



# Sigmoid colon cancer presenting as a large abdominal mass accompanied by abscess and rupture: a case report and literature review

Haibo Ding, MD, Baiying Xu, MD, Yueming Wang, MS, Bin Xu, BS, Wei Qiu, MS, Wenzhong Zhang, MS, Yongbing Wang, MS, Gang Li, MS\*

**Introduction and Importance:** Colon cancer presenting as a large abdominal mass accompanied by abscess and rupture is rare and prone to be misdiagnosed and delayed. In addition, the treatment plan is not clear when combined with abdominal wall metastasis.

**Case Presentation:** A 79-year-old woman presented with a large abdominal mass accompanied by abscess and rupture. It was misdiagnosed as a soft tissue infection in a local hospital, and after a comprehensive examination, it was diagnosed as sigmoid colon cancer with abdominal wall metastasis and abscess formation. The patient underwent a one-stage surgery, including en bloc resection of the tumor and invaded abdominal wall, as well as autologous tissue abdominal wall reconstruction, with a good clinical prognosis.

**Clinical Discussion:** For the diagnosis of large abdominal masses, abdominal CT, and pus culture are more valuable than ultrasound. For colon cancer with abdominal wall metastasis, one-stage surgery to completely remove the tumor and full-thickness of the abdominal wall, and the use of autologous tissue abdominal wall reconstruction technology to repair defects is feasible.

**Conclusion:** This case highlights the importance of using colon cancer as one of the differential diagnoses for the diagnosis for large abdominal mass accompanied by abscess and rupture in elderly patients, as well as the possibility of one-stage surgical resection of the tumor and invasion of the abdominal wall and reconstruction of the abdominal wall with autologous tissue when there is abdominal wall metastasis.

**Keywords:** abdominal wall metastasis, abdominal wall reconstruction, case report, sigmoid colon cancer, superficial abdominal wall tissue infection

## Introduction

Colon cancer, with changes in bowel habits, abdominal pain, and other intestinal symptoms as the initial manifestation<sup>[1]</sup>, not only easily attracts attention from patients in clinical, but also can receive timely and accurate diagnosis and treatment. However, with extraintestinal symptoms as the initial manifestation<sup>[2]</sup>, due to atypical symptoms, it is prone to misdiagnosis in clinical<sup>[3]</sup>. Among them, it is rare to have a large abdominal mass accompanied by abscess and rupture as the initial manifestation, and patients are easily misdiagnosed as superficial abdominal wall

Department of General Surgery, Pudong New Area People's Hospital, Shanghai, People's Republic of China

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\*Corresponding author. Address: Department of General Surgery, Pudong New Area People's Hospital, 490 Chuanhuan South Road, Shanghai 201200, People's Republic of China. Tel.: +86 181 174 409 75. E-mail: 18491570@qq.com (G. Li).

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## HIGHLIGHTS

- A rare case of sigmoid colon cancer with a large abdominal mass accompanied by abscess and rupture as the initial manifestation: a case report and literature review.
- Abdominal soft tissue infection is a common clinical disease.
- Sigmoid colon cancer with a large abdominal mass accompanied by abscess and rupture as the initial manifestation is rare and prone to misdiagnosis in clinical.
- It is necessary to use colon cancer as one of the differential diagnoses for large abdominal soft tissue infections in elderly patients and further improve abdominal CT and pus culture.
- The application of abdominal wall reconstruction technology for autologous tissue repair of large abdominal wall defects left after resection of abdominal wall metastases is feasible.

tissue infection and delayed<sup>[4]</sup>. In addition, when combined with abdominal wall metastasis, there is no clear guideline for the treatment and repair of postoperative huge abdominal wall defects<sup>[5]</sup>.

In this report, we present a rare case of sigmoid colon cancer with a large abdominal mass accompanied by abscess and rupture as the initial manifestation, accompanied by abdominal wall invasion. We discuss the clinical diagnostic difficulties and

directions, treatment options, and techniques for repairing huge abdominal defects, with the aim of improving surgeons' awareness of this disease and improving the level of diagnosis and treatment.

This case report has been reported in line with the Surgical CAse Report (SCARE) Criteria<sup>[6]</sup>.

