



Fluoroscopic-guided laparoscopic ileocolic resection with retrieval of retained (PillCam®) wireless capsule endoscope

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Wireless capsule endoscopy (CE) was introduced in 2000 as a method to examine the portion of the alimentary tract not otherwise accessible by conventional fiber optic endoscopy [1, 2]. In 2001, the Food & Drug Administration (FDA) approved a device for clinical use, PillCam® (Medtronic, Minneapolis, MN, USA) which includes the SB2 and SB3 variants [3]. Today, it is estimated that wireless capsule endoscopy has been successfully applied to > 500,000 patients [4].

While CE remains a safe, noninvasive imaging solution for the midgut, an important morbidity of wireless CE use is retention which most commonly occurs within the distal small bowel [5]. The International Conference on Capsule Endoscopy (ICCE) defines retention as a CE remaining within the alimentary tract for > 2 weeks, or requiring intervention for removal, either medical or surgical [6]. Large meta-analyses have revealed an overall retention rate of approximately 1.5–2%, but this increases substantially to ~8% for the subset of patients with an established history of inflammatory bowel disease (IBD) [7, 8]. While retention is often considered a minor adverse event because in most patients the capsule is excreted after 15 days of ingestion, in some IBD patients this complication can result in obstruction or bowel perforation [9]. Although expectant management is feasible in select instances, 60% of CE retentions are managed by surgical retrieval [7–9]. Minimally invasive laparoscopic approaches, including the use of real-time

fluoroscopic assistance, has been recently reported by Jain et al. [10]. In a similar fashion, the use of fluoroscopic assistance for retrieval of a retained CE is demonstrated here.

In this video vignette, a 24-year-old female with a long-standing history of small bowel Crohn's disease underwent wireless CE for small bowel imaging. Serial abdominal X-rays revealed the CE was retained and did not clear the alimentary tract for a period of 4 months preceding surgical intervention. As she developed progressive abdominal pain and chronic obstructive symptoms, the patient was referred for surgical consultation, and a computed tomography scan revealed a retained CE in the region of the terminal ileum related to active Crohn's disease. At operation, a laparoscopic single-port approach was used in conjunction with real-time fluoroscopy for the purposes of localizing the retained CE during planned resection of the diseased segment of bowel. As detailed in the video, a vessel sparing ileocolic resection was performed. Fluoroscopy was found to be a useful adjunct which facilitated retrieval of the retained CE. Quite interestingly, it was not found to be lodged within the diseased segment.

Compliance with ethical standards

Conflict of interest Sam Atallah reports consultancy (such as consulting fees and honoraria) from Medtronic Inc., Applied Medical, Con-Med Inc, and Medrobotics. Sergio Larach holds stock options with Applied Medical Inc. The other authors declare that they have no conflict of interest.

Ethical approval This research was performed in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards.

Informed consent Informed consent was obtained in accordance with the standards set forth by hospital regulations.

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