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Undiagnosed Endoscopy Capsule Retention Causing Delayed Intestinal Obstruction in a Patient with a Small Bowel Neuroendocrine Tumor

Authors' Contribution:

Study Design A
Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
Literature Search F
Funds Collection G

ADEF **Nikolaos G. Symeonidis**
ABDEF **Kalliopi E. Stavrati**
BEF **Efstathios T. Pavlidis**
AF **Kyriakos K. Psarras**
BD **Eirini C. Martzivanou**
BC **Christina C. Nikolaidou**
BE **Maria C. Meitanidou**
BE **Sofia N. Tsiftsi**
AF **Theodoros E. Pavlidis**

2nd Propaedeutic Department of Surgery, Aristotle University School of Medicine, Hippokraton General Hospital, Thessaloniki, Greece

Corresponding Author: Nikolaos G. Symeonidis, e-mail: niksym@hotmail.com

Conflict of interest: None declared

Patient: Female, 82-year-old
Final Diagnosis: Endoscopic capsule retention • intestinal obstruction
Symptoms: Abdominal pain • abdominal distension
Medication: —
Clinical Procedure: Laparotomy
Specialty: Surgery

Objective: Unusual clinical course

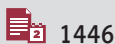
Background: Capsule endoscopy has played a significant role in small bowel investigation, providing the opportunity of detecting neoplastic lesions to a greater degree and at an earlier stage than other diagnostic procedures. Failure to excrete the capsule with the feces within 48 h can lead to capsule retention with increased risk of further complications such as bowel obstruction and perforation. Capsule retention can remain undetected in case of incomplete follow-up and poor patient compliance. Acute small bowel obstruction as late as many months following capsule endoscopy investigation is very rare, with only a few cases reported in the published literature. We herein report a rare case of prolonged capsule retention which remained undiagnosed, resulting in small bowel obstruction 6 months after the initial investigation.

Case Report: An 82-year-old woman presented with abdominal pain and symptoms suggestive of intestinal obstruction. The patient history included a capsule endoscopy investigation because of episodes of abdominal pain 6 months prior to admission. Both the outcome of the investigation and the excretion of the capsule remained undetermined due to her history of dementia and follow-up failure. Radiologic investigations identified the capsule causing small bowel obstruction. Upon surgery, the capsule was found to be impacted in a stenotic small bowel lesion, and a segmental small bowel resection was performed. Histologic examination revealed the presence of a stenotic small bowel neuroendocrine tumor.

Conclusions: Appropriate follow-up is necessary to diagnose the complication of capsule retention which, if it remains unrecognized, can cause life-threatening complications as late as many months after capsule endoscopy.

Keywords: Capsule Endoscopy • Carcinoma, Neuroendocrine • Intestinal Obstruction

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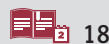
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Background

Capsule endoscopy (CE) has played a significant role in small bowel investigation, providing the opportunity of detecting various lesions to a greater degree and at an earlier stage than other diagnostic techniques. Although CE is considered a safe investigation, the complication of capsule retention (CR) can potentially lead to life-threatening complications such as intestinal obstruction and perforation and may necessitate surgical removal of the capsule [1]. CR is usually defined as the failure to excrete the capsule with the feces within a period of 2 weeks [2]. In a recent meta-analysis by Rezapour et al, the overall frequency rate of CR is reported to be approximately 2% [3]. Higher CR rates have been reported in patients with increased risk of luminal stenosis such as those with inflammatory bowel disease and small bowel tumors [4]. The majority of patients with CR are asymptomatic, with less than 2% of all CR cases presenting with symptoms [5]. Patients without positive confirmation of capsule excretion within 2 weeks or patients developing obstructive or perforated-related symptoms are suspected for complicated CR. Acute small bowel obstruction as late as many months after CE is very rare, with only a few cases reported [1,6]. The aim of this report is to present a rare case of unrecognized prolonged CR causing small bowel obstruction 6 months following the investigation due to a stenotic small bowel neuroendocrine tumor.