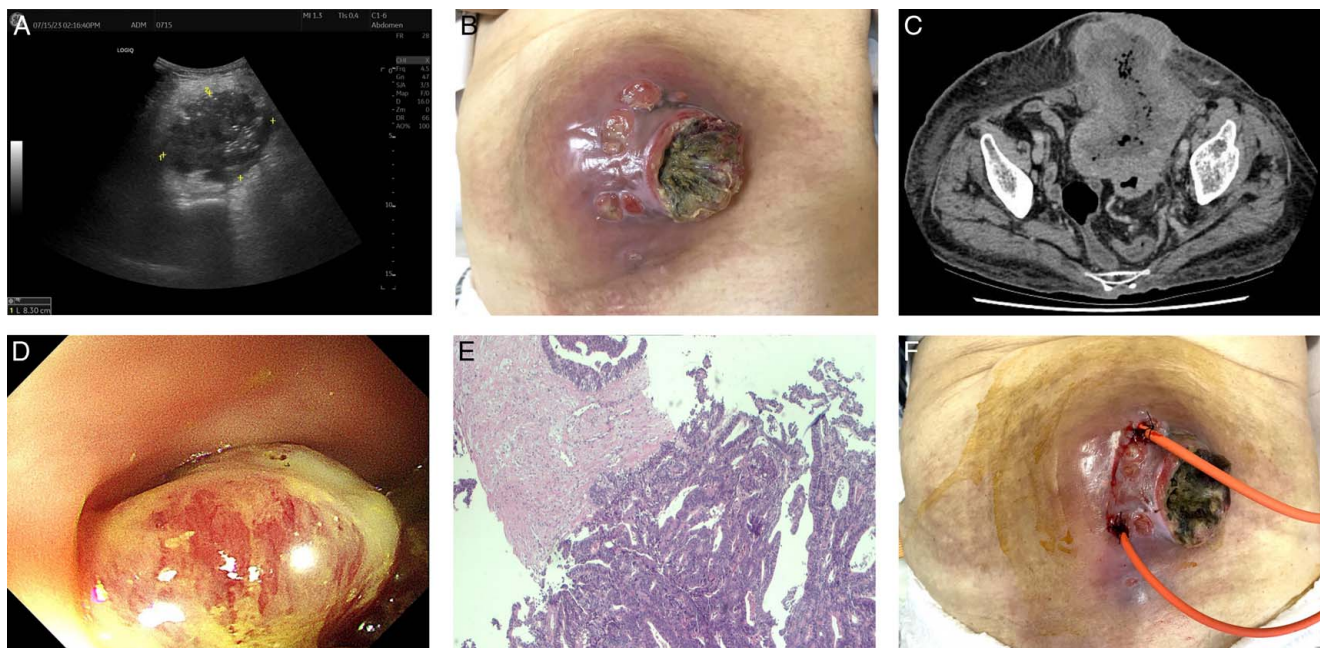
## Case presentation

A 79-year-old woman was admitted to the hospital with a left lower abdominal mass that had been red, swollen, and ruptured for more than 6 months. More than 6 months ago, the patient had redness, swelling, pain, and discomfort in the left lower abdominal wall, and 1 month later, because of those symptoms without significant relief, she went to the local hospital. Physical examination showed that the patient had a 10 cm-diameter, red, swollen, and hard mass with localized tenderness in the left lower abdomen. Abdominal ultrasound examination showed a mixed echogenic area in the lower abdominal area underneath the skin (83 mm × 65 mm) (Fig. 1A). The patient was diagnosed with soft tissue infection of the left lower abdominal wall and treated with local anti-inflammatory ointment. After treatment, there was no significant relief in symptoms and the abdominal wall mass gradually increased in size and elevation, accompanied by mass ulceration, pus, and foul odor, which lasted for more than 5 months. Later, she came to our hospital for further treatment. The patient had a history of constipation for more than 6 years and had been treated with oral constipation capsule for more than 4 years. At admission, the patient had a poor mental state, frequent bowel movements, accompanied by weight loss, and had no history of abdominal pain, abdominal distension, vomiting, or

hematochezia. Physical examination showed pale skin and mucous membranes, malnutrition, and pitting edema over both legs. The patient weighed 52.5 kg, was 172 cm tall, had an upper arm circumference 18.5 cm, thigh circumference 31.5 cm. Specialized examination showed that the patient had a bulging mass in the left lower abdomen of about 15 cm × 12 cm, with redness and swelling in the local area. The central part of the mass can be seen about 2 cm in diameter rupture and necrotic-like tissue, the surrounding scattered skin ulcers with pus flow. The location of the mass is fixed with tenderness, and the surrounding red and swollen area can reach a subcutaneous fluctuating sensation, the umbilicus is pressurized and deviated to the right (Fig. 1B).

