



Surgery for a small intestine haemorrhage with use of a laparoscope for localization of the bleeding site

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ABSTRACT

Unlike in other parts of the digestive tract, the localization of a haemorrhage site in the small intestine is difficult. In the case of massive bleeding and the need for an urgent operation, localization of the area or site of bleeding in the small bowel may be challenging for the surgeon. The authors report a method of finding sites of bleeding using a laparoscope in a patient with massive gastrointestinal bleeding. Endoscopic diagnostics were inconclusive and an angio-CT revealed bleeding in the small bowel in the left middle-abdomen. Emergency laparotomy was performed with enterotomy and an inspection of the suspected

part of the intestine with a laparoscope. Three sites of bleeding were found, of which one with active bleeding was ligated. Additionally, the small intestine parts over the bleeding sites were devascularized by ligation of arterial branches supporting them. This resulted in the bleeding stopping and the patient eventually recovering. The authors believe that the presented technique may be helpful in intraoperative localization of bleeding sites in the small bowel.

Keywords: obscure gastrointestinal bleeding; small intestine; laparoscopy.

INTRODUCTION

Obscure gastrointestinal bleeding is defined as bleeding where the site and source in the gastrointestinal tract cannot be determined despite the use of advanced diagnostic measures, including endoscopy, video capsule endoscopy, angio-CT and CT enterography [1, 2, 3]. This rare condition may be caused by a small bowel pathology: vascular malformation, tumour, diverticulum or inflammation. As these situations are rare and finding the source of bleeding in the small bowel is difficult, diagnosis of these pathologies is challenging and time consuming. Emergency surgery may be necessary in the case of massive haemorrhage, ineffective endoscopic measures and rapid deterioration of the patient's condition. When endoscopic findings are inconclusive, an intraoperative identification of the site of bleeding in the small bowel may be challenging. Some authors suggest a wide resection of the suspected portion of the bowel, whereas others opt for a wide enterotomy and a direct inspection to find the site of bleeding. Both options may be ineffective and carry a risk of serious complications.

This article displays the unusual use of a laparoscope in identifying the site of bleeding. We report a case of a middle-age woman suffering from recurrent, serious bleeding from the small bowel, in whom sites of bleeding were diagnosed intraoperatively by direct inspection of the bowel lumen with a laparoscope.

The authors did not find any similar report in the literature and, therefore, decided to present this case.

CASE REPORT

A 56-year-old female patient was admitted to the authors' institution due to serious gastrointestinal bleeding from an unknown source. Five days before admission, the patient underwent a total left hip joint alloplastic in the orthopaedic department due to osteonecrosis of the femoral head. Her history towards chronic gastrointestinal diseases was negative, but she was a constant user of strong analgesic drugs because of severe pain from her hip joint. Likewise, post-operatively she required high doses of painkillers, including non-steroidal anti-inflammatory drugs (NSAIDs) and opioids (protected with proton pump inhibitors). On the 3rd post-op day, the patient reported weakness and discharged a large amount of tarry stools. She presented symptoms and signs of serious haemorrhage: low blood pressure (80/60 mmHg), tachycardia (pulse rate 126/min), paleness and anaemia (Hb = 6.3 g/dL, E = 2.4 G/L, Ht = 30). She received a replacement of 4 units of red cell concentrate (RCC); however, there was no significant response. The patient was given extensive diagnostics but the results of the emergency gastroscopy and colonoscopy were inconclusive: the former only revealed some non-bleeding erosions in the duodenal bulb, whereas the latter only showed tarry stool inside the colon. An angio-CT-scan showed a leakage of the contrast into the lumen of the small intestine localized in the left middle-abdomen, but embolization of the bleeding vessels was not attempted. During all these diagnostic measures, the patient's general condition significantly deteriorated despite a transfusion of 6 more units of RCC. She was pale, cold, sweating and hypotensive. The consulting surgeon made a decision to conduct an emergency operation.

PREOPERATIVE PLANNING

The authors had the following operative plan:

- incision of the jejunum (enterotomy) at the level of presence of blood,
- clearing of the jejunum by rinsing and aspiration of the contents as far distally as possible,
- introduction of the laparoscope into the lumen of the cleared jejunum,
- internal inspection of the bowel and coagulation or ligation of bleeding sites.

A laparoscope was prepared for this operation, although the main procedure was performed via laparotomy.

