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CASE REPORT

Atypical serious hematochezia and rare imaging feature in gastrointestinal tuberculosis

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Abstract

A young patient had serious hematochezia for nearly 2 months without obvious cause. Abdominal CT images showed rare features such as serious hemorrhage and multiple miliary nodules in the small bowel. The colonoscopy showed multiple lymphoid follicles in the terminal ileum. The laparotomy showed adverse adhesion in the abdominal cavity and multiple miliary noduli in the surfaces of small bowel wall. The pathology suggested tuberculosis. This patient received anti-TB therapy and the condition improved gradually. There are many variants of GI tuberculosis demonstrating uncommon and rare imaging features. It turned to be difficult in diagnosis when it showed the rare appearance, such as the great amount of intestinal bleeding and multiple noduli in our case. The reason why gastrointestinal bleeding might be attributed to the invasiveness of submucosal vessels by the tuberculosis bacteria. And the multiple noduli on the bowel wall might be the granuloma formation. Therefore, from the experience of our case, gastrointestinal tract might also be the first and only involved site, and it may cause great amount of bleeding to a life danger, even in young people.

Keywords Gastrointestinal tuberculosis · Hematochezia · Granular noduli

Background

Although tuberculosis of gastrointestinal (GI) tract is uncommon worldwide [1, 2], it still gains relatively high prevalence in China [3, 4]. There might be no specific feature in clinical symptom of GI tuberculosis such as respiratory condition, and the laboratory test of tuberculosis also might show negative. The common symptom for GI tuberculosis could be abdominal pain, vomiting, diarrhea, and small amount of hematochezia. However, great amount of hematochezia with fresh blood is rare, especially serious bleeding to life danger. The diagnosis always becomes difficult when the rare symptom shows up, and radiology might be helpful for the diagnosis.

However, there are variant appearances of GI tuberculosis on images. It will help the diagnosis when it appears the common and typical feature such as the common involved site and the deformation of ileocecal junction. Although variant image appearances of GI tuberculosis have been introduced before [5–8], multiple noduli on small bowel

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wall associating great amount of bleeding such as in our case have never reported before. We here share this case for the first time for benefiting more clinicians.

Case presentation

A 23-year-old male patient had symptoms of diarrhea for 2 months, abdominal distension for 1 month and melena for 2 weeks (Fig. 1).

The diarrhea in this patient occurred after he had seafood 2 months ago and kept 1–2 times per day but without other symptoms. This condition lasted for 1 week and recovered after he took some anti-diarrhea drugs. However, the symptoms of abdominal distension and constipation showed up 1 month later along with intermittent nausea, vomit and low-grade fever in the afternoon. Slightly elevated white blood cell (WBC, 11.4×10^9/L) and an elevated C-reaction protein (CRP 46 mg/L) were recorded in the blood test at local hospital. Then bowel obstruction was shown by abdominal radiograph. Erythrocyte sedimentation rate (ESR): 16 mm/h, T-spot tuberculosis (−) were expressed in the laboratory test in local hospital. After the 8-day treatment of fasting, gastrointestinal decompression and anti-infection (cefminox sodium), the symptoms alleviated, feces occult blood test was negative and the hemoglobin decreased from 123 to 106 g/L.

However, the symptom of melena and fever occurred 2 weeks ago with positive feces occult blood test. Immunoglobulin M (IgM) of *Legionella pneumophila* and cytomegalovirus (CMV) showed positive. Tuberculin skin test was negative and T-spot test result was equivocal. Several anti-infectious and hemostasis medicine were provided, including hemocoagulase, carbazochrome sodium sulfonate, cefotaxime sodium and metronidazole. However, the platelet kept decreasing, with the lowest level of 19×10^9/L. The results of bone marrow puncture showed the stagnation of erythropoiesis. Later on, glucocorticoid (methylprednisolone, 40 mg Qd*3d) with γ-globulin were administrated, and the PLT increased. During this period, he got weight loss for nearly 10 kg (kg). The average amount of bleeding is 1000–3000 mL per day. The details of bleeding after hospitalization are in the Table 1.