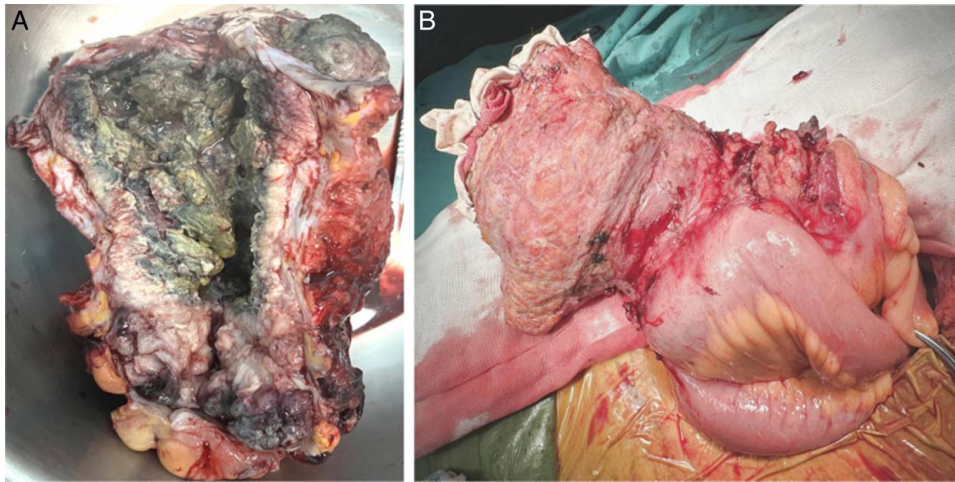
Blood examination revealed hypoalbuminemia (albumin 18 g/l), anemia (hemoglobin 51 g/l, HCT 18%), and hypokalemia (blood K +2.6 mmol/l). CEA and CA19-9 were normal. Pus culture showed *Escherichia coli* (100% proportion). CT scan showed a large pelvic tumor communicating with the sigmoid colon with abdominal wall invasion and rupture (Fig. 1C). Fistulography showed no contrast agent entering the intestinal cavity. Colonoscopy showed a cauliflower-like neoplasm in the sigmoid colon 20 cm from the anus, and the intestinal cavity was too narrow to pass through (Fig. 1D). The biopsy pathology at the site of abdominal wall rupture showed metastatic adenocarcinoma (Fig. 1E).

After admission, the patient was treated with local catheterization to drain pus (Fig. 1F), wet compress of magnesium sulfate on the abdominal wall to reduce swelling. In addition, the patient was also treated with anti-infection, electrolyte imbalance correction, blood transfusion, and intravenous nutrition. After a clear diagnosis of sigmoid colon cancer with anterior abdominal

