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case report

Small-bowel carcinoid presenting with acute bleeding detected upon wireless capsule endoscopy

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Background. *Intestine carcinoid usually presents with clinical symptoms and signs deriving from its endocrinological influences and rarely bleeds profusely.*
Case report. *We present a patient with intestinal bleeding of unknown origin. After conventional diagnostic procedures only wireless capsule endosopy was able to discover a tumour of small bowel, which was the reason of bleeding. On patohistological examination after the surgical resection it proved to be a small bowel carcinoid.*
Conclusions. *There are indications that WCE, besides being the first small bowel imaging technique, is a very important diagnostic tool, deserving consideration in the early phases of diagnosing small-bowel disease, especially in less intensive or occult bleeding.*

Key words: intestinal neoplasms-dignosis; carcinoid tumor; endoscopy

Introduction

The small intestine has to-date been a problematic section of the gastrointestinal (GI) tract for exploration. In patients with obscure or manifest GI bleeding the major part of the small bowel was unreachable by means of esophagogastroduodenoscopy (EGDS), push enteroscopy (PE) and coloileoscopy (CIS), the major limitations being its remoteness from GI tract openings and its length (3.4-7.9m approx.). Other conventional diagnostic procedures in small bowel bleeding are blood pool scintigraphy, angiography and barium small bowel series. Virtual endoscopy, employed lately, is an interesting alternative to conventional diagnostic techniques.[1]

In recent years a novel endoscopic tool, the wireless capsule endoscopy (WCE) has been developed.[2] It allows to endoscopically explore the small intestine in its entirety using a system composed by a peristalsis propelled video capsule with a radio transmitter, a sensor-array attached to the patients abdominal wall and a data recorder worn at the patient's belt. The data collected can then be retrieved and analyzed using a workstation.

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Abbreviations: GI – gastrointestinal, EGDS – esophagogastroduodenoscopy, PE – push enteroscopy, WCE – wireless capsule endoscopy, RBC – red blood-cell count, MCV – medium red blood-cell volume

We present a case of manifest GI bleeding in which WCE facilitated identification of the bleeding site, its localization and treatment.

Case report

A 58-year-old man with maelena lasting for 3 days prior to the admission was referred to our hospital. On admission the patient was complaining of minor fatigue during the past few days. He had been on antihypertensive and statin therapy for several years. He was otherwise in good health, somewhat pale; on rectal examination black semi-fluid stools were found. The only pathological laboratory finding was normocytic anaemia (red blood-cell count - RBC 3.75 10^9/L, Hb 11.4 g/dL, medium red blood-cell volume - MCV 89.5 fL). He underwent oesophagogastroscopy with no positive finding. On colonoileoscopy, two polyps in the sigmoid without any sign of recent haemorrhage were found and frank maelena was seen to be flowing from the ileum into the caecum. Blood pool scintigraphy showed some active bleeding in a region projecting into the right upper abdominal quadrant, most probably a part of the small bowel. On angiography of the superior mesenteric artery and celiac trunk no extravasate was found in their course. On WCE performed with an M2A plus capsule and analyzed using the RAPID software (both Given Imaging Inc., Yoqneam, Israel) small bowel mucosa showed few small angiodisplasia-like mucosal changes in the proximal jejunal region. Following 3.5 hours of small bowel transit time we visualized a bleeding site in the vicinity of the tumour of 7 mm in diameter. The tumour was projected into the right lower quadrant of the abdomen (Figure 1).

On explorative laparotomy, a small umbilication of jejunal serosa lying 50 cm distally to the ligament of Treitz was found. At this site a 10 mm fixed tumour was palpable. Distally from it the lumen was filled with blood, which was even more evident on transillumination. A jejunal segmental resection of 5cm (Figure 2), followed by a one-layer terminoterminal anastomosis, was performed. The surgeon found no pathology on palpatory examination of the liver.

On patohistological examination the resected formation was found to be a well differentiated malignant (more than 10 mm in diameter) carcinoid of the small intestine, initial stage T2 N0. The tumour cells expressed serotonin, some of them somatostatin. There

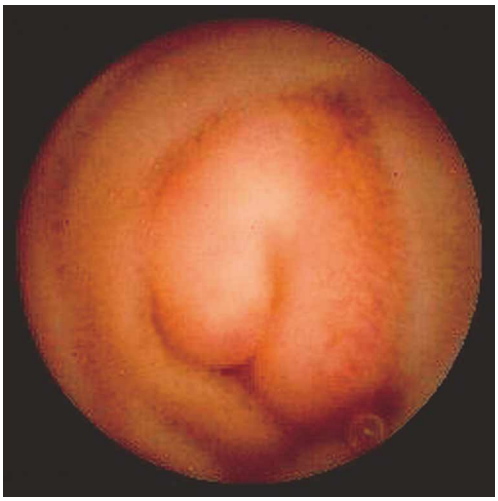

Figure 1. Capsule endoscopy view of the tumour.

