MAGNETICALLY CONTROLLED CAPSULE ENDOSCOPY RELIABLY IDENTIFIES LANDMARKS IN STOMACH MUCOSA

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Abstract Body

Introduction. In the US, more than 7 million EGDs are performed costing more than $12.3 billion annually. For some patients, capsule endoscopy may be preferable to EGD due to its less invasive nature and lack of required sedation. A limitation of capsule endoscopy is that it moves via gravity and peristalsis and is unable to be purposely directed by an operator. This limitation is overcome through the use of external magnetic control to drive the capsule. The primary objective of this pilot study was to determine if a magnetically controlled capsule (MCC) can reliably identify anatomic landmarks in the stomach mucosa. Secondary objectives included patient satisfaction and a comparison to a follow-up EGD.

Methods. In this prospective observational study at an academic health system, adult patients with a clinical indication for an EGD were screened for enrollment. Patients were excluded if they had an established contraindication to capsule ingestion. Following informed consent, each study participant ingested an MCC. The capsule driver was a physician investigator who attempted to visualize and document the following landmarks of the stomach mucosa: the cardia, fundus, lesser curvature, greater curvature, angularis, antrum and pylorus. Videos were reviewed by the capsule driver and by a separate board-certified gastroenterologist who was also an experienced capsule endoscopist. Patient satisfaction was measured immediately after the exam. Participants were referred to EGD within 5 days or as soon as feasible. MCC were compared to EGD performed per standard clinical practice. Patients were contacted by telephone at day 7 and 30 to measure follow-up compliance and safety.

Results. Twenty-five patients (13 female, 12 male) consented to participate in the study. Each patient had at least one clinical indication for EGD (15 dyspepsia, 8 reflux, 4 anemia, 2 melena and 4 with other symptoms). Stomach mucosa landmarks were identified at a high rate and confirmed by the second physician with high inter-observer agreement (Table 1). Landmarks were captured with video and still photos were conveyed in a patient report (Figure 1). Patient satisfaction measures were high: 96% reported that MCC was "easy" to swallow; 100% reported the procedure did not require missed time at work due to sedation. Twenty-three of the patients received a follow-up EGD and two did not follow up. No cancerous lesions or high-risk bleeding stigmata were detected on MCC or EGD. None of the patients reported a negative experience at telephone follow-up at day 7 or 30 after procedure.

Conclusions. In this pilot study, MCC demonstrated the ability to reliably detect stomach mucosal landmarks. If confirmed in a larger study, MCC may represent a less invasive manner to visualize the mucosa of patients with upper gastrointestinal symptoms.

Table 1: Identification of Landmarks on Magnetically Controlled Capsule (MCC)

Landmark	Physician 1 (Capsule driver)	Physician 2 (Video Overread)	Inter-Observer Agreement
1. Lower Esophagus	96%	96%	100%
2. Z Line	75%	83%	92%
3. Cardia	88%	96%	92%
4. Fundus	96%	83%	88%
5. Body	96%	96%	100%
5a. Greater Curvature	96%	96%	100%
5b. Lesser Curvature	96%	96%	100%
6. Angularis	88%	96%	92%
7. Antrum	96%	96%	100%
8. Pylorus	96%	96%	100%