Diagn Interv Radiol 2007; 13:87-89

Life-threatening gastrointestinal system bleeding in Hodgkin disease: multidetector CT findings and review of the literature

Erhan Akpınar, Barış Türkbey, Barbaros Erhan Çil, Murat Canyiğit, Ziya Dündar, Ferhun Balkancı

ABSTRACT
Acute lower gastrointestinal system (GIS) bleeding is a life-threatening condition. Immediate determination of the origin of the bleeding is crucial, since hemostatic management must be initiated as rapidly as possible. Colonoscopy, radionuclide studies, and conventional angiography are considered the most important methods for assessing the origin of the bleeding. There are few published reports about the feasibility of computed tomography (CT) in acute GIS bleeding. We present multidetector CT (MDCT) findings in a case of Hodgkin disease status one month post-chemotherapy (CHOP protocol; cyclophosphamide, doxorubicin, vincristine, prednisone) that presented with acute lower GIS bleeding.

Key words: • *gastrointestinal hemorrhage* • *multidetector computed tomography* • *angiography* • *Hodgkin disease* • *chemotherapy*

From the Departments of Radiology (E.A., B.T. ✉ *bturkbey@yahoo.com*, B.E.Ç., M.C., F.B.), and General Surgery (Z.D.), Hacettepe University School of Medicine, Ankara, Turkey.

Received 31 December 2005; revision requested 27 February 2006; revision received 27 February 2006; accepted 19 March 2006.

Acute lower gastrointestinal system (GIS) bleeding is a common cause of hospitalization in patients presenting with melena and hematochezia (1). Immediate determination of the origin of the bleeding is elusive but life saving, since hemostatic procedures can be performed promptly. Colonoscopy can reveal the origin of bleeding in many cases, but may fail to do so because of technical difficulties secondary to fresh blood, clots, and stool in the colon lumen (2). Moreover, colonoscopy is unable to evaluate bleeding in the small intestine (3). Scintigraphy and angiography are other options for determining the origin of bleeding (4). In the related literature, there are few reports about the feasibility of using computed tomography (CT) for the determination of the origin of acute lower GIS bleeding (3–7). Herein, we report a case of Hodgkin disease that presented with acute lower GIS bleeding that was diagnosed with multidetector computed tomography (MDCT).

Case report

A 69-year-old male with a 5-month history of Hodgkin disease was admitted to our department with massive hematochezia; 1 month prior to this admission he received the CHOP (cyclophosphamide, doxorubicin, vincristine, prednisone) chemotherapy protocol. Laboratory studies showed a decline in hemoglobin from 12 g/dl to 8.5 g/dl within first 3 hours of his admission and his platelet count was 143,000/ml; activated prothrombin time was within normal ranges. Immediate colonoscopy without bowel preparation revealed massive bleeding and clots in the colon lumen, and it was not possible to pass beyond the first 30 cm of the colon. MDCT without oral contrast material administration was performed (Somatom Emotion Duo, Siemens, Erlangen, Germany). Into an antecubital vein 120 ml of iodinated contrast agent (300 mg/ml) was injected via a 20-gauge catheter at a flow rate of 3.5 ml/sec. To achieve optimal contrast enhancement, a region of interest was placed on the descending aorta and as soon as the density in the region of interest reached a threshold of 100 HU, the patient was instructed to maintain an inspiratory breath-hold while 3-mm thick arterial phase images were obtained; at the 70th second of contrast medium injection, 5-mm thick venous phase images were obtained. On CT, contrast material extravasation at the level of the ileal segments on the arterial phase images was seen (Fig. 1a). Additionally, the extravasated contrast material increased at the same level on the venous phase images (Fig. 1b). For a possible embolization procedure, angiography was performed with an initial abdominal aorta run with a 5-F pigtail catheter. Since an actively bleeding focus could not be visualized, the superior mesenteric artery (SMA) was selectively catheterized with a 5-F diagnostic catheter and the SMA injection revealed active bleeding from branches of ileocolic artery (Fig. 2). Branches of the SMA were catheterized superselectively and images were