Then he was referred to our hospital and had severe melena on the second day. The homogeneous high-density area (Fig. 2) in computer tomography (CT) images was detected in the 3rd–4th small bowel lumen after administration of contrast agents, and the CT value increased with the time delay, which suggested continuous hemorrhage. Simultaneously, diffused wall thickened and enhancement was detected in almost the whole small bowel, and multiple nodules around 2–3 mm with ring-like enhancement could be found in the bowel wall (Fig. 3). No fistula or wandering gas was detected. Multiple lymph nodes were found gathering around the mesentery. The thick and enhanced peritoneum was observed, which suggested the existence of peritonitis.

To the best of our knowledge, the CT images did not show the typical findings for any kind of gastrointestinal disease, so we gave several possible diagnoses: (1) tuberculosis. It is a common disease in our country and the incidence showed increase in gastrointestinal involvement including young people; this patient had low-grade fever in the afternoon; multiple nodules with small and uniform size on the small bowel wall might be the TB granuloma; peritonitis is common. However, severe intestinal hemorrhage was rare in TB, and the ileocecus, which was usually the most commonly involved site for TB, appeared normal in this patient. (2) Crohn's disease. Young patient with recurrent attacks of hematochezia are common; multiple bowel involved is also

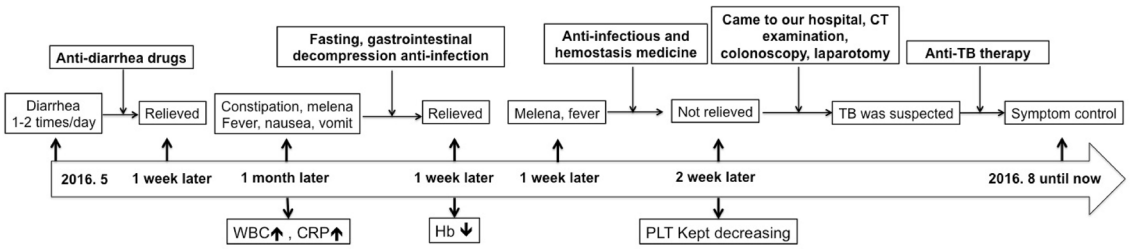

Fig. 1 History timetable. This timetable depicts the main development of this patient's history

Table 1 The amount of bleeding since hospitalization

Date (July, 2017)	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th	16th	17th	18th
Day since hospitalization	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Amounts (ml)	150	950	3000	0	0	500	1120	1150	720	1740	3110	2200	470	150

Fig. 2 Enhanced abdominal CT images show the hemorrhage. **a–d** Ax images on the same location with different phases (**a** unenhanced phase; **b** arterial phase; **c** venous phase; **d** delayed phase) showed amounts of the high-intensity (white arrow) increased inside the cavity of the small bowel wall, which suggested hemorrhage. **e–h** Ax images on the same location with different phases (**e** unenhanced phase; **f** arterial phase; **g** venous phase; **h** delayed phase) showed amounts of the high-density (white arrow) increased inside the cavity of the small bowel wall, which suggested hemorrhage. **i, j** Maximum intensity projection (MIP) of the angiography showed normal appearance of abdominal vessels

