

MEDICAL PHILATELY

Capsule Endoscopy

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Pill camera endoscopy. Israeli innovations that changed the world. Stamp, Israel 2010

Capsule endoscopy (CE) is a wireless swallowable system consisting of a single use video capsule miniature camera (VCE) for getting the images of gastrointestinal mucosa. I remember the contraption Crosby Capsule that we would use for blind intestinal biopsy, when I was assistant Gastroenterologist to Dr. H. G. Desai (1974) at Nair Hospital.

CE is of a size and shape of a pill weighing less than 4 grams and measuring 11mm X 26 mm; it is powered by two mercury free silver oxide batteries which also illuminate GI tract by white LED light. Battery life span is about of 8-12 hrs. Wireless, sensor arrays or a sensor belt is attached to a patient along with a data recorder. The images are reviewed at the computer workstation in video format with tools available to speed up and slow down the review process. Review process usually takes about 1 hour. More than 5000 images are transmitted during battery life. Primary use of a capsule is to examine areas of small intestines that cannot be visualized by other type of endoscopes such as OGD scopy, double balloon endoscopy and colonoscopy.

Capsule was invented by Israeli inventor **Gavriel Kidan** in 1990s. Gavriel was an electric engineer,



International Conference on gastroenterology and endoscopy, Rome Stamp Italy, 1988

developing guided missile technology. New instrument was tested by British Gastroenterologists in 2000. It was only cleared by FDA for small intestinal visualization in 2011.

Patient's bowels are prepared earlier with a laxative purge. After 12 hrs fasting, capsule is ingested with a glass of water and fluid restriction is needed till next two hrs. Sensor arrays and belt are removed once capsule is expelled into the colon or when the battery expires. Patient is free to ambulate through activities of daily living throughout the day. Capsule itself passes naturally with bowel movements and is usually passed in the stool within 24-72 hrs.

Contraindications for VCE include the swallowing disorders, small-bowel obstruction, patients with a reduced level of consciousness etc.

Although very popular due to its non-invasive character and safety, VCE can be the cause of undue anxiety due to complications. One of the

complications is capsule retention. It is defined as the presence of the capsule in the bowel lumen for a minimum of 2 wk after ingestion, or when the capsule is retained for an unspecified period of time. Most of the time, retained capsules are asymptomatic. However, risk of bowel obstruction may necessitate endoscopic or surgical intervention. Retention rates are as low as 1.4%, which makes the procedure acceptable. Patient should not undergo MRI until the capsule is excreted.

Development of capsule endoscopy (CE) in 2001 has closed the diagnostic gap between conventional gastro-duodenoscopy and colonoscopy by non-invasive and safe way. Video CE (VCE) is most commonly performed for obscure GI bleeding, but other indications include diagnosis or follow up of Crohn's, surveillance of hereditary polyposis syndromes, NSAID induced small bowel lesions, celiac disease and suspicion of small bowel tumors. In obscure GI bleeding, VCE was found to have sensitivity of 95% and specificity of 75%.

Video capsule endoscopy (VCE) is therefore a powerful diagnostic tool that has proven useful especially in imaging the small intestine. It offers greater magnification than traditional endoscopy and provides excellent resolution. The technology is still evolving.

Limitations of CE are its Cost and its inability to obtain a biopsy specimen or offer endoscopic therapy.