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Case Report

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Recurrent intestinal bleeding treated by double-balloon endoscopy in haemodialysis patients

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Abstract

Gastrointestinal (GI) bleeding is a common and troublesome complication of end-stage renal disease (ESRD). Patients often have various lesions in the small bowel and in either upper or lower GI tracts. Recently developed double-balloon endoscopy (DBE) enables observation of the entire small intestine through a combination of anterograde and retrograde approaches. Moreover, DBE is useful not only for diagnosis of small intestinal lesions; it provides a mode of treating the disease. This article presents patients with several small intestinal diseases from our facility. Their bleeding sources were identified using DBE. We also report two representative cases of angiodysplasia that had been diagnosed and treated successfully using DBE. One case particularly underscored the usefulness of the combination of capsule endoscopy (CE) and DBE as an electively diagnostic approach for patients with GI bleeding. Small intestinal bleeding is often observable repeatedly in a single patient, as described for case 1. In such circumstances, DBE can treat the lesions successfully without surgical procedures. In this report, ESRD patients, in whom comorbid conditions made it difficult to perform surgical procedures, receive great benefit from DBE.

Keywords: angiodysplasia; capsule endoscopy; double-balloon endoscopy; end-stage renal disease; gastrointestinal bleeding

Background

Among ESRD patients, gastrointestinal (GI) bleeding is a common complication. Angiodysplasia is the second most common cause of GI bleeding in elderly patients with end-stage renal disease (ESRD) [1]. These lesions respectively account for about 20 and 30% of upper and lower GI bleeding and approximately one-half of recurrent upper GI bleeding [2].

A double-balloon endoscope (DBE) is a newly developed device that can be inserted more deeply into the small intestine via either an oral or anal approach. It can support endoscopic observation and treatment for the entire small intestine while obviating general anaesthesia.

After both endoscope itself and overtube reach the duodenum, the balloon fitted to the tip of overtube is firstly inflated to fix the tube to the intestine. Then the endoscope is inserted further through the overtube in place. When the endoscope is inserted as far as possible, the balloon on the endoscope tip is inflated. Thereafter, the balloon of the overtube is deflated, and the overtube can reach the tip of the endoscope with the use of the endoscope itself like a guidewire. When the distal end of the overtube reaches the end of the endoscope, the balloon on the overtube is inflated to fix a distal side to the intestine. The above-described sequence is repeated until the endoscope arrives at the target portion of intestine. We performed DBE with no major complications on four ESRD patients. We present herein those cases as well as several considerations about newly developed techniques that enable us to observe the small intestine.

Case reports

Case 1 (A.T.)

The patient was a 70-year-old male who started to receive haemodialysis because of diabetic nephropathy in 1992. He developed haematochezia from 1995. Although he had undergone both upper and lower gastroenteral endoscopy repeatedly, the bleeding point was not determined. Scintigraphy performed to detect GI haemorrhage revealed an accumulation of activity on the right side of the common iliac artery, which suggested small intestinal bleeding.

Moreover, his blood type of AB and D negative was difficult to match for blood transfusion. He was referred to our hospital in June 2006 for more extensive examination and treatment. He had a haemoglobin concentration of 5.6 g/dl at admission. He underwent DBE, which showed red spots at the middle portion of the jejunum. We treated this lesion using argon plasma coagulation (APC) and clipping (Figure 1-A, B). Thereafter, the same type of lesion appeared four times in different areas of the intestine. However, we treated these lesions successfully using the same method (Figure 1-C).

