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Retention of a Small Bowel Capsule Endoscopy: Case Report

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ABSTRACT

Capsule endoscopy (CE) is a revolutionary diagnostic tool introduced in 2000, enabling non-invasive visualization of the entire small intestine. Initially indicated for obscure gastrointestinal bleeding and suspected Crohn's disease, its applications have expanded since then. While CE is generally safe, capsule retention (CR) is a rare but significant complication, occurring in 1–2% of cases and up to 13% in high-risk patients. CR is defined as the failure of capsule excretion within two weeks, which can lead to asymptomatic retention or complications like obstruction and perforation. Advances in pre-procedural assessments, such as the Patency Capsule® and imaging techniques, have improved the ability to predict and prevent CR. Management of CR includes medical therapy, enteroscopy, or surgery, with most cases resolving without intervention.

Keywords: Capsule endoscopy, capsule retention, Crohn disease, patency capsule, surgery.

INTRODUCTION

Capsule endoscopy (CE) has proven to be a very useful device for gastro-intestinal diseases and safe, with few reported complications. The most common indications for its use include obscure gastrointestinal bleeding, Crohn's disease, and neoplastic lesions. However, complications such as retention, perforation and small-bowel obstruction have been reported 1, 2, 3**.**

Retention rates for the capsule range from 1-2%. While it is usually asymptomatic, it can sometimes lead to partial or complete intestinal obstruction. This is considered one of the more severe complications, often perplexing physicians, as surgical intervention is required to remove the retained capsule 4, 5**.**

Here, we report the case of a young woman admitted with diffuse abdominal pain associated with chronic diarrhea and an obscure gastrointestinal bleeding. The indication for CE was established following a normal endoscopy. Capsule retention was diagnosed after 45 days of non-expulsion.

OBSERVATION

A 32-year-old female patient, a chronic smoker and insulin-dependent diabetic, has been followed for six months for diffuse abdominal pain associated with chronic diarrhea and an obscure gastrointestinal bleeding. These symptoms have progressed in a context of anorexia and unquantified weight loss. Clinical examination revealed a conscious patient, hemodynamically and respiratory stable, with a BMI of 21.5 kg/m^2. Abdominal examination showed a non-distended abdomen with tenderness in the periumbilical region and the right iliac fossa. Pelvic examinations were normal.

Biological workup revealed a hemoglobin level of 7.5 g/dL (hypochromic and microcytic), a white blood cell counts of 7,800/mm^3, an elevated fecal calprotectin level at 941.4, and a CRP level of 12 mg/L. Esophagogastroduodenoscopy and colonoscopy were normal. An abdominal CT scan revealed a circumferential, regular, and non-stenosing wall thickening in some ileal and jejunal loops, with infiltration of the surrounding fat.