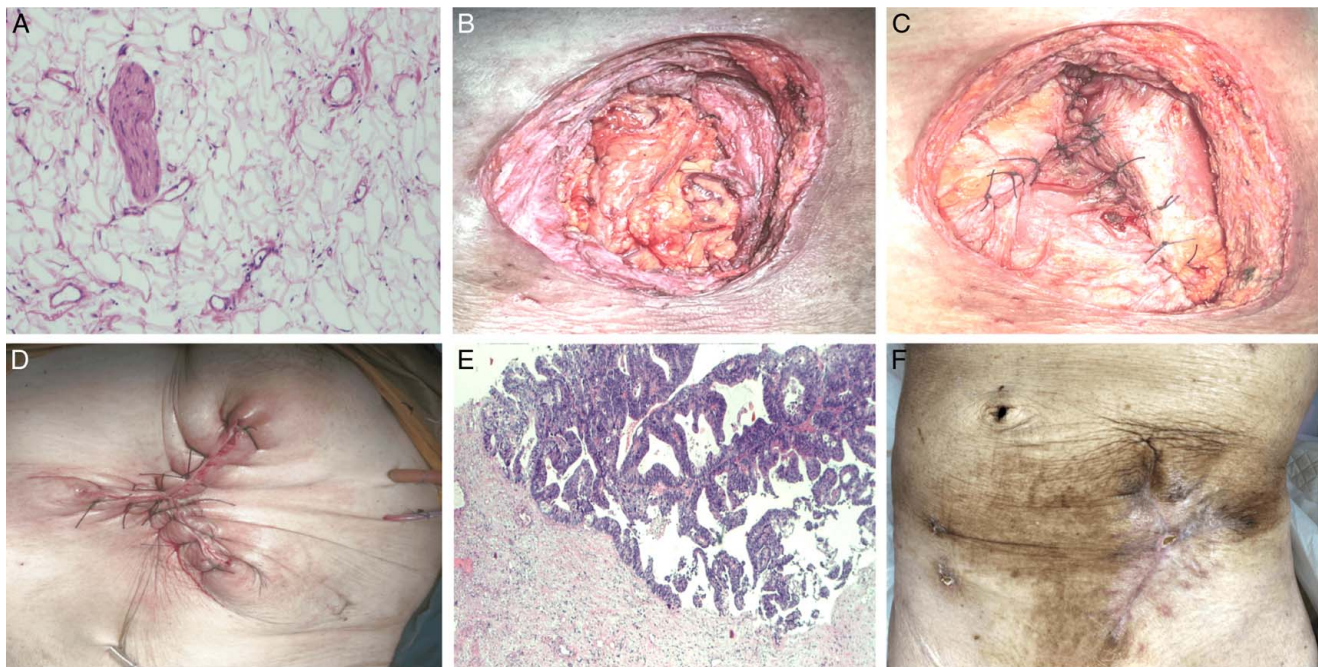


**Figure 1.** Preoperative diagnosis and treatment. (A) Abdominal ultrasound results of the patient's initial visit; (B) A bulging mass in the patient's left lower abdomen upon admission; (C) Transverse plane CT revealed a large pelvic tumor communicating with the sigmoid colon with abdominal wall invasion and rupture, forming soft tissue masses approximately 14.1 × 9.1 × 4.3 cm; (D) Colonoscopy showed a cauliflower-like neoplasm in the sigmoid colon 20 cm from the anus, and the intestinal cavity was too narrow; (E) The biopsy pathology at the site of abdominal wall rupture showed metastatic adenocarcinoma; (F) Local catheterization and drainage after admission.





**Figure 2.** Intraoperative mass condition. (A) The mass was 15.0 × 9.0 × 4.0 cm in size, located in the sigmoid colon and invading the full-thickness abdominal wall, with a 2 cm sinus in the center; (B) The mass originated from the sigmoid colon with lateral invasion of the small intestine wall.



**Figure 3.** Defect repair techniques, pathology, and prognosis. (A) The rapid pathological diagnosis of the defect site was fibrous adipose tissue; (B) Peritoneal defect reconstructed by omentum autotransplantation; (C) Muscle defect repaired by CST and Y-shaped muscle suture; (D) Skin and subcutaneous tissue defects repaired by Y-shaped relaxation suture; (E) The final pathological diagnosis indicated a moderately poorly differentiated tubular adenocarcinoma; (F) Abdominal wall defect healed well after operation.

wall metastasis and abscess formation and sufficient preoperative preparation, the patient underwent radical operation. The size of the tumor was 15 cm × 9 cm × 4 cm (Fig. 2A), weighing 1.02 kg. Intraoperative exploration revealed tumor invasion of the entire abdominal wall, root invasion of the sigmoid colon, and lateral invasion of the small intestine (Fig. 2B). Operations included radical resection of sigmoid colon cancer, full-thickness resection of abdominal wall metastasis, partial resection of the small intestine, and descending colon-rectum anastomosis.

After tumor resection, a huge full-thickness defect of 12 × 12 × 8 cm was left on the abdominal wall. The rapid pathological diagnosis of the defect site was fibrous adipose tissue, without involvement of cancer (Fig. 3A). Peritoneal defect was reconstructed by omentum autotransplantation (Fig. 3B), while muscle defect was repaired by component separation technique (CST)<sup>[7]</sup> and Y-shaped muscle suture<sup>[8]</sup> (Fig. 3C). A T-shaped cross shaped drainage tube was placed in an arc shape between the deep fascia and tendon membrane gap, and continuous negative pressure suction was performed

postoperatively<sup>[19]</sup>. The skin and subcutaneous tissue defect were sutured with a Y-shaped relaxation suture (Fig. 3D), and a postoperative compression bandage was applied. The patient was instructed to sit in a semi-seated position to reduce incision tension.

