

Wireless Capsule Endoscopies

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The small intestine is a 22-foot-long passageway coiled in the deep recesses of the human body. Here numerous abdominal ailments such as internal bleeding, Crohn's disease, polyps and cancer can hide undetected. An estimated 19 million Americans suffer from such diseases linked to the small intestine. Today diagnosis of such problems requires a push endoscopies or radiology, which possess a limited, range of view and are uncomfortable.

Recently the difficulty of trying to diagnose patients in such an unreachable area has been enhanced with a wireless capsule endoscopies. Essentially this is a camera that is swallowed and functions inside the body taking pictures as it journeys through the small intestine.

The wireless capsule endoscopies consist of two parts, the capsule and a recorder. The capsule is a small CMOS camera with an optical lens that records images as it travels past the intestines wall. The capsule is able to take color images and also contains a small light so the images are clear, it contains its own power source. It is the size of a large pill and is administered by the patient swallowing and allowing it travel to through the digestive system by peristalsis. Taking two pictures per second as the capsule travels. The recorder consists of a Walkman size box that is worn around the waist on a belt. It has a series of small antenna that are placed on the patient's lower abdomen. The recorder saves pictures taken for eight hours. At the end of the eight hours the patients return the recorder to the hospital and the images can be loaded on to

a computer and analyzed instantly. Through the capsules journey it takes approximately 50,000 images

The images are transmitted using radiotelemetry. Doctors are able to view images of the digestive tract.

The procedure is painless and undetectable; the patients can continue their daily routine without interference. Unlike colonoscopies the intestinal lumen does not have to be filled with air. The main drawback to this equipment is that although it possesses a greater ability to detect problems than push endoscopies, it has been found it testing that identifying the location of particular images to be more difficult.

The wireless capsule endoscopies have received FDA and CE approval. It has received a wide range of testing in people and animals. Pioneered by Israeli company Given Imaging, their product the M2A capsule has been distributed throughout North America and Europe. To date the company estimates that 4,000 M2A capsules have been sold. Each camera/recording unit is priced at \$450 with the monitoring system required to retrieve the data at \$30,000.

Source: Fritscher-Ravens A, Swain CP. "The wireless capsule: new light in the dark," *Digestive Diseases and Sciences*, vol. 20, no.2, February 2002.