

# World Journal of *Gastrointestinal Surgery*

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## Acute appendicitis in the short term following radical total gastrectomy misdiagnosed as duodenal stump leakage: A case report

Jun Ma, Zhen-Ping Zha, Chao-Ping Zhou, Xiang Miao, Shu-Qiang Duan, Ya-Ming Zhang

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### Abstract

#### BACKGROUND

Common diseases after radical gastrectomy include cholecystitis and pancreatitis, but the sudden onset of acute appendicitis in a short period following radical gastrectomy is very rare, and its clinical symptoms are easily misdiagnosed as duodenal stump leakage.

#### CASE SUMMARY

This is a case report of a 77-year-old woman with lower right abdominal pain 14 d after radical resection of gastric cancer. Her pain was not relieved by conservative treatment, and her inflammatory markers were elevated. Computed tomography showed effusion in the perihepatic and hepatorenal spaces, right paracolic sulcus and pelvis, as well as exudative changes in the right iliac fossa. Ultrasound-guided puncture revealed a slightly turbid yellow-green fluid. Laparoscopic exploration showed a swollen appendix with surrounding pus moss and no abnormalities of the digestive anastomosis or stump; thus, laparoscopic appendectomy was performed. The patient recovered well after the operation. Postoperative pathology showed acute purulent appendicitis. The patient continued adjuvant chemotherapy after surgery, completing three cycles of oxaliplatin plus S-1 (SOX regimen).

#### CONCLUSION

Acute appendicitis in the short term after radical gastrectomy needs to be differentiated from duodenal stump leakage, and early diagnosis and surgery are the

most important means of treatment.

**Key Words:** Gastric cancer; Acute appendicitis; Surgery; Complications; Case report

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**Core Tip:** Common forms of abdominal inflammation occurring after radical gastrectomy are cholecystitis and pancreatitis, of which cholecystitis has the highest incidence. In contrast, the incidence of appendicitis in the short term after radical gastrectomy is rare and has not been reported before. Herein, we present a case of acute appendicitis in the short term following radical total gastrectomy. We suggest that acute appendicitis in the short term after gastric cancer surgery needs to be differentiated from duodenal stump leakage and that early diagnosis and surgery are the most important means of treatment.

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## INTRODUCTION

Acute appendicitis is mainly caused by bacteria, fecal stones, and malformations, and the pathogenic condition must be mucosal damage and bacterial invasion[1]. Common forms of abdominal inflammation occurring after radical gastrectomy are cholecystitis and pancreatitis, of which cholecystitis has the highest incidence[2]. In contrast, the incidence of appendicitis in the short term after radical resection of gastric cancer is rare and has not been reported. The lack of typical symptoms of metastatic lower right abdominal pain is attributed to resection of the stomach and greater omentum. The symptoms mainly manifest as persistently aggravated right-sided abdominal pain and a high perforation rate; therefore, the inflammation is not easily confined, and the clinical symptoms are easily misdiagnosed as duodenal stump leakage.

## CASE PRESENTATION

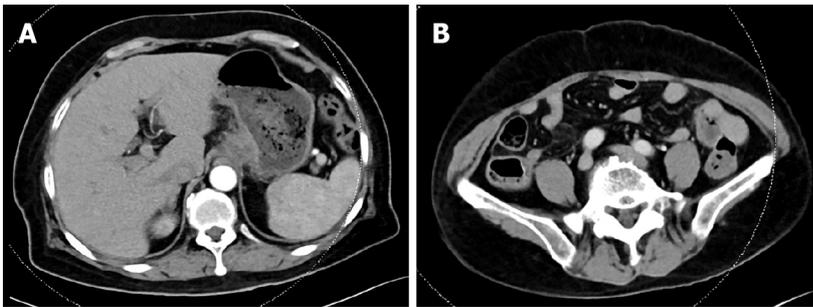
### Chief complaints

Durative pain in the lower right abdomen 14 d after radical total gastrectomy.

### History of present illness

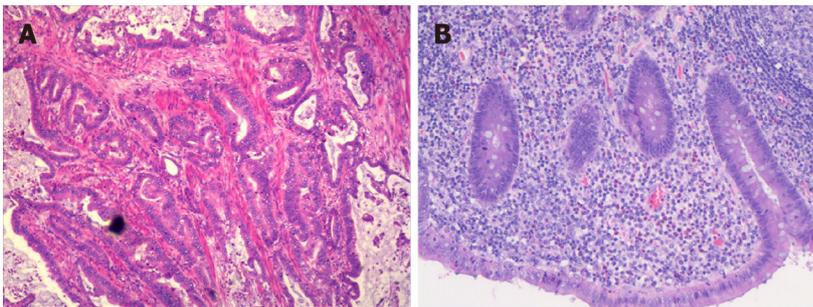
A 77-year-old woman was diagnosed with gastric cancer, and preoperative pathology showed adenocarcinoma, moderately differentiated, HP (-). On May 23, 2022, computed tomography (CT) showed that the cardia was thickened and reinforced (Figure 1A), and the appendix was normal (Figure 1B). Preoperative clinical staging showed cT4Nx; preoperative neoadjuvant therapy was recommended, but the patient refused due to advanced age, and "radical total gastrectomy (D2 lymph node dissection)" was performed under general anesthesia on May 26, 2022. Intraoperative exploration: The gallbladder had been removed; the omentum was adhered to the gallbladder bed, no ascites was seen, and no metastatic nodules were seen in the liver or peritoneum. Postoperative pathology indicated stage IIIB, moderately differentiated, intestinal-type adenocarcinoma with lymph node involvement (7/30) (Figure 2A). The resection margin was negative. The immunohistochemical marker results were as follows: CK (+), Her-2 (3+), MSH2 (+), MSH6 (+), PMS2 (+), MLH1 (+), and Ki-67 (approximately 70%).