Postoperative pathology showed that the tumor was located in the sigmoid colon, invading the full-thickness abdominal wall, and a 2 cm diameter sinus was visible in the center. The small intestine wall has tumor invasion, no vascular or nerve invasion, no lymph node metastasis, and a negative margin. The final pathological diagnosis indicated a moderately poorly differentiated tubular adenocarcinoma (Fig. 3E).

The abdominal wall defect healed well (Fig. 3F), and the patient had a favorable postoperative clinical outcome.

## Discussion

Cross-sectional imaging techniques such as ultrasound and CT are the most commonly used techniques for the diagnosis of abdominal mass<sup>[10,11]</sup>. However, the ultrasound, in this case, failed to diagnose the source of the abdominal mass, which is consistent with the research results of Barker and Lindsell<sup>[12]</sup>, which showed that the accuracy of ultrasound in diagnosing the source organs of abdominal mass was only 88%, and most of the giant masses that were not correctly diagnosed originated from the pelvic cavity. Based on the literature review results in Table 1 and this case, it may be more appropriate to use CT as the primary diagnostic examination for patients with large abdominal masses accompanied by abscesses or ruptures. Regarding the origin of the abdominal wall abscess, in this case, even CT and fistulography did not clearly indicate the intestinal origin of the abscess<sup>[18]</sup>. However, positive results of *Escherichia coli* cultured in pus and pathological biopsy of abdominal wall rupture can help clarify the diagnosis<sup>[19]</sup>. This indicates that for elderly patients with large abdominal masses accompanied by abdominal wall abscesses or ruptures, diagnosis cannot be made solely based on ultrasound and physical examination. It is necessary to include colon cancer as one of the differential diagnoses and further improve abdominal CT, colonoscopy, gastrointestinal imaging, pus culture, abdominal wall biopsy, and other examinations to clarify the condition<sup>[13]</sup>.

For resectable T4b colon cancer, the NCCN guidelines recommend the use of neoadjuvant chemotherapy with the goal of tumor shrinking and downstaging to improve R0 resection and pathological response rate<sup>[20–22]</sup>. For emergency management of colon cancer, the American Society of Colonic and Rectal Surgeons (ASCRS) Practice Guidelines state that the main goal is to achieve maximum possible tumor control while ensuring life<sup>[23]</sup>. However, there are no clear guidelines for the treatment of colon cancer with abdominal wall metastasis and abscess formation. A small sample study by Kong *et al.*<sup>[24]</sup> demonstrated that neoadjuvant therapy is feasible for cases of perforated colon cancer after local sepsis control, not only to reduce the tumor stage, but also to reduce the rate of positive margins. The patient in this case was expected to be intolerant to chemotherapy due to poor basic conditions and ultimately underwent one-stage surgery<sup>[21]</sup>. This is similar to most cases in the literature review in Table 1, where only one case underwent surgery due to patient intolerance after two courses of neoadjuvant chemotherapy. There were no preoperative symptoms of intestinal obstruction or

peritonitis, but the patient has recently started to experience an increase in bowel movements, and a colonoscopy showed a too-narrow intestinal cavity to pass through. These are all signs of impending intestinal obstruction, and the anatomical results of the patient's postoperative specimens also confirm this. In summary, based on the recommendations of the ASCRS Practice Guidelines, we have adopted a plan of improving preoperative preparation and subsequent one-stage surgery.

