, the interventional radiologist proceeds with the endovascular portion of the procedure. The procedure uses a covered stent (stent graft) to serve as a blood flow conduit through the aneurysm sac. The graft

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