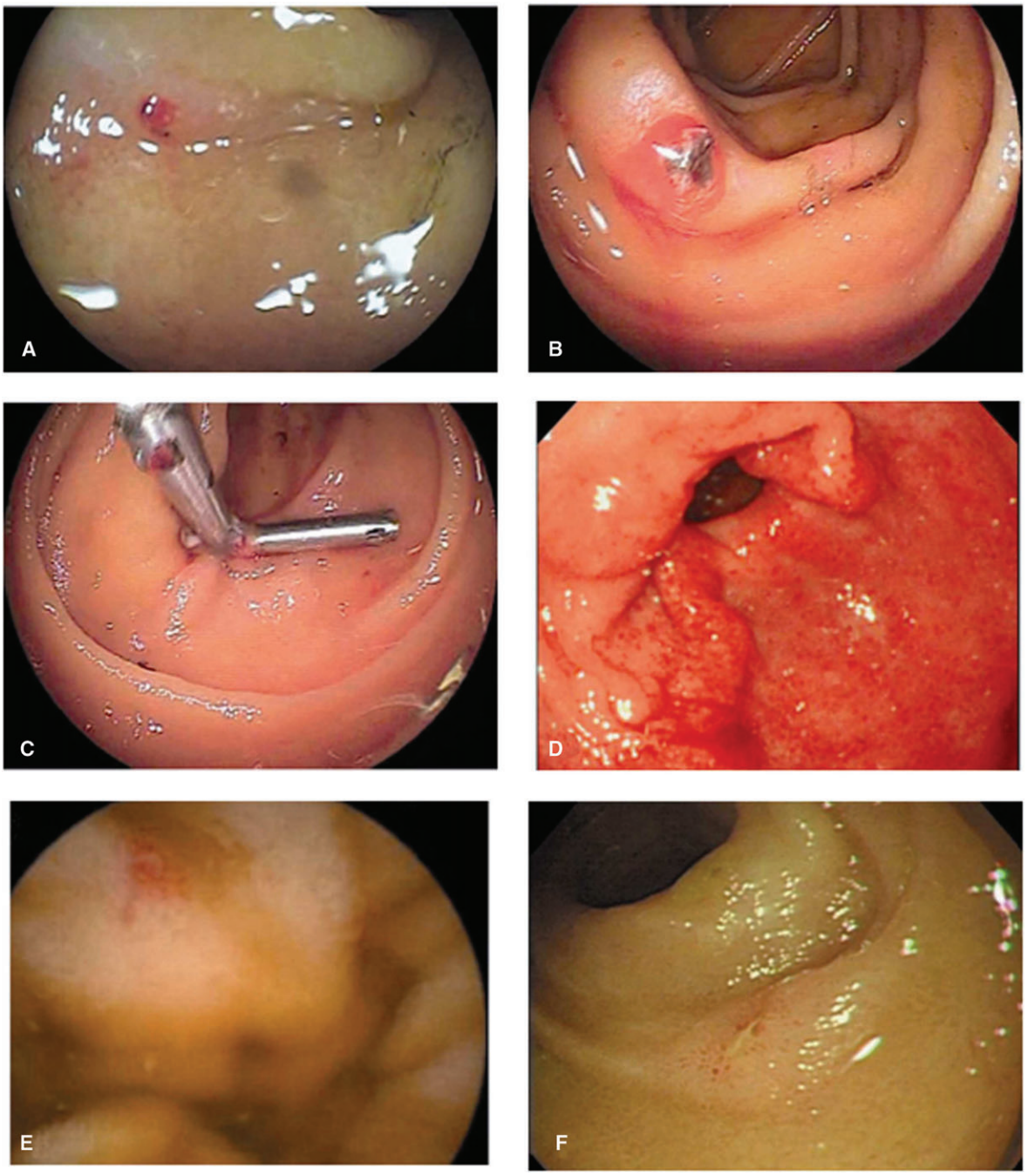

Fig. 1. Endoscopic findings of each patient. Case 1: a bleeding point could be observed by double-balloon endoscopy (**A**). Argon plasma coagulation technique was applied to the lesion (**B**). Clipping under observation by double-balloon endoscopy was also added to the same lesion (**C**). (**D**) Case 2: diffuse antral vascular ectasia (DAVE) lesion was observed with use of conventional upper gastric fibrescopy. (**E**) Case 3: Angiodysplasia observed by capsule endoscopy. (**F**) Case 4: intestinal erosion was observed by double-balloon endoscopy.

Case 2 (S.M.)

Thepatient was a 58-year-old male who started to receive haemodialysis for a condition of unknown aetiology in 2006. He had liver cirrhosis and received radiofrequency abrasion therapy for treatment of hepatocellular carcinoma. After he developed a sudden decrease in Hb as well as haematochezia, upper GI endoscopy and colonoscopy failed to identify the source of bleeding. Scintigraphy performed to detect GI haemorrhage revealed an accumulation of activity on the upper jejunum. He underwent capsule endoscopy (CE), which showed diffuse antral vascular ectasia (DAVE) and angiodysplasia in the small intestine (Figure 1-D). He underwent DBE. Then he received APC at DAVE. He was discharged and showed no clinical signs of recurrent bleeding.

Case 3 (M.K.)