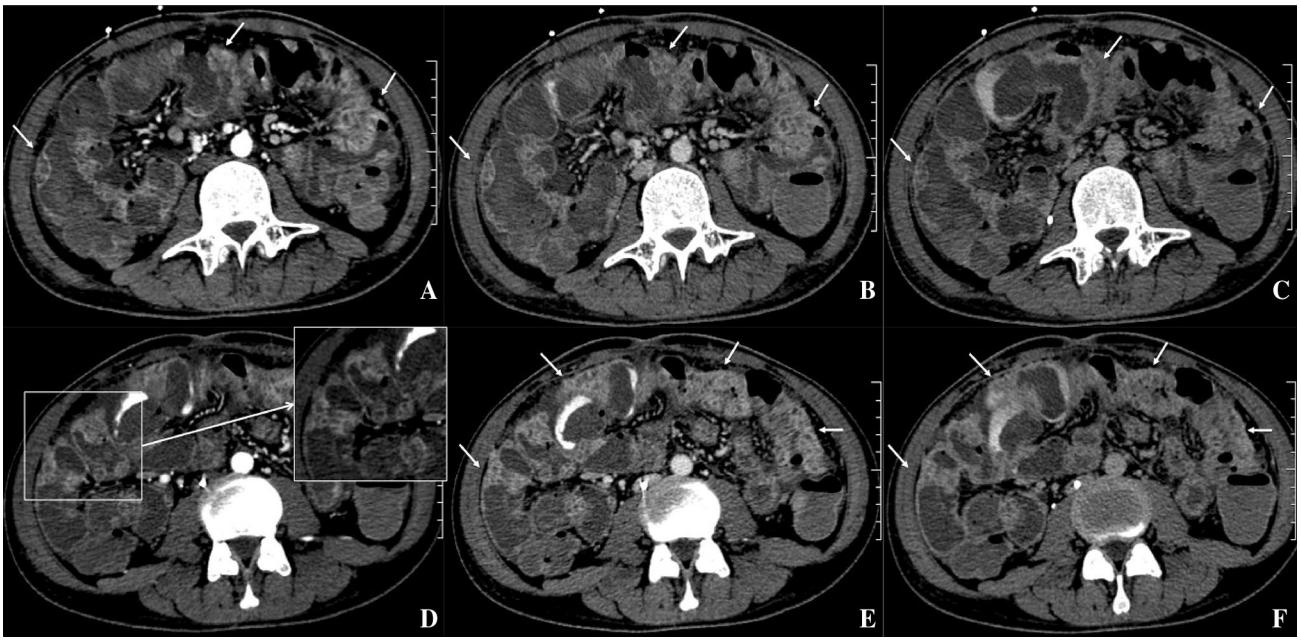

Fig. 3 Enhanced abdominal CT images show the multiple miliary nodules. a–**c** Ax images on the same location with different phases (**a** arterial phase; **b** venous phase; **c** delayed phase) showed multiple miliary nodules around 2–3 mm with ring-like enhancement on the bowel wall (white arrow). **d–f** Ax images on the same location with different phases (**d** arterial phase; **e** venous phase; **f** delayed phase) showed multiple miliary nodules around 2–3 mm with ring-like enhancement on the bowel wall (white arrow)

common. However, the way of wall thicken and enhancement in this patient was not the typical findings since irregular wall thicken and/or target sign might be more common for acute Crohn's. (3) Other origins of infection. The enhancement of bowel wall also might suggest infection. In addition, the patient had fever and elevated CRP. However, it still could not make an explanation for the multiple miliary noduli on the bowel wall.

The colonoscopy after CT examination showed normal appearance in colon except lots of bloodstain. Multiple lymphoid follicles in the terminal ileum were found with fresh blood (Fig. 4a). This patient underwent laparotomy immediately. During the operation, adverse adhesion in the abdominal cavity was detected. Multiple miliary noduli were detected in the peritoneum, omentum, and surfaces of small bowel wall. The adhesive bowels were swollen and hard to relieve (Fig. 4b). The pathology of the omental noduli presented multiple epithelioid granuloma noduli with apparently multinucleated giant cell reaction (Fig. 4c, d). The acid-fast stain showed positive (Fig. 4e, f). As so far, TB could be diagnosed.

However, no positive findings were detected in his chest CT image except little pleural effusion.

This patient received anti-TB therapy and the condition improved gradually: the symptom of intestinal bleeding relieved gradually and halted 1 month later. Then, another unenhanced CT examination on abdomen showed the relief of the wall involvement of small bowel and the celiac effusion, comparing with the previous one (Fig. 5). And the colonoscopy during 10-month follow-up also showed the normal appearance of colon and terminal ileum (Fig. 6).