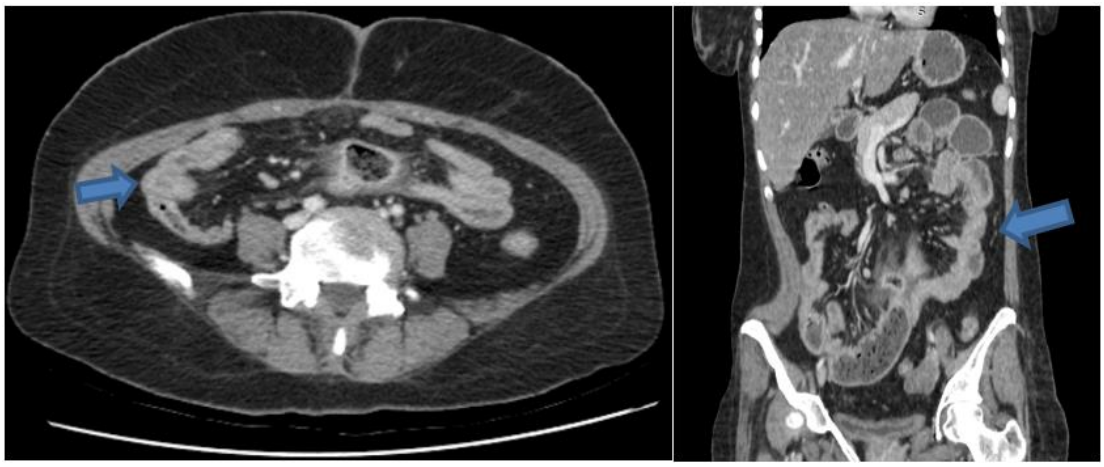

Figure 1: CT scan image showing the wall thickening of some small bowel loop

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A video capsule endoscopy was performed. 45 days after ingesting the CE, the patient presented to the emergency department with diffuse abdominal pain, bilious vomiting, and cessation of bowel movements without gas retention. Clinical examination revealed a conscious patient, hemodynamically and respiratory stable, with a distended and tympanic but painless abdomen. Digital rectal examination showed a glove stained with normal-colored stool. An abdominal X-ray (ASP) was performed due to the sub-occlusive presentation, revealing the presence of the video capsule in the left flank along with an air-fluid level suggestive of a small bowel obstruction with no pneumoperitoneum. Given the complication of capsule retention, surgical extraction was indicated.

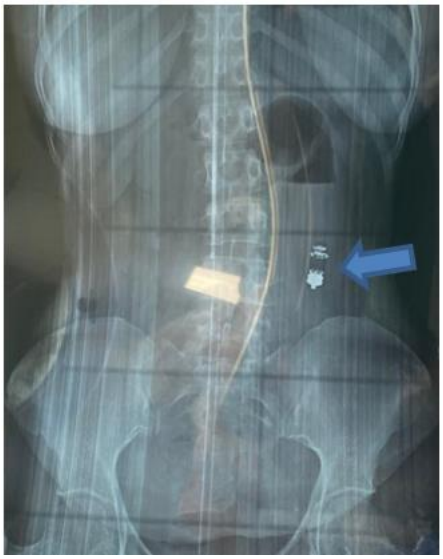

Figure 2: Plain abdominal X-ray showing the capsule endoscopy device

Surgical exploration revealed the presence of a substenosing thickening of the small bowel located 30 cm from the duodenojejunal angle, stopping the progression of the video capsule, as well as a second substenosing thickening 30 cm from the ileocecal junction. The procedure involved segmental resection of the two thickened areas with extraction of the video capsule and the creation of two end-to-end small bowel anastomoses: one located 30 cm from the duodenojejunal angle and the other 30 cm from the ileocecal junction.

Histopathological examination revealed chronic ulcerated inflammatory lesions type Crohn.

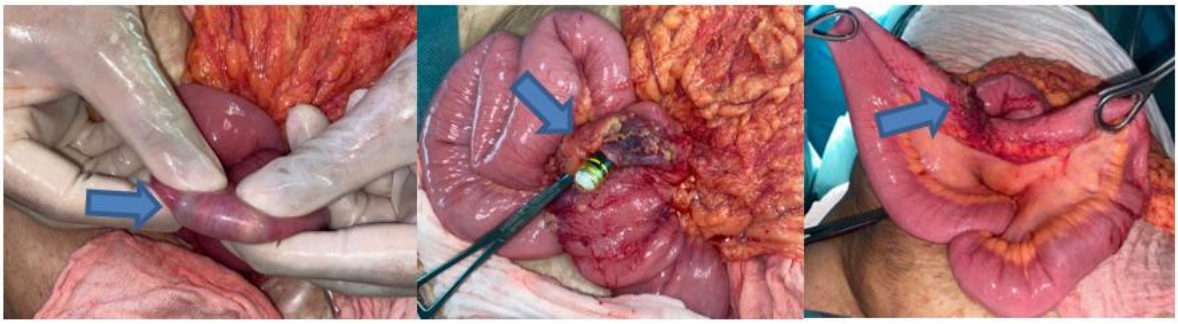

Figure 3: per operative images showing: left (intra luminal localization of CE) ; middle (extraction of the CE); right (small bowel stricture)

DISCUSSION

Capsule endoscopy was first described was in 2000 6. Since then, it been having been widely used to explore the entire small intestine and diagnose severe diseases. Obscure gastro-intestinal bleeding, suspected Crohn's disease, was the major indication for the CE. However, the last recommendation of the European Society of Gastrointestinal Endoscopy (ESGE) Guideline – Update 2022 –, have expanded its indications to include established Crohn's disease (to assess the extent and location of lesions), malabsorptive syndromes, small intestinal tumors, and surveillance for patients with polyposis syndromes 7. Some relative contraindications include for CE include patients with known or suspected GI obstruction, strictures, fistulas, or motility disorders, as well as those with cardiac pacemakers or other implanted electro-medical devices, dysphagia, and pregnancy 8, 9.