Case Report

An 82-year-old woman presented with diffuse periumbilical pain and diarrhea. No fever or additional symptoms were reported. A physical examination revealed abdominal distention and tenderness, with mildly elevated bowel peristalsis. Laboratory tests showed moderately elevated inflammatory markers. The patient history included episodes of longstanding, blunt, colicky abdominal pain, which were investigated by means of CE 6 months prior to admission. Capsule endoscopy investigation results were not obtained and the elimination of the capsule to the feces remained undetermined because the person responsible for the care of the patient neglected to provide adequate follow-up. The patient had a history of dementia, which also contributed to the longstanding capsule retention until the occurrence of symptoms.

Plain abdominal radiography demonstrated a radiopaque lesion resembling an endoscopic capsule in the lower abdomen (Figure 1). Abdominal CT showed small bowel obstruction with a capsule retained in the proximal ileum and no free intraperitoneal air or fluid (Figure 2). The bowel wall proximal to the retained capsule was dilated and thickened.

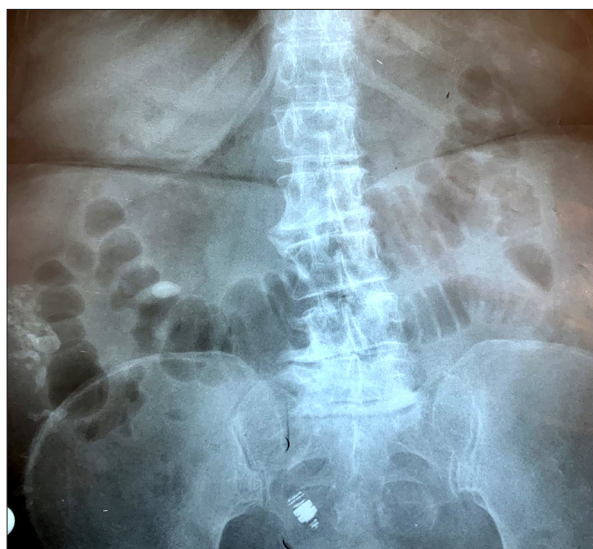


Figure 1. Plain abdominal radiography demonstrates a radiopaque lesion resembling endoscopic capsule in the lower abdomen.

Emergency laparotomy was performed. Upon exploration, a tumor involving the small bowel wall and its mesentery, causing ring-like stenosis, was identified at the proximal ileum. Palpation of the affected area revealed the presence of the endoscopic capsule, which was impacted in the stenotic area, causing small bowel obstruction (Figure 3). Enterectomy of the afflicted small bowel segment (including the tumor along with 10 cm of healthy-looking bowel on each side) was performed and intestinal continuity was restored by hand-sewn end-to-end anastomosis. The patient had an uneventful postoperative course. Histopathology report described a lesion compatible with epithelial neuroendocrine grade 2 tumor, pT3N1. Out of 39 harvested lymph nodes, 7 were infiltrated by the tumor. After discharge, she was referred to the Medical Oncology Department for further management.

Discussion

CE has recently become an important diagnostic tool used for the investigation of a variety of clinical indications, primarily the localization of occult bleeding and diagnosis of small bowel tumors and inflammatory bowel disease. Small bowel tumors are detected in 2.4% of all CEs performed [4]. Recent data suggest that small bowel neuroendocrine tumors represent the most frequent neuroendocrine neoplasm of the gastro-entopancreatic duct, with a steady increase in incidence over the last 3 decades [7], indicating the importance of CE in the diagnosis of neuroendocrine tumors, especially in early stages.

Although CE is a relatively safe procedure, there are potential complications involved, with CR being the most important. In