In terms of surgical options, when the abdominal wall is invasion, the abscess wall and abdominal wall that has been penetrated by the fistula may also contain cancer cells<sup>[25]</sup>. Therefore, en bloc resection of the colon, invaded organs and fistulae, and full-thickness abdominal wall is the preferred option<sup>[14,26,27]</sup>. However, how to strike a balance between the safety of the resection margin and adequately repairing the abdominal wall defect is another critical issue to be addressed, which requires the support of abdominal wall reconstruction techniques<sup>[28]</sup>. Since the abdominal wall invasion was unknown in this patient, preoperatively we designed an anterolateral thigh flap and prepared a biological patch<sup>[29]</sup> to cope with different abdominal defects. Intraoperatively, the flap was preserved as much as possible by incising along the red-white junction line of the skin, the safety of the resection margin was ensured by rapid intraoperative biopsy of the tissue at the abdominal wall defect. In this case, the abdominal wall defect left after resection was about 12×12×8 cm, but in the end, the flap and patch were not applied. This is because the poor nutritional status of patients and contaminated wounds not only result in a low survival rate after flap transplantation, but also a high recurrence rate after the application of biological patches<sup>[30]</sup>. The patient's defect is close to the midline of the abdomen, and there is a possibility of self-repair. Through intraoperative pulling together of the muscles, we found that the defect was close to the abdominal midline, and there is a possibility of autologous repair. Therefore, we utilized the greater omentum as an alternative for the peritoneum to protect abdominal organs<sup>[31,32]</sup>. Based on the case of abdominal wall relaxation in an elderly woman, we used CST and Y-shaped relaxation suture techniques to repair defects by autologous organs. Compared with denervated myofascial tissue and patches, this has a better cushioning against the intra-abdominal pressure, which cannot only rebuild abdominal defects but also restore the support strength of the abdominal wall<sup>[33,34]</sup>, making it very suitable for this case.

Our case report has several limitations. Firstly, we lack images of abdominal soft tissue infections at the patient's initial visit, and only have written records and ultrasound results of the visit, so we cannot fully determine the patient's initial symptoms. Secondly, considering the patient's condition, we did not use neoadjuvant therapy, so it is unclear how this will affect the surgical outcome and recurrence rate. Finally, the patient currently has a good prognosis and quality of life during follow-up, which is not inferior to other cases in the literature review in Table 1. But this is a rare case report of similar situations, therefore, there is a lack of a control group to evaluate the effectiveness of primary surgery and autologous tissue abdominal wall reconstruction techniques, which is also a future research direction. Further comparative studies are necessary in the future to demonstrate the differences between these different strategies.

Table 1

A literature review of reported cases of colon cancer presenting as an abdominal mass accompanied by abscess.