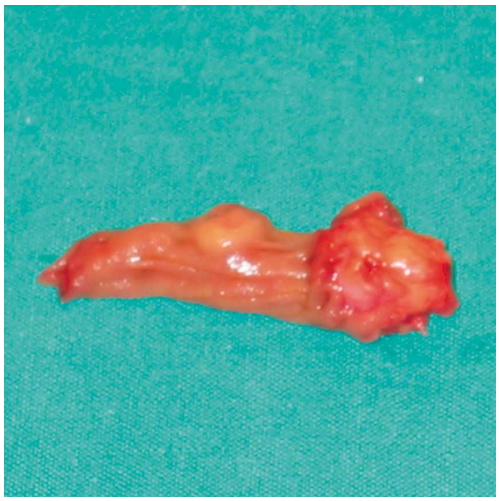

Figure 2. Tumour after excision.

was no need for the additional therapy, only the follow-up was recommended.

Discussion

When haemorrhage from the GI tract is suspected, we usually choose from, or combine, upper GI tract endoscopy and colonoscopy, which gain visual access to both end-sides of the GI tract and only to a small part of the small bowel, proximal jejunum and distal ileum. We performed both in this case, but didn't visualize any actively bleeding sites, and consequently deduced that bleeding derived from the small intestine.

PE has a diagnostic yield ranging between 13 and 38%; in a randomized trial its sensitivity was 37% compared to 64% for WCE.[3,4] It has the advantage of allowing treatment and specimen cropping and has higher specificity in its range.[5] Because of the proximity of the bleeding lesion to the ligament of Treitz (50cm) in our patient's case PE would have probably led to the diagnosis without any need to perform WCE, but we didn't perform it. In regard to its lower diagnostic yield and the possibility of performing WCE, we didn't perform barium small bowel series. Besides involving patient radiation, trial barium small bowel series were in different studies shown to be less diagnostic than WCE (27% vs. 45% of cases).[6,7]

The explorative surgery unaccompanied by additional techniques has a yield of approximately 10%.[8] The recognition of vascular lesions cannot be achieved without the aid of transillumination or intraoperative endoscopy. The latter is invasive and associated with many complications, i.e. postoperative paralytic ileus and perforation. We refrained from performing explorative surgery with intraoperative endoscopy, as the bleeding wasn't haemodinamically or otherwise threatening to the patient in the immediate time, not advocating for such an invasive technique.

Other morphologic and functional techniques, such as angiography of the superior mesenteric artery and blood pool scintigraphy with marked erythrocytes promised to bring some insight into the diagnostic problem.

Blood pool scintigraphy gives a positive scan with at least 5 ml of intraluminal blood. It may confirm small intestinal bleeding, it confers no information about the nature of the bleeding lesion and accurate localization is impossible. With sequential scanning it allows the detection of intermittent bleeding. Angiography of mesenteric arteries can demonstrate active bleeding and well vascularized nonbleeding lesions. Its diagnostic yield is 50-70%, but falls to 25-50% when the bleeding slows or stops; a positive find can only be gained with bleeding rates exceeding 0.5 or 1 ml/min.[9] In our case blood pool scintigraphy pinpointed to a bleeding site in the small intestine, whereas with angiography no bleeding site was identified. It might be that the bleeding site in our patient was smaller than required for identification, the more probable explanation is that at the time of angiographical examination there was no bleeding from the site.

Following angiography and blood pool scintigraphy we performed WCE. We visualized a bleeding site just before the tumorous formation and concluded it could be an angiodisplasia. When surgery was performed, besides the tumour, no angiodisplastic lesion was found. During WCE we probably wrongly interpreted blood in the lumen as deriving from a »lesion« of the intestinal mucosa, which, revising the WCE images, we concluded could well be an adherent coagulum or just superimposed blood. As we know of, our diagnostic mistake had no repercussions on the patients' well being.

Aftermath, we reconsidered the diagnostic path we took in view of the diagnostic yield of single diagnostic techniques and their cost. EGDS and colonoscopy were well employed

in our case as they helped eliminate the regions inspected as possible sites of bleeding and gave ground to suspicion of ongoing bleeding in the small intestine. From here we proceeded to angiography and blood pool scintigraphy, costly techniques, which drew us no nearer to the diagnosis. The cost of WCE is approximately that of angiography alone and in our case it gave the only definitive information, which in consequence led to the cessation of bleeding by removal of the tumour. Therefore, it would have been more cost-effective, if we had performed WCE before employing other techniques.

It has been demonstrated that WCE has many advantages over conventional procedures; it produces visual images and has a greater sensitivity in uncovering small bowel disease. It is also safe, easy for the patient, can be repeated many times, it has limited contraindications and a low complication rate. Its limitations are almost as obvious as its advantages; it confers diagnostic potential, but lacks possibilities of tissue sampling and treatment,[10] the exact site of the abnormality is not readily determined and it is demanding in view of the time needed to view the produced images.

More experience will be needed in this field, but there are indications that WCE, besides being the first small bowel imaging technique, is a very important diagnostic tool, deserving consideration in the early phases of diagnosing small-bowel disease, especially in less intensive, or occult bleeding.

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