the disposable plastic-covered capsule is typically excreted in the stool within 10-48 hours 10. Preparation for the CE is generally required to ensure a good visualization of the mucosa and the patient are often instructed to fast or follow a clear liquid diet for 10-24 hours prior to the procedure 11.

the most common reasons for an incomplete examination are battery exhaustion, capsule retention, technical failure, and poor small-bowel preparation 12, 13, 14.

Capsule retention is considered an infrequent but potentially serious complication, occurring in approximately 1-2% of patients undergoing CE, with rates as high as 13% in patients with inflammatory bowel disease due to underlying inflammatory strictures 15. CR is defined as radiographic confirmation of capsule remaining in the small bowel longer than 2 weeks after the ingestion 16.

Several studies have identified risk factors for CR. The retention rate does not correlate with capsule size 17, 18. In patients with suspected small bowel bleeding, the CR rate is approximately 2%, similar to that observed in patients with chronic diarrhea or abdominal pain. However, it increases to 13% in patients with a higher risk of small bowel strictures, such as those with inflammatory bowel disease 19. The highest CR rate (10–20%) are observed in patients undergoing CE for subacute small bowel obstruction or in those with small bowel tumors (10–25%) 20, 21. Other risk factors for CR include previous small bowel resection, abdominal radiation therapy and chronic use of high-dose non-steroidal anti-inflammatory drugs 22, 23, 24.

Traditional imaging techniques, such as small bowel follow-trough (SBFT) and abdominal computed tomography (CT) had failed to reliably identify the patient at high risk of CR, as studies shown that the majority of patients with CR had normal prior imaging results 25, 26, 27.

More recently, Patency capsule® (PC) and dedicated small bowel cross-sectional imaging techniques, including CT or magnetic resonance enterography/enteroclysis have been proposed, in order to prevent CR 28.

The PC which not expose patients to radiation, it's relative inexpensive price and can be easily repeated consistently, is the best way for detecting the patient at high risk of CR since several

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case series and a recently published meta-analysis confirmed the accuracy of PC test, reporting a sensitivity of 97%, and a specificity of 83% compared to cross-sectional imaging techniques, which are more operator-dependent 27, 28, 29. When the PC is combined with small bowel imaging, the sensitivity in predicting CR can reach 100%, suggesting new protocols to improve the safety of CE 28, 30.

Clinically, CR can be suspected in two types of patients: those who do not report the capsule excretion 15 days after the ingestion (the asymptomatic and most common form) and those who develop a complicated form (seen in less than 2% of CR), such as obstructive syndrome or peritonitis (perforation) without evidence of capsule excretion 31, 32, 33. Plain abdominal X-ray is the preferred diagnostic tool to confirm CR, as it widely available, easy to perform, non-invasive, repeatable and inexpensive. CT, although exposing patients to a higher dose of ionizing radiations, can be used in certain case, to provide the location and the cause of CR 34, 35. Management of CR may involve, abstention, medical therapy, enteroscopy or surgery. Most asymptomatic patient (35 - 50%) will excrete the capsule without any intervention. the use of medical therapy can help even more the excretion in some patients 25, 36, 37. Centers with expertise in enteroscopy may attempt endoscopic removal 38.

Surgical interventions in case of medical, endoscopy failure or in complicated case, is the key. it can be performed via open or laparoscopic approaches, involving capsule extraction via enterectomy or intraoperative manual bowel manipulation and digital rectal retrieval. This approach also allows the removal of both the obstructing lesion and the retained capsule 39, 40, 41.

CONCLUSION

Capsule endoscopy is a valuable diagnostic tool for investigating small bowel diseases, with expanded indications supported by recent guidelines. Although generally safe, capsule retention (CR) remains a rare but potentially serious complication, especially in high-risk patients. Advances like the Patency Capsule® have improved the ability to predict and prevent CR, enhancing the safety of capsule endoscopy. For cases of capsule retention, most are managed conservatively or medically, but complicated cases may require surgical interventions.

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