ENDOSCOPY

Guided capsule endoscopy appears feasible and accurate for exploration of the stomach

Guided capsule endoscopy could pave the way for the future of endoscopic examination of the stomach, according to the findings of a feasibility study by Jean-Francois Rey and colleagues. Given the number of gastric examinations performed worldwide, in addition to the invasive nature of gastroscopy and the need for sedation, the ability to carry out noninvasive, patient-friendly, sedation-free examination of the stomach is desirable.

Video capsule endoscopy is accepted as a diagnostic tool for small-bowel disease and its applications in the esophagus and colon have also been evaluated. Until now, however, video capsule endoscopy of the stomach has been held back by the large size of the gastric cavity and, consequently, the speed with which existing passive capsule endoscopes would pass through the stomach. “Before we started this trial, gastric examination had never been performed with a capsule endoscope,” explains Rey, lead author of the study. “We had to imagine how a guided capsule could be directed in a human stomach.”

Previous work has shown that capsule endoscopes can be steered by the use of magnets. In line with the findings of these studies, the prototype guided capsule endoscope used by Rey and colleagues included a capsule endoscope (31 mm long, 11 mm in diameter) and magnetic guidance equipment. The magnetic guidance system was installed in a building used for CT and MRI next to the endoscopy unit of the institute where the feasibility study was performed.

29 volunteers and 24 patients took part in the study. 24 h before being enrolled for capsule endoscopy, patients underwent conventional gastroscopy for indications such as reflux symptoms and/or epigastric pain. All participants drank 1,300 ml of water within 1 h before the capsule endoscope was ingested to create an air–water interface in the stomach and

Credit: J. F. Rey

provide a baseline position from which to manoeuvre the capsule. The position of the participants on the table of the guidance system was changed during the course of the examination to improve visualization and, if necessary, to aid navigation or movement of the capsule. The capsule itself could be steered magnetically in five possible ways—forward, backward, diving, tilting or ‘jumping’—via two joysticks and based on real-time information obtained from the capsule’s two image sensors.

No premedication was given or requested and participants had no problems ingesting the water or swallowing the capsule. A few participants drank a small volume of additional liquid to aid navigation of the capsule endoscope.

Capsule endoscopy had a technical success rate of 98%. Visualization was incomplete in three participants because of resistant mucus and in two patients because of excessive gastric motility. Overall, full visualization of the antrum, body, fundus and cardia was possible in 98%, 96%, 73% and 75% of cases, respectively. 30 pathological findings were detected: 14 by gastroscopy and capsule endoscopy, 10 by capsule endoscopy only and 6 by gastroscopy only, but the significance of these findings is limited by the unblinded nature of this pilot study.

Capsule endoscopy of the stomach also appears safe: one patient experienced temporary abdominal pain that resolved spontaneously, and left lower quadrant pain in another patient was found to be caused by recurrent sigmoid diverticulitis.

“The ability to magnetically guide the capsule without major difficulties ... opens up a totally new field for noninvasive gastric examination,” says Rey. “It allows the examiner to see a more physiologic aspect of the stomach (no sedation, no air inflation, no endoscope) and it could be important for further studies of gastric motility.” Rey goes on, “The quality of the pictures is amazing ... it gives details of the gastric mucosal aspect and minute abnormalities such as tiny polyps.”

The results of a blinded trial by the authors that compares guided capsule endoscopy with high definition gastroscopy in 91 patients will be presented later this year. In addition, Rey and colleagues are now working to improve the prototype guided capsule endoscope and gain approval for its use in the clinic.

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