

New Israeli development: ingestible "X-ray" capsule as an alternative to colonoscopy

A novel, Israeli developed "X-ray capsule", which generates accurate 3D imaging of the colon after being swallowed by the patient, has been cleared for marketing by European regulatory agencies. The capsule detects early signs of carcinogenic colorectal tumors and in the future may be an alternative to colonoscopy, a screening feared and avoided by many despite its crucial importance.

Dr. Itay Gal, Ynet, 23 January 2018

A new generation of colorectal scans is here: the European Economic Area (EEA) has cleared for marketing a new capsule developed in Israel. Now with a CE mark, the capsule generates high-resolution 3D imaging of the inside of the colon to detect pre-carcinogenic polyps that may have developed there. In the future, the capsule may be an alternative to colonoscopy, a procedure dreaded by many due to the physical discomfort it involves.



(Image: Shutterstock)

Developed by Israeli technological company Check-Cap headquartered in Isfiya, the capsule is essentially a swallowed x-ray camera. It creates 3D X-ray imaging of the interior of the colon, very much like Computerized Tomography (CT) scanner so as to detect pre-carcinogenic polyps and tumors. Unlike regular colonoscopy and alternative procedures such as virtual colonoscopy and video capsule, the new capsule does not require bowel preparation with laxatives ahead of the screening.

Regular colonoscopy is used to identify and remove pre-carcinogenic polyps before they transform into tumors. Although physicians recommend undergoing colonoscopy by anyone who turns 50, its execution is unpleasant as it involves the insertion of tube through the anus. Many people dread even the preparations for the screening, which involve taking laxatives three consecutive days before the scan.

The video capsule, which received FDA approval about a year ago, also provides an interior image of the colon. However, it too requires the use of laxatives.

"We've worked on the technological concept since 2005," recalls Yoav Kimchy, Ph.D., founder and CTO of Check-Cap. "We held lab tests, animal trials and human trials which started in 2012. For the past five years, we have been developing the product and testing it on hundreds of people."

How the capsule works



The patient swallows the X-ray capsule



Capsule transmits signals from the inside of the colon to the sensors on the patient's back



Information is transmitted to a computer, which generates 3D imaging of the colon's interior.



How does it work?

Once in the clinic, the technician attaches a recorder with several sensors to the patient's back. The patient is asked to swallow a capsule with some water. He or she then sips a small amount of radiocontrast agent mixed with dietary fibers. The patient is instructed to drink the mix 3 times a day until the test is concluded.

The capsule procedure takes 2-3 days, during which the patient can lead normal life, including going to work, eating, drinking, driving, showering, sleeping and engaging in any activity as long as it is not extreme. At the end of the screening, the patient returns the equipment to the clinic and waits for the clinical results.

The information from the capsule is transmitted to a computer, which generates bi-dimensional and three-dimensional images of the colon. These images allow the physician to diagnose the colon's condition within less than 30 minutes, including the writing of the report. The findings also allow for accurate pinpointing of the location of the suspected polyp, so as to accelerate its removal process by means of colonoscopy, if necessary.

The Company says the radiation absorbed in the patient's body throughout the test is minimal and equivalent to the low-dose radiation we are exposed to during transatlantic flight or ordinary chest x-ray scan.

Common and lethal: colorectal cancer

Colorectal cancer is the second most prevalent malignant disease in Israel after breast cancer in women and prostate cancer in men. It is also the second leading cause of death of all cancer types, second among women after breast cancer and second in men after lung cancer.

Early diagnosis of colorectal cancer saves lives and prevents mortality. The general recommendation is for every person over 50 to undergo colonoscopy and then every 10 years. The conventional colonoscopy is done under sedation by inserting an endoscope tube through the anus into the colon. A video camera at the end of the endoscope and tiny surgical instruments are used to detect polyps and remove them in case they are pre-carcinogenic.

Research has shown that lifestyle changes significantly reduce the risk for colorectal cancer. Dietary recommendations include low-calorie nutrition, avoidance of red meat, preference of fruit, vegetable and dietary fibers. This diet was shown to have a protective effect against colorectal cancer. Absence of cigarette smoking, normal body weight and regular exercise are also said to be effective in reducing the risk for colorectal cancer.

Figures of Israel's health ministry show some 3,200 people are diagnosed every year with colorectal cancer, most of them 60 years old or older. However, recent years saw increased morbidity in younger people, 20 to 50 years old.