OPERATION COURSE

The patient was operated on under general anaesthetic. The abdominal cavity was opened via a midline incision and after opening the peritoneum, 1000 mL of clear fluid was sucked. The small intestine was filled with blood from about 70 cm distally to the Treitz ligament, suggesting that bleeding was occurring at this level. The large bowel was also filled with blood. The jejunal wall was incised and the bloody contents of the bowel were aspirated, followed by the introduction of a catheter and a saline solution rinse. The jejunum was rinsed several times and cleared of blood, clots and jejunal juice. To prevent the retrograde advancement of bloody contents, the distal part of the jejunum was clamped with a fine intestinal clamp. Once the jejunum was cleared, a 30 cm long, oblique optics laparoscope was introduced into the lumen and a detailed internal inspection of the suspected portion of the bowel was performed. This resulted in the discovery of 3 points where clots were firmly attached to the jejunal mucosa: one 5 cm from the entry point of the laparoscope and 2 more approx. 9 cm distally. An attempt at removing one of the clots resulted in bleeding which convinced the authors that it may be the source of the haemorrhage. To achieve haemostasis, the bleeding site was ligated with 1 stitch put through the mucosa. Next, all 3 sites of bleeding were devascularized externally, by the ligation of the arterial bundles supplying them from the mesentery. Enterotomy was closed with a linear stapler and a drain was put in the abdominal cavity.

The patient's general condition was stable enough to move her to the surgical ward. In the following postoperative days, the patient's condition gradually improved: she still required a replacement of 2 units of RCC, but signs of gastrointestinal bleeding disappeared. Oral feeding was started on the 2nd post-op day and the drain was retrieved on the 4th day. Eventually, the patient was discharged on the 8th postoperative day in fairly good shape. She had a follow-up at 4 months and was found in good condition, without the recurrence of gastrointestinal bleeding.

DISCUSSION

The presented case is interesting because of how unusual it is to use a laparoscope for the identification of the source of bleeding in the small bowel. Intraoperative use of an endoscope for introspection of the intestine lumen is not rare but requires that the instrument is ready in advance as it is not normally available in the theatre. Also, most surgeons are not familiar with using an endoscope and, therefore, additional support from a gastroenterologist may be necessary. In contrast, a laparoscope is immediately available in the theatre as it is used daily. The authors did not find any reports of similar cases in the literature.

As was mentioned earlier, intraoperative localization of the bleeding point along the 1.5 m of the small intestine is challenging. There are 2 conventional methods for doing this. The 1st option consists of a resection of the intestine, beginning from the potential site of bleeding (the small bowel filled with blood is slightly cyanotic, while an empty small bowel is pink). After resection of the first 30 cm of the small bowel, the excised fragment is cleaned and inspected for the presence of a bleeding site; when it is found, the operation may be completed by anastomosis of the bowel stumps. If it is not, the next 30 cm fragment should be resected and inspected, until the source of bleeding is found. The 2nd conventional technique consists of gradual, continuous incisions of the small bowel and inspection of the mucosa in order to detect the haemorrhage site. Both techniques require resection of a portion of unaffected (healthy) small bowel which may result in further morbidity. Both also come with a risk of complications. The technique reported in this article seems to be safer and without the drawbacks of conventional methods.

The authors believe that a good alternative for surgery in this case is a transcatheter arterial embolization of the bleeding vessel during angio-CT scanning. This technique has been successfully used for endovascular fitting of bleeding from gastric and duodenal peptic ulcers which could not be controlled by endoscopic measures. It has a significantly lower mortality rate when compared to conventional surgery [4]. However, the interventional radiologist did not undertake an attempt to embolize.

The actual cause of massive bleeding in our case remains unclear, although it is likely to be an effect of the chronic use of relatively large doses of analgesic drugs, mostly NSAIDs. Tai and McAlindon presented a literature review on the small bowel enteropathies caused by these drugs. An assessment of the mucosa was performed with capsule endoscopy. The authors found that the concomitant use of proton pump inhibitor agents with both selective and nonselective NSAIDs in gastroduodenal protection exacerbates endoscopic enteropathy, which is thought to be due to intestinal dysbiosis. In a proportion of patients, enteropathy was associated with haemorrhagic changes of the mucosa and manifested clinically as intestinal bleeding [5]. It is likely that this mechanism played a role in the presented case. Unfortunately, the cause of bleeding (ulceration, erosion, protruding vessel or vascular malformation) was not precisely determined during laparoscopic inspection of the small bowel.

Reviewing the literature, the authors found numerous articles devoted to the diagnostics and management of obscure

gastrointestinal haemorrhages. Most of them concern effectiveness of various diagnostic measures such as endoscopy, video capsule endoscopy, angio-CT and CT enterography. The most commonly diagnosed causes of obscure bleeding from the small bowel were inflammatory lesions [5], diverticula [6], vascular malformations [7, 8], antithrombotic therapy [2], benign tumours (lipomas) [9] and malignancies (carcinoma and gastro-intestinal stromal tumours) [10].

A final remark concerning nomenclature – The American College of Gastroenterology, in an article published in 2015, suggested replacing the term “obscure gastrointestinal bleeding” with “suspected small bowel bleeding” [1]. The authors believe that both scientific evidence and common sense justify this statement when the source of bleeding is detected neither in the stomach/duodenum nor in the large bowel. In these cases, it must be located in the small intestine and further diagnostic effort should be focused on small bowel investigations.

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