The patient recovered well after the operation; all inflammatory indexes gradually decreased, and her blood sugar was well controlled. On June 3, 2022, her D-dimer level was significantly elevated, and ultrasound showed intermuscular thrombosis located in the lower right extremity, which was treated with low-molecular-weight heparin. On June 4, 2022, CT showed no abnormalities around the anastomosis or stump, no leakage of oral pantothenic glucosamine into the abdominal cavity, no abnormalities in the ileocecal region or appendix, and no significant fluid accumulation in the abdominopelvic cavity (Figure 3). On June 8, 2022, her blood count, calcitonin and C-reactive protein (CRP) levels were normal, and she was ready to be discharged. However, during the night of June 9, 2022, the patient complained of persistent pain on the right side of the abdomen, and the abdominal pain became



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**Figure 1** Imaging data of May 23, 2022. A: Computed tomography (CT) showed that the cardia was thickened and reinforced; B: CT showed that the appendix was normal.



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**Figure 2** Photomicrographs (hematoxylin and eosin, × 200 magnification). A: Moderately differentiated tubular adenocarcinoma; B: Acute purulent appendicitis and periapical inflammation.



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**Figure 3** Imaging data of June 4, 2022. A: Computed tomography showed no abnormalities around the anastomosis or stump, no leakage into the abdominal cavity from oral pantothenic glucosamine, no abnormalities in the ileocecal region or appendix, and no significant fluid accumulation in the abdominopelvic cavity; B: No abnormalities were found in the ileocecal region or duodenal stump; C: No abnormalities were found in the appendix.

significantly worse on the morning of June 10, 2022.

#### **History of past illness**

The patient had a previous history of diabetes, hypertension, cholecystectomy and no history of chronic appendicitis.

#### **Personal and family history**

There was no family history of tumors.

#### **Physical examination**

On June 6, the abdominal incision was healing well, and the patient reported tenderness in the lower right abdomen, muscle tension and rebound pain.



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**Figure 4** Imaging data of June 10, 2022. A: Computed tomography showed that there was effusion in the perihepatic and hepatorenal interstitial areas; B: There was effusion in the right paracolic sulcus and exudative changes in the right iliac fossa; C: Effusion was seen in the pelvis.

### Laboratory examinations

The patient's leukocyte level was  $17.18 \times 10^9/L$ ; neutrophil ratio, 88.4%; calcitonin level, 0.19 ng/mL; and CRP level, 65.20 mg/L.

### Imaging examinations

On June 10, 2022, CT showed effusion in the perihepatic and hepatorenal spaces, right paracolic sulcus and pelvis and exudative changes in the right iliac fossa (Figure 4). Subsequent ultrasound-guided puncture revealed a slightly turbid yellow-green fluid.

## FINAL DIAGNOSIS

Acute suppurative appendicitis after radical gastrectomy.

## TREATMENT

On June 10, 2022, laparoscopic exploration revealed yellow-green fluid in the perihepatic and pelvic cavities (Figure 5A and B); the duodenal stump was wrapped in tissue and did not show leakage (Figure 5C), and there were no abnormalities in the esophageal-jejunal anastomosis or jejunal-jejunal anastomosis. A large amount of pus moss was seen in the ileocecal region, and the terminal ileum wrapped around the appendix (Figure 6A). A septic and swollen appendix was seen after careful laparoscopic separation of the adhesions (Figure 6B). The appendiceal mesentery was treated with harmonic scissors and absorbable clips, the root of the appendix was ligated with thread, and the appendiceal stump was cauterized (Figure 6C). A pelvic drainage tube was placed after aspiration of intra-abdominal fluid.

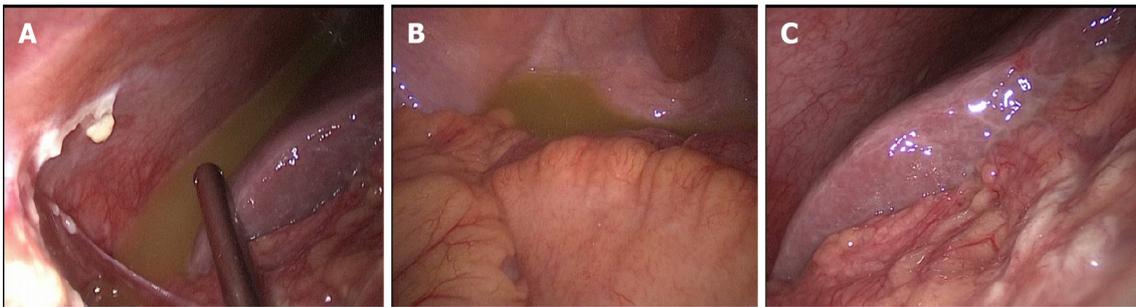
## OUTCOME AND FOLLOW-UP

Postoperative pathology showed acute purulent appendicitis and periapical inflammation (Figure 2B). The patient recovered well after surgery and was successfully discharged two weeks later. Follow-up CT showed no significant abnormalities in the abdominal cavity (Figure 7). The patient continued adjuvant chemotherapy after surgery, completing three cycles of oxaliplatin and S-1 (SOX regimen).

## DISCUSSION