Discussion

The radiological image appearance in combination with enteroscopy could be the comprehensive techniques for the diagnosis and evaluation of GI tuberculosis. First, the most common sites of GI tuberculosis are the distal ileum and caecum, which are predisposed to infection owing to the abundance of lymphoid tissue and relative stasis of gut contents at these sites. A short and contiguous segment stricture with symmetrical concentric mural thickening and homogeneous mural enhancement is the common abnormality. In addition, the typical lymphadenopathy with ring-like enhancement and tuberculosis peritonitis could have a great help for the diagnosis. The previous studies introduced the imaging appearances in differentiating GI tuberculosis from Crohn's disease [5–8]. However, there are many variants of GI tuberculosis demonstrating uncommon and rare imaging features. It turned to be difficult in diagnosis when it showed the rare appearance, such as the great amount of intestinal bleeding and multiple noduli in our case.

The reason why gastrointestinal bleeding might be attributed to the invasiveness of submucosal vessels by the tuberculosis bacteria. And the multiple noduli on the bowel wall

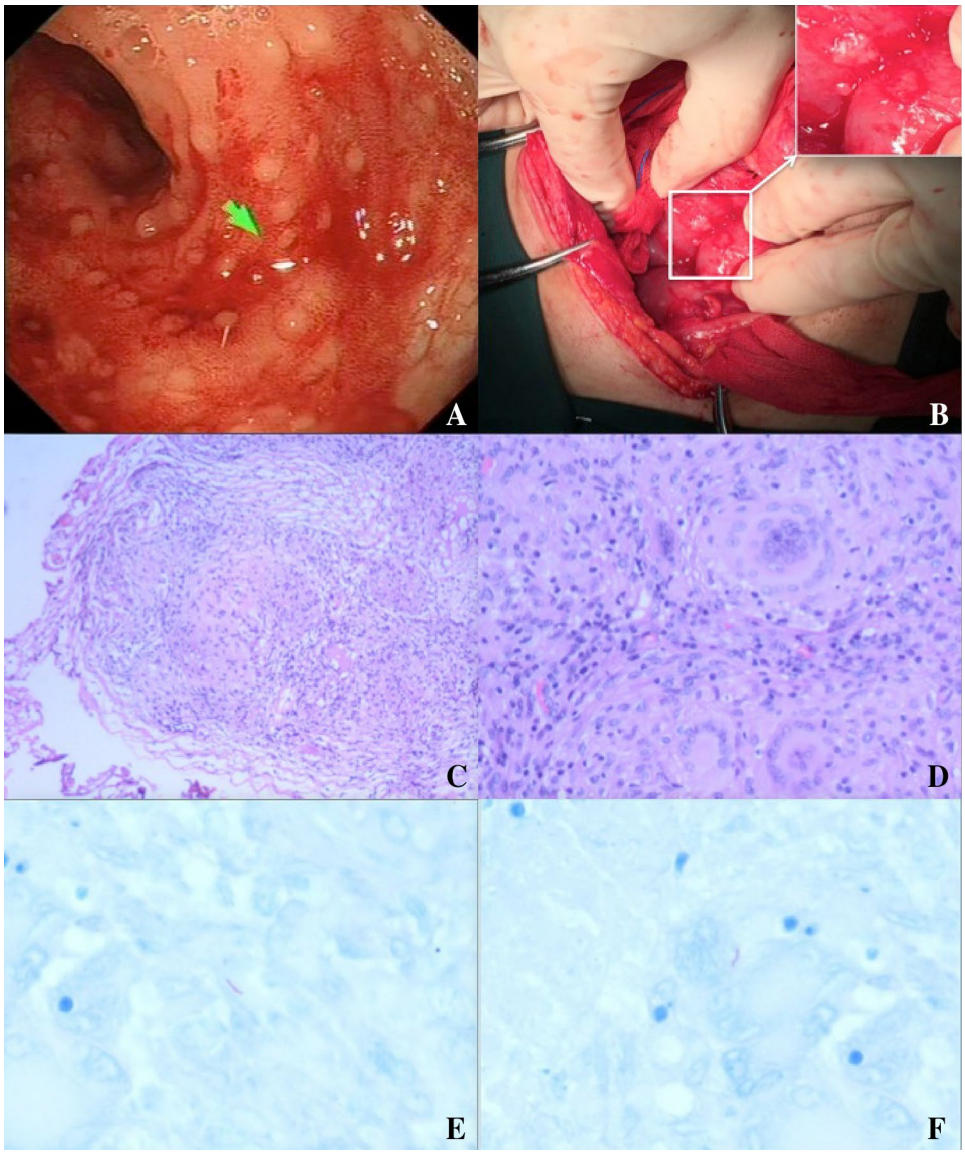

Fig. 4 Colonoscopy, laparotomy and pathology. **a** View of colonoscopy in terminal ileum: multiple foci could be detected with fresh blood. **b** View of laparotomy: heavy adhesion was shown among small bowel, and multiple miliary noduli were detected on the surface of small bowel