The patient was a 74-year-old male who started to receive haemodialysis for a condition of unknown aetiology in 1989. He had peripheral arterial disease and angina pectoris. He developed haematochezia in March 2008. Upper endoscopy and colonoscopy failed to identify the source of bleeding. He was referred to our hospital in April 2008 for more extensive examination and treatment. He had a haemoglobin concentration of 7.5 g/dl at admission. He underwent CE, which showed angiodysplasia at the upper side of the jejunum (Figure 1-E). Immediately after the CE procedure he developed an inflammatory reaction of unknown aetiology. Moreover, the capsule endoscope itself became lodged within the small intestine. We postponed the scheduled DBE until his general status was resolved. During the follow-up, his haematochezia stopped. We continued to monitor the patient closely without therapy because the active bleeding had ceased.

Case 4 (I.Y.)

The patient was a 59-year-old male who started to receive haemodialysis because of diabetic nephropathy in 2005. He had liver cirrhosis caused by hepatitis C virus infection, which was treated with interferon. He developed haematochezia from April 2008. He received upper and lower endoscopy at an outpatient clinic, but the bleeding point was not detected. He was referred to our hospital in May 2008 for more extensive examination and treatment. Although vascular ectasia was detected at the upper jejunum using CE, we were unable to identify the source of the active bleeding point. Although he underwent DBE, we were unable to identify the source of bleeding (Figure 1-F). During the follow-up, his haematochezia stopped. Although his Hb had been as low as 7.1 g/dl at the outpatient clinic, his haemoglobin concentration recovered to 9.3 g/dl at admission. We closely followed up his condition without therapy because active bleeding had ceased.

Discussion

Patients with ESRD are well known to have an increased incidence of haemorrhagic complications [3]. Both platelet dysfunction and quantitative abnormality of the von Willebrand factor have been considered as important predisposing factors for haemorrhagic diathesis in such patients. Zuckerman *et al*. [2] reported a 39% occurrence of clotting abnormalities in patients with chronic renal failure.

Acute GI haemorrhage in patients with chronic renal failure is a severe complication causing higher mortality and morbidity rates than in cases without chronic renal disease [3,4]. Recurrent bleeding is more frequent in patients with chronic renal failure than in those without chronic renal failure [2,4]. Consequently, early recognition of the exact bleeding site and prompt treatment are important for management of such patients.

Haemorrhage at the small intestine is less common than bleeding in the upper GI tract or colon, but its underlying cause is more difficult to diagnose [5,6]. Regarding haemorrhage of the small intestine, assessment of the exact localization and the cause of bleeding have been difficult both clinically and endoscopically [7].

DBE, a newly developed endoscopic visualization technique of the small intestine, was developed by Yamamoto *et al*. [8] in 2001. A typical DBE comprises a 200 cm long endoscope, a 145 cm long semi-elastic external tube and two latex balloons to fix the endoscope inside the small intestine better and enable easier injection. The endoscope can be inserted via either an oral or anal route. The DBE method is applied to cases with pathological conditions of the small intestine, to identify a bleeding source, or to detect obstructive and neoplastic changes in the small intestine.

CE is a new diagnostic method that enables non-invasive assessment of lesions of the small intestine mucosa [9]. The capsule contains a miniature digital video camera, which can take pictures with very little light, and a data transmission apparatus. After the capsule is swallowed by the patient, it passively moves along the alimentary tract through its peristaltic movements. CE is applied to cases with chronic bleeding from the alimentary tract and chronic iron-deficiency anaemia, conditions that suggest the presence of a tumour in the small intestine. CE, however, is contraindicated in patients with cardiac pacemakers because the method uses radiofrequency waves to transmit data through the abdominal wall [10]. Reportedly, the radiofrequency waves can interfere with pacemakers.

We first adopted CE for chronic anaemia in case 3 because this method is more non-invasive than DBE. We performed DBE because of deteriorative effects on a pacemaker in case 1, and because of active bleeding in case 2. We detected bleeding points in the small intestine with these devices. However, CE requires a further DBE method to achieve haemostasis.

Newly available imaging techniques can replace prior approaches to small bowel pathology. Because of its ability to take biopsies and to carry out therapeutic interventions, DBE is the most efficacious among newly developed techniques such as CE and radiological diagnosis with respect to minimizing laparotomy and intraoperative enteroscopy. Those features bring great benefit to ESRD patients because the patients often experience repeated bleeding episodes within the small intestine.

Conclusion

Newly established DBE is useful for identifying bleeding sources in patients with intestinal bleeding. Additionally, this new system is useful as a therapeutic tool for performing non-surgical haemostasis for bleeding in the small intestine. Moreover, the combination of CE and DBE is a promising elective approach for ESRD patients with intestinal haemorrhage.

Conflict of interest statement. None declared.

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