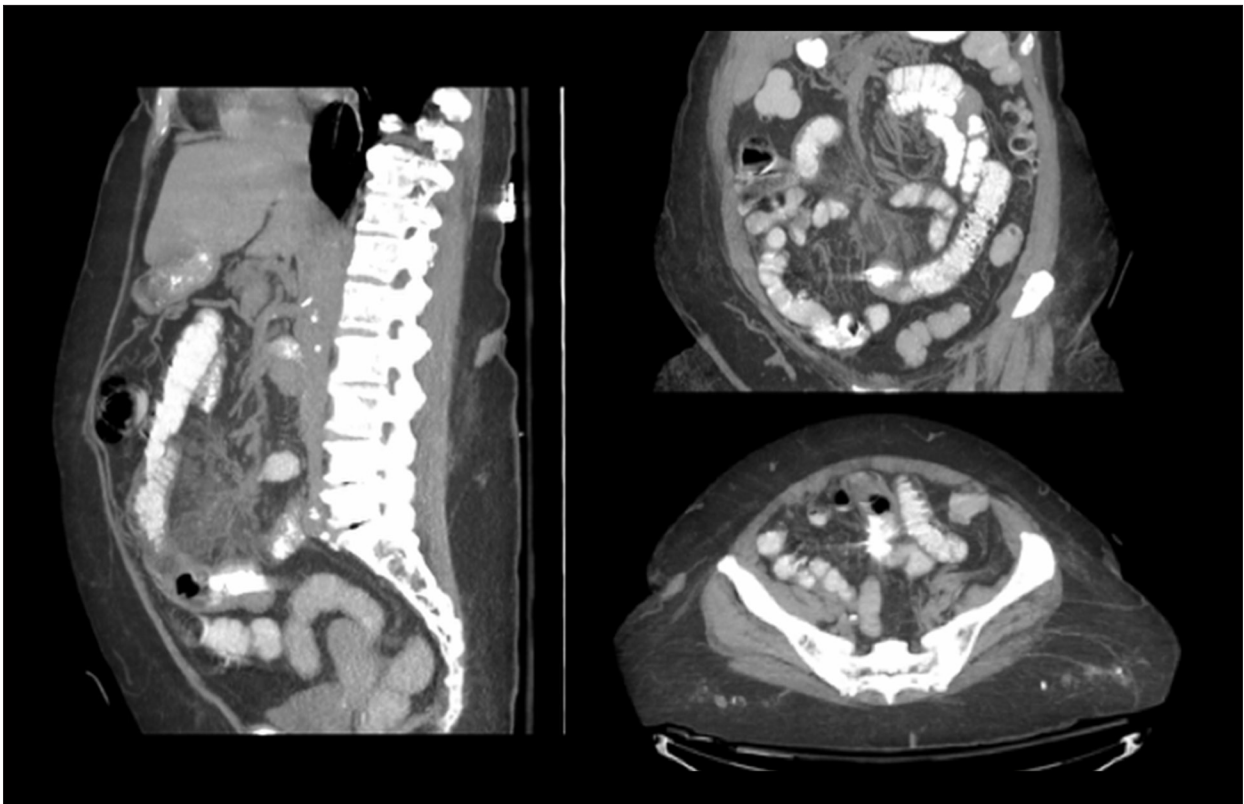


Figure 2. Multi-planar reconstruction computed tomography shows the endoscopic capsule in the lower abdomen, causing small bowel obstruction.

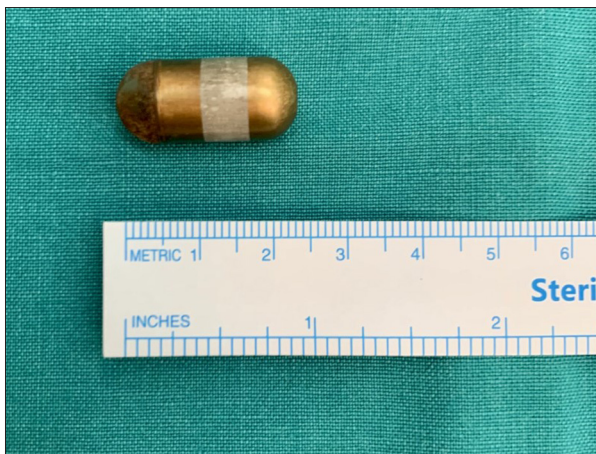


Figure 3. Endoscopic capsule surgically retrieved.

most cases, CE is concluded with the elimination of the capsule with the feces within 10 to 48 h [2]. The International Conference on Capsule Endoscopy consensus defined CR as the presence of the capsule in the GI tract for 2 weeks after ingestion, or when it is indefinitely retained unless targeted medical, endoscopic, or surgical intervention is initiated [2]. The complication of CR should be clearly differentiated from incomplete examination, which is defined as the failure of the capsule to reach the cecum within the recording time, and

delayed transit, in which the capsule is harbored in a specific part of the bowel for more than 2 h [2].