wall and peritoneum. **c, d** Pathology of the omental noduli: multiple epithelioid granuloma noduli with apparently multinucleated giant cell reaction. **e, f** Acid-fast stain of noduli showed positive, which suggested tuberculosis

might be the granuloma formation. From his severe condition and multiple bowel wall involved, it could be inferred that this patient had suffered large amount of tuberculosis bacteria. Another reason might be attributed to the mistake of steroid therapy at the initial time. Thus, it might induce dispersing of tuberculosis bacteria. However, enteroscope was not conducted in this patient because of the contraindication: large amounts of hemorrhage. Therefore, the reason of hemorrhage was strongly suspected with tuberculosis but still not confirmed by enteroscope.

In addition, this patient had no symptoms of aspiratory disease at initial and showed normal in lung imaging which should be the common sites for tuberculosis involved. Therefore, from the experience of our case, GI tract might also be the first involved site, even in young people.

Anti-tuberculosis therapy is crucial for GI tuberculosis. It will make the patient's condition worse if it has not come to our mind that tuberculosis is also the possible etiology, like this case at the initial stage. However, it is not easy to make the correct diagnosis since GI tuberculosis has heterogeneous imaging appearance. Therefore, we would like to share our experience of this rare case to benefit more clinicians, radiologists and patients.

