

Small Bowel Tumor Detection in Capsule Endoscopy: Balancing Preoperative Diagnosis Against Capsule Retention



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Received 17 July 2012; Revision submitted 17 July 2012; Accepted 13 August 2012

Abstract

This is the case report of a 58-year-old male patient who presented with recurring abdominal pain of 4 months duration. He had undergone multiple investigations including upper and lower gastrointestinal tract endoscopies and diagnostic laparoscopy, but there were no significant findings detected.

Capsule endoscopy revealed a submucosal small bowel tumor that was suspected to originate from the distal third of the small bowel. Surgery was indicated and a highly differentiated neuroendocrine tumor was found at laparotomy at the distal ileum. An ileocecal resection was performed confirming a neuroendocrine tumor of the small bowel (G2T2N1M1). This article is part of an expert video encyclopedia.

Keywords

Balloon enteroscopy; Capsule endoscopy; Capsule endoscopy, video; Endoscopy; Neuroendocrine tumor; Small bowel; Video.

Video Related to this Article

Video available to view or download at doi:10.1016/S2212-0971(13)70121-3

Technique

Patency capsule to indicate small bowel obstruction and capsule endoscopy for detection of small bowel tumor.

Materials

- Capsule endoscope: PillCam™ SB2; Given Imaging EMEA, Hamburg, Germany.
- Agile™ patency capsule; Given Imaging EMEA, Hamburg, Germany.

Endoscopic Procedure

Neuroendocrine tumors (NETs) are solid malignant neoplasms that may originate from any neuroendocrine cells throughout the body. Many of these tumors have been called 'carcinoids' in the past. Typically, NET arises in the stomach, the lung, or the rectum. Small intestinal NETs (SI-NETs) are the most common gastrointestinal manifestation of NET. The patient's prognosis depends on the differentiation of the tumor and on tumor spread. Incidence of SI-NETs has

significantly increased in the last years, which may be due to *in vivo* changes, increased clinical and pathological awareness, or increased detection of tumors with improved diagnostic methods. SI-NETs are typically malignant and diagnosed late; survival rates have remained unchanged over the last 30 years.

In a large multicenter series on 5129 small bowel capsule endoscopies, 124 (2.4%) had small bowel tumors (112 primary and 12 metastatic). In approximately 90% of patients, gastrointestinal bleeding was the reason for investigation; others were abdominal pain and search for primary neoplasm. The main primary small bowel tumor was gastrointestinal stromal tumor (32%), followed by adenocarcinoma (20%) and SI-NET (15%); 66% of secondary small bowel tumors were melanomas.

This is a case report on a 58-year-old male patient who presented with recurring abdominal pain of 4 months duration. Several diagnostic tests had previously been performed, and upper and lower gastrointestinal tract endoscopies and diagnostic laparoscopy were without significant findings. A few days before referral to our hospital, mechanical intestinal obstruction was clinically suspected and resolved with conservative treatment. The procedure was discussed now with the surgeons, and computed tomography imaging was performed. A small liver lesion was detected, possibly representing metastasis. There was no sign of intestinal obstruction or intra-abdominal pathology visualized.

Now, the patient underwent patency testing of the intestinal tract by ingesting a so-called 'patency capsule.' This device is a dissolvable capsule that approximates the size and shape of the PillCam small bowel video capsule. In case it is not egested within approximately 30 h, it disintegrates by means of the intestinal fluid contents, which dissolves the capsule. Unfortunately, this patency capsule was not excreted, but the patient suffered abdominal pain for a few hours after

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swallowing the test capsule, only resolving approximately 36 h later. Magnetic resonance imaging (MRI) of the small bowel (MRI enterography) did not detect any intestinal pathology but confirmed the small liver lesion. Diagnostic laparotomy was suggested now, but in view of previous negative laparoscopy, further clarification of the etiology of the patient's symptoms and localization of disease was looked for. Consideration was given to the fact that causation of temporary bowel obstruction might be difficult to identify during laparotomy. Consent was obtained by the surgeon and the gastroenterologist to offer video capsule endoscopy, and an increased risk of capsule retention was discussed with the patient in detail.