CR is asymptomatic in the majority of the cases [4]. Symptoms arise from capsule impaction causing partial and/or intermittent bowel obstruction and can be further complicated with complete obstruction or even bowel perforation. Luminal stenosis due to a variety of conditions such as ulcers, tumors, Crohn's disease-related strictures, NSAID-induced enteropathy, radiation enteritis, or post-anastomotic strictures can facilitate obstruction [8-10]. It has been stated that CR due to small bowel tumors has the advantage that the impacted capsule aids in identifying the location of the bowel segment that needs to be resected [11]. In our case, initial symptoms were attributed to episodes of incomplete small bowel obstruction caused by the neuroendocrine tumor. CR remained undiagnosed because of inadequate follow-up combined with patient dementia, which resulted in failure to confirm capsule elimination. The capsule was ultimately impacted to the stenotic-neoplastic area, leading to complete intestinal obstruction.

Although CR due to unsuspected, obstructive, or partially obstructive lesions is well described, prolonged, unrecognized CR causing small bowel obstruction many months after the initial investigation is very rare. A few reports have identified

asymptomatic patients with CR of long duration, up to even 4.5 years [12,13]. Symptomatic CR usually occurs within a few days following CE due to obstruction, making diagnosis straightforward. Cases of patients presenting with symptoms indicating obstruction or even perforation months after the initial CE are very rare and diagnosis is initially elusive because of the missed association of the 2 events. Prolonged symptomatic CR, similar to the present case, has previously been reported, with the time elapsed between CE and the presentation of symptoms ranging from 6 months to 2 years [1,6,14]. Prolonged CR usually is the result of poor follow-up leading to failure to clearly identify capsule elimination with the feces.

Contraindications to CE include clinical or radiographic evidence of bowel obstruction, extensive and active Crohn's disease with or without strictures, and intestinal pseudo-obstruction [15]. Acute abdominal pain, swallowing disorders, pregnancy, longstanding NSAID drugs use, presence of large and numerous diverticula, Zenker's diverticulum, gastroparesis, and previous pelvic or abdominal surgeries may represent relative contraindications as well [1,16]. Diagnosis of CR is typically straightforward given the recent history of the investigation and the radiopaque nature of the capsule, which allows easy detection by imaging techniques. If no evidence of capsule excretion is reported within a few days following CE, an X-ray of the abdomen should be performed. Treatment for refractory cases and complete small bowel obstruction typically requires surgical intervention. Capsules trapped high in the upper GI tract can also be managed by endoscopic retraction as a first line of attempt.

In order to avoid CR, the patency capsule (PC) was introduced [3]. It is a radiopaque, self-dissolving capsule, similar in shape and size to the aforementioned endoscopic capsule. PC is used prior to CE and unlike CE does not transmit images, but provides indirect information regarding small bowel patency. It has been proved to be a safe and efficient diagnostic tool in patients with risk factors for CR, allowing subsequent use of CE. It is considered safe to proceed to a CE when the PC traverses the intestinal tract within 30 h [17]. Beyond that time limit, the PC begins to be dissolved by the digestive juices that enter through uncoated areas on the edges of the capsule, preventing impaction in stenotic areas and subsequently small bowel obstruction [17]. If the patient experiences abdominal pain or excretes fragmented PC with the stools, GI patency cannot be confirmed; therefore, CE is not safe. However, there are still some reported cases in the literature of patency capsule retention [18]. Unfortunately, in our case, the PC was not used prior to CE.

Conclusions

CE has opened new horizons in small bowel investigation. Appropriate post-CE follow-up is necessary to diagnose the complication of CR. CR should be suspected in the absence of evidence of capsule excretion and in the presence of obstruction symptoms. Clinicians should be aware that CR can occur even after a considerable time following CE.

Conflict of Interest

None.

Declaration of Figures Authenticity

All figures submitted have been created by the authors who confirm that the images are original with no duplication and have not been previously published in whole or in part.

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