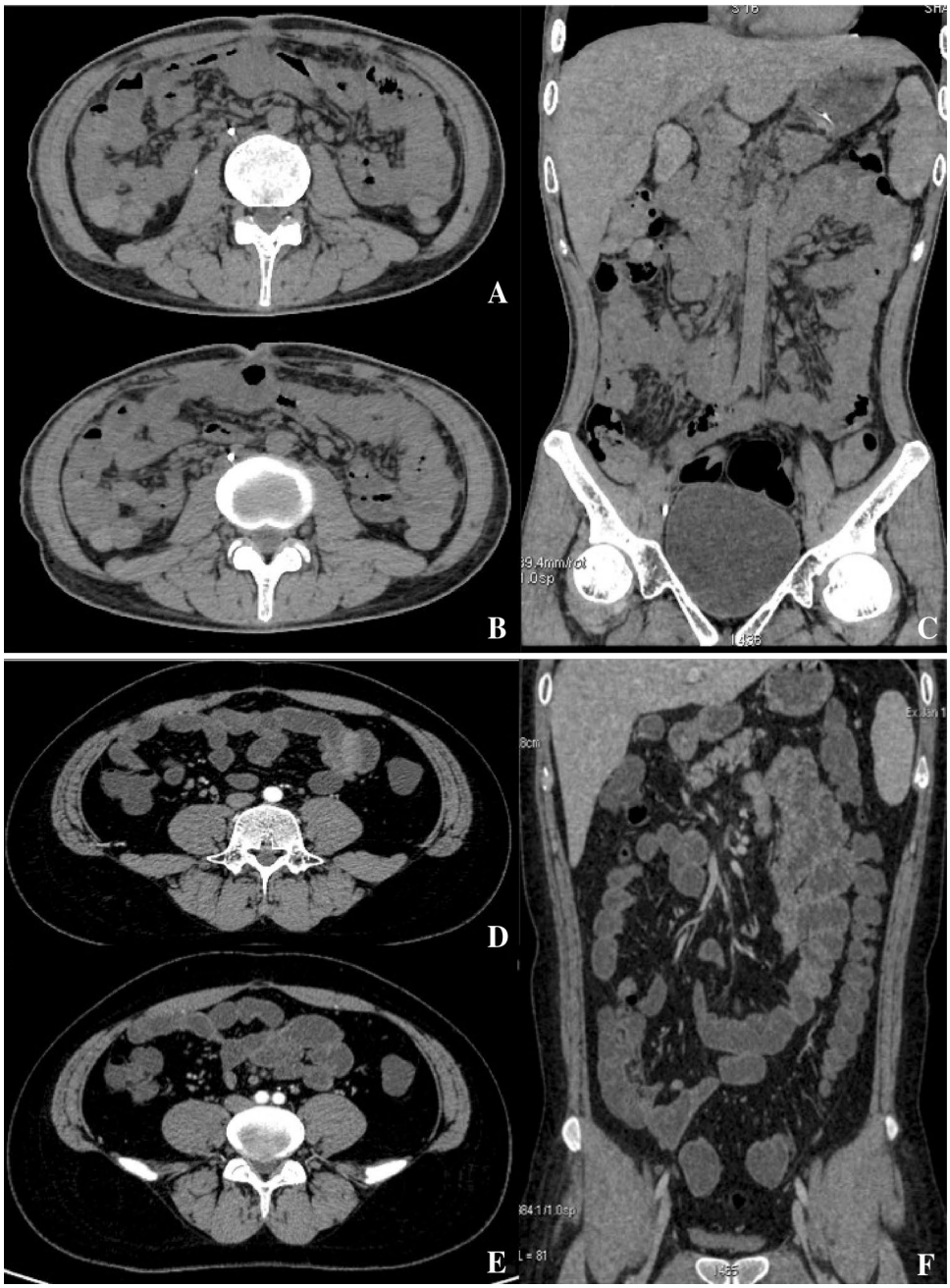

Fig. 5 CT images for follow-up. The swollen of small bowel wall showed relived after anti-TB therapy 1 month later (**a**–**c**). The bowel appeared normal during 10-month follow-up (**d**–**f**)

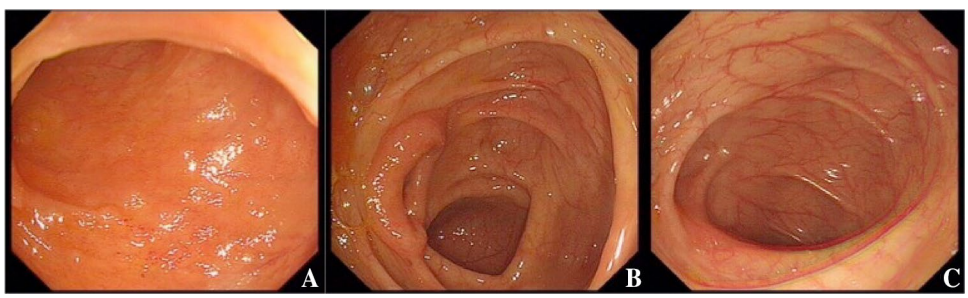

Fig. 6 Colonoscopy for follow-up. During 10-month follow-up, the terminal ileum (**a**), ileocecus (**b**) and the colon (**c**) showed normal appearance with colonoscopy

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Compliance with ethical standards

Conflict of interest Jing Liu, Ge Bai, Jianxing Qiu, Yan Chi, Xiaoyu Hu, Yong Huang, Xiaoying Wang, and Huahong Wang declare that they have no conflict of interest.

Human/animal rights All procedures followed have been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments.

Informed consent Informed consent was obtained from all patients for being included in the study.

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