Case	Current Report	Basukala <i>et al.</i> (2021) <sup>[13]</sup>	Klein <i>et al.</i> (2023) <sup>[14]</sup>	Ruscelli <i>et al.</i> (2018) <sup>[15]</sup>	Aritake <i>et al.</i> (2022) <sup>[16]</sup>	Velasco <i>et al.</i> (2019) <sup>[4]</sup>	Mohandas <i>et al.</i> (2010) <sup>[17]</sup>	Matsumoto <i>et al.</i> (2001) <sup>[3]</sup>	
Age/sex	79/F	63/F	85/F	71/M	67/M	34/F	84/M	81/F	81/M
Location of abdominal mass	LLQ	RLQ	LUQ	LLQ	LLQ	MUQ	RLQ	RLQ	RUQ
Associated symptoms/signs	Anemia, anorexia, diarrhea, BWL, malnutrition	AP, hematochezia, nausea, fever, anorexia, BWL, malnutrition, leukocytosis, anemia	AP, anorexia, Constipation, leukocytosis, anemia	AP, fatigue, nausea, fever	AP, leukocytosis	AP	Fever, leukocytosis	AP, anemia	AP, anemia, leukocytosis
Past medical history	Constipation	Constipation, LC	Anemia, sciatica	Lung cancer Surgery	Not available	Not available	Not available	Aortic valve replacement, warfarin, hypertension	Appendectomy, medication on heart disease
Size of abdominal mass (cm <sup>2</sup> )	15 × 9	8 × 9	10 × 9	Not available	Not available	12 × 12	20 × 20	6 × 4	9 × 8
Laboratory findings	Albumin 18 g/l, Hb 51 g/l, K + 2.6 mmol/l, WBC,N,CEA, CA19-9 normal	WBC 16.5 × 10 <sup>9</sup> , Hb 70 g/l, albumin 2.6 g/dl, CEA highly elevated	Anemia, leukocytosis	WBC 11.62 × 10 <sup>9</sup> , N 90%	WBC 21.23 × 10 <sup>9</sup> , N 87.1%	CEA,CA19-9 normal	WBC 12.6 × 10 <sup>9</sup> , N 84%, CRP 133.5 mg/dl	Hb 86 g/l, CEA 9 ng/ml	Albumin 2.6 g/dl, Hb 88 g/l, WBC 9.85 × 10 <sup>9</sup> , CEA 11.7 ng/ml
Preliminary diagnostic examination	Ultrasound	CT	CT	CT	CT	CT	CT	CT	CT
Abdominal CT	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Colonoscopy	Yes	No	No	No	No	Yes	No	No	No
radiography of digestive	Yes	No	No	No	No	No	No	No	Yes
Pathologic biopsy	Yes	No	No	No	No	Yes	No	No	No
Culture results of abscess	<i>Escherichia coli</i>	Not available	<i>Staphylococcus warneri</i> , <i>Prevotella</i>	Not available	Not available	Not available	Not available	Not available	<i>Streptococcus pneumoniae</i> , <i>Streptococcus pyogenes</i> , <i>Neisseria</i>
Preoperative treatment	AI, TB, blood transfusion	AI, intravenous analgesics	AI, Incision, TB	Not available	Not available	Diversion stoma, FOLFOXIRI 2 course	Not available	Not available	Discharge pus, TB
One-stage surgery	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Operative method	Extended sigmoid colectomy, autologous tissue abdominal wall reconstruction	Extended right hemicolectomy	Emergency transverse colectomy	Emergency left hemicolectomy	Left hemicolectomy	Extended right hemicolectomy, Perforator flap transplantation	Emergency right hemicolectomy	Emergency right hemicolectomy	Extended right hemicolectomy
Location of the tumor	sigmoid colon	ascending colon	transverse colon	descending colon	descending colon	transverse colon	ascending colon	ascending colon	transverse colon
Histology	Adenocarcinoma, PD-MD	Not available	Adenocarcinoma, MD	Not available	Not available	Adenocarcinoma, MD	Adenocarcinoma	Mucinous adenocarcinoma, MD	Mucinous adenocarcinoma, WD

TNM stage	T4N0M1	Not available	T4N0M1	Not available	T4N2M0	T4N0M0	T4N0M0	T3N0M1	T4N0M0	Prognosis
Distant metastases	Yes	No	No	Not available	No	No	No	Yes	No	Alive and well 6 months after surgery
Complications	No	No	No	Colonostomy necrosis	intestinal paralysis	No	No	No	No	Alive and well 11 months after surgery
Prognosis	Alive and well 6 months after surgery	The patient recovered smoothly and was discharged on the 14th day after surgery	Not available	Died of septic shock two days after surgery	Alive and well 6 months after surgery	Died 11 months after surgery due to recurrence	Not available	Not available	Alive and well 11 months after surgery	

Age [Years], Sex [Female/Male], AI, anti-infection; AP, abdominal pain; BWL, body weight loss; CT, computed tomography; LC, laparoscopic cholecystectomy; MD, moderately differentiated; PD, poorly differentiated; TB, tube drainage; WD, well differentiated.

### Conclusion

This case suggests that colon cancer should be considered as one of the differential diagnoses for elderly patients with large abdominal masses accompanied by abdominal wall abscesses or ruptures, and further improve abdominal CT, pus culture and other examinations to clarify the condition. In terms of treatment, if the patient’s condition is poor, active surgical treatment may be a better choice, and the operation should include en bloc resection of the colon, invaded organs and fistula, and full-thickness abdominal wall. For postoperative abdominal wall defects, if the defect is close to the abdominal midline, a combination of omentum autotransplantation, CST, and Y-shaped suture to repair the abdominal wall defect is also an option.

### Ethical approval

The studies involving humans were approved by Pudong New Area People’s Hospital. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study. Written informed consent was obtained from the individual(s) for the publication of any potentially identifiable images or data included in this article.

### Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

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### Author contribution

H.D., B.X., Y.W., and B.X.: conceptualization; H.D., B.X., and W.Q.: writing – original draft; W.Z., Y.W., and G.L.: writing – review and editing; H.D., Y.W., and G.L.: investigation; Y.W. and G.L.: supervision.

### Conflicts of interest disclosure

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

### Guarantor

Gang Li, M.S.

### Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

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