Capsule endoscopy revealed a small bowel tumor potentially in the distal third of the small bowel. Surgical resection was scheduled for an appointment 4 days later with the patient being asymptomatic. However, 2 days later, abdominal pain recurred and a mechanical small bowel obstruction with a retained capsule endoscope was diagnosed by X-ray imaging. Immediate surgery was indicated and a highly differentiated NET was found by laparotomy at the distal ileum. An ileocecal resection was performed and the tumor completely resected, with histopathology disclosing a G2T2N1M1 (liver) SI-NET.

Key Learning Points/Tips and Tricks

- Small bowel capsule endoscopy is useful in detecting small bowel neoplasm and might even be indicated in the case that a tumor obstruction cannot be excluded.
- Tumor retention of the capsule endoscope may not be a complication of the investigational method but part of the diagnostic process, and removal of the endoscope will take place at surgical resection of the tumor.

Complications and Risk Factors

- Capsule retention is a potential risk in diagnosing small bowel tumors. Provocation of real mechanical bowel obstruction by the capsule endoscope has only exceptionally been reported until now, but the capsule is retained before a stricture in most cases without causing symptoms.
- The Agile patency capsule is reported to be reliable in excluding significant bowel strictures and preventing capsule retention.
- In the reported case, the patency capsule was not excreted, which indicates significant small bowel obstruction. But for all the negative test results, from flexible endoscopy, MRI, and laparoscopy, capsule endoscopy was nevertheless performed. Risk of capsule retention was indeed anticipated; therapeutic laparotomy was considered a reasonable therapy in case of retention for a one-step capsule retrieval and localization of the obstructive intestinal site.

Alternatives

- Balloon enteroscopy is a valid alternative to capsule endoscopy in diagnosing small bowel disease and might be preferred in suspicion of small bowel tumor obstruction in many cases. Time and effort of this technique is significant; combining oral and peranal investigations leads to complete visualization of 80% of the small bowel at the most. Balloon enteroscopy offers the opportunity to take biopsies.
- Balloon enteroscopy could have been used to retrieve the capsule endoscope in the presented case, but capsule retrieval was envisaged for the time of tumor resection in this case.
- Magnetic resonance (MR) enteroclysis might be performed instead of MR enterography. MR enteroclysis improves distention of the small bowel and might therefore be preferred to detect subtle pathology of the distal small bowel or distal small bowel obstruction.

Scripted Voiceover

Time (min:sec)	Voiceover text
0:01	A 58-year-old male patient presents, reporting 4 months of recurring abdominal pain.
0:10	A hypervascular lesion is detected in the liver, but gastrointestinal endoscopies and diagnostic laparoscopy revealed no significant findings.
0:18	Capsule endoscopy was performed after obtaining informed consent of the patient and discussing possible capsule retention.
0:31	Retained secretions indicate a stenosis of the distal small bowel; shortly thereafter, a tumor is visualized.
0:42	The video sequence is repeated to outline the typical features of this small bowel tumor.
0:52	Distorted mucosal vessels on an intraluminal protruding lesion are indicative of a neoplasm of the small bowel.
1:10	The capsule endoscope is retained before the tumor, bouncing back into the proximal small bowel and reveals normal mucosal surface.
1:25	Elective surgical resection of the small bowel tumor was scheduled for a few days later. We refrained from doing balloon enteroscopy or any other diagnostic test because of the definitive capsule endoscopy findings. Capsule retrieval did not seem necessary.
1:50	The patient returned to the hospital early with acute abdominal pain. Plain abdominal x-ray was performed.
2:00	Plain x-ray exam indicates mechanical small bowel obstruction and the capsule endoscope is retained at the right lower quadrant. During urgent laparotomy the tumor was removed from the distal small bowel.
2:14	A highly differentiated neuroendocrine tumor was found at histopathological examination.

Further Reading

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