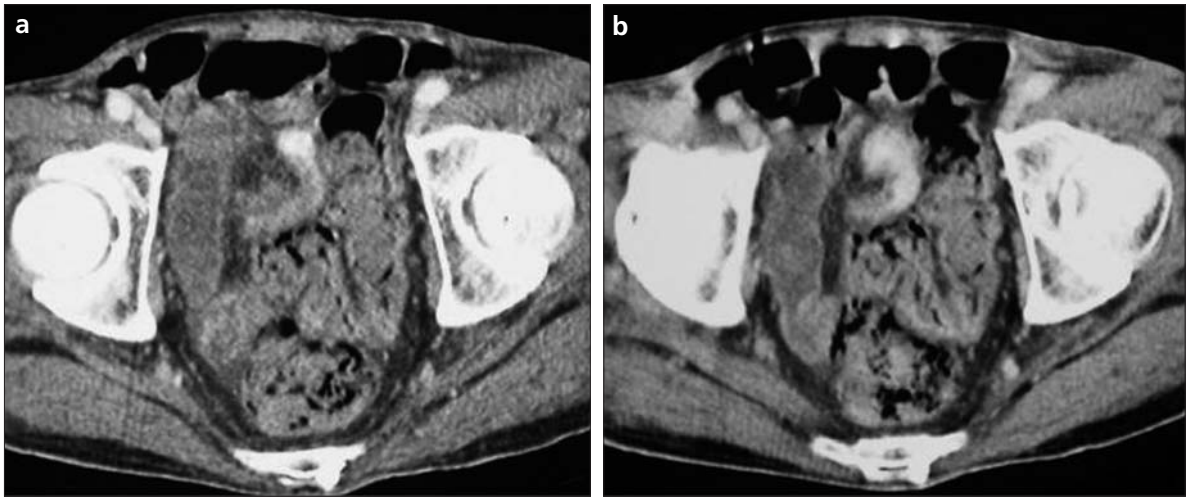

Figure 1. a, b. MDCT images during the arterial **(a)** and venous **(b)** phases show contrast material extravasation at the level of ileal loops **(a)** with increased extravasation in the venous phase image **(b)**.

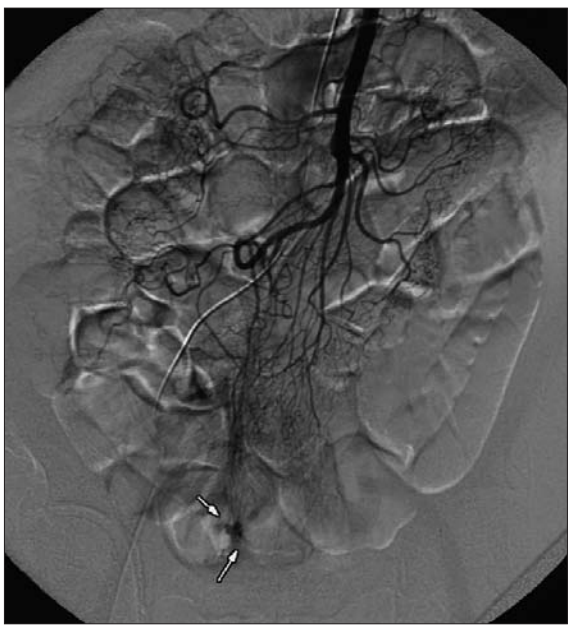

Figure 2. Angiogram of the superior mesenteric artery shows active bleeding from branches of ileocolic artery *(arrows)*.

obtained, yet no source of bleeding was observed. As there was no evidence of vasospasm, the bleeding was thought to have spontaneously stopped during the procedure; therefore, embolization was not possible. The patient again became hemodynamically unstable (mean arterial pressure dropped 35 mmHg during the next 2 h) and his hemoglobin level decreased from 9 g/dl to 6.6 g/dl despite intensive transfusions. The patient was immediately taken to surgery. During laparotomy, hemorrhagic findings were present, but no accompanying gross pathology was detected in the bowel segments. Right hemicolectomy and ileostomy procedures were performed. The clinical course was uneventful with a stable hemodynamic state. Gross pathological examination showed diffuse edema of the colonic and ileal mucosa. Histopathologically, lymphatic ectasia, fibrosis, villous atrophy, and regenerative changes, possibly due to chemotherapy, were seen. The patient was discharged on the 15th postoperative day without any symptoms of GIS bleeding.

Discussion

Acute lower GIS bleeding is a life-threatening condition and the origin of the bleeding should be immediately determined in order to perform etiologic treatment. Angiodysplasia, diverticulosis, polyps, intestinal tumors, inflammatory diseases, and radiation-induced enteritis are common causes of lower GIS bleeding (3, 5–7). Moreover, Yoshida proposed that in hematopoietic malignancies, GIS bleeding can be encountered and the pathogenesis can be multifactorial, such as direct leukemic cell infiltration, mucosal changes ensuing from bone marrow suppression or immunodeficiency states, infections due to various pathogens, and preceding peptic ulcers (8). In determining the origin of GIS bleeding, colonoscopy can be adequate for many cases, but has some technical disadvantages secondary to fresh blood, clots, and stool in the colon lumen. To overcome these disadvantages bowel cleansing can be performed, but this may result in a delay that can dangerously inhibit etiologic treatment (2, 3, 7). Moreover, the source of bleeding in the small intestine cannot be determined with colonoscopy (2, 3, 7). In case of a negative colonoscopy, bleeding originating from the small intestine can be suspected and can be evaluated by enteroclysis or enteroscopy, although these techniques can seldom be performed in an emergent condition (3, 9). The small intestine is rarely a source of lower GIS bleeding and current diagnostic tools may be insufficient for finding the source (10).

Angiography can be performed in cases of lower GIS bleeding, but the bleeding should be active and must be at a rate of 0.5 ml/min at the time of examination (7, 11). Angiography may only depict contrast extravasation

and vascular abnormalities, additional pathologies, such as polyps, tumors, and diverticula, cannot be demonstrated (3). Furthermore, angiography is an invasive technique, which is associated with possible complications (3).

Contrast enhanced CT is a minimally invasive method that can be easily performed in emergent conditions without any preparation (3). The traditional technique of MDCT for GIS bleeding consists of a preliminary unenhanced series followed by contrast enhanced scanning of 2–3 mm slice thickness (5, 6); however, in some series, MDCT was successfully performed without obtaining unenhanced images (7). There are limited reports on the usefulness of contrast enhanced CT in the evaluation of emergent lower GIS bleeding (3, 5–7, 12). MDCT is advantageous over other methods for the diagnosis of acute lower GIS bleeding due to its availability, speed, and reproducibility (6). MDCT allows scanning of the entire abdomen in the arterial phase during one breath-hold (6). On axial images obtained by MDCT, the active bleeding site can be readily identified. Moreover, multiplanar reconstructions permit rapid and accurate identification of active bleeding sites (6). Tew et al. reported that MDCT successfully showed active bleeding in both the colon and small intestine (6).

In our case, the diagnosis of active bleeding was made when a linear, jet-like, swirled focal collection of dense contrast material was identified within the ileum lumen. In addition, the amount of extravasated contrast material increased on the venous phase images. Our patient had a recent history of Hodgkin disease and underwent chemotherapy just a month earlier, which was believed to be the cause of the bleeding. Although intestinal bleeding due to the mucosal irritation effect of some chemotherapeutics is known, to the best of our knowledge, there are no reported cases of acute lower GIS bleeding secondary to the CHOP chemotherapy regimen during the course of Hodgkin disease.

In conclusion, MDCT is a potential alternative to more invasive procedures in the assessment of the origin of massive lower GIS bleeding. MDCT should be considered as the first step since it may detect the active bleeding site even if it is in the small intestine, providing critical assistance to the angiographer or surgeon.

References

1. Longstreth GF. Epidemiology and outcome of patients hospitalized with acute lower gastrointestinal hemorrhage: a population-based study. Am J Gastroenterol 1997; 92:419–424.
2. Zuckerman GR, Prakash C. Acute lower intestinal bleeding, part I: clinical presentation and diagnosis. Gastrointest Endosc 1998; 48: 606–617.
3. Ernst O, Bulois P, Saint-Drenant S, Leroy C, Paris JC, Sergent G. Helical CT in acute lower gastrointestinal bleeding. Eur Radiol 2003; 13:114–117.
4. Lefkovitz Z, Cappell MS, Kaplan M, Mitty H, Gerard P. Radiology in the diagnosis and therapy of gastrointestinal bleeding. Gastroenterol Clin North Am 2000; 29:489–512.
5. Miller FH, Hwang CM. An initial experience: using helical CT imaging to detect obscure gastrointestinal bleeding. Clin Imaging 2004; 28:245–251.
6. Tew K, Davies RP, Jadun CK, Kew J. MDCT of acute lower gastrointestinal bleeding. AJR Am J Roentgenol 2004; 182:427–430.
7. Rajan R, Dhar P, Praseedom RK, Sudhindran S, Moorthy S. Role of contrast CT in acute lower gastrointestinal bleeding. Dig Surg 2004; 21:293–296.
8. Yoshida T. Complicated gastrointestinal bleeding of neoplastic diseases of the hematopoietic system. Nippon Rinsho 1998; 56:2405–2410.
9. Zuccaro G Jr. Management of the adult patient with acute lower gastrointestinal bleeding. American College of Gastroenterology. Practice Parameters Committee. Am J Gastroenterol 1998; 93:1202–1208.
10. Rios A, Montoya MJ, Rodriguez JM, Parrilla P. Emergency surgery in severe lower gastrointestinal hemorrhage. Cir Esp 2005; 78:308–311.
11. Sos TA, Lee JG, Wixson D, Sniderman KW. Intermittent bleeding from minute to minute in acute massive gastrointestinal hemorrhage: arteriographic demonstration. AJR Am J Roentgenol 1978; 131:1015–1017.
12. Ettorre GC, Francioso G, Garribba AP, Fracella MR, Greco A, Farchi G. Helical CT angiography in gastrointestinal bleeding of obscure origin. AJR Am J Roentgenol 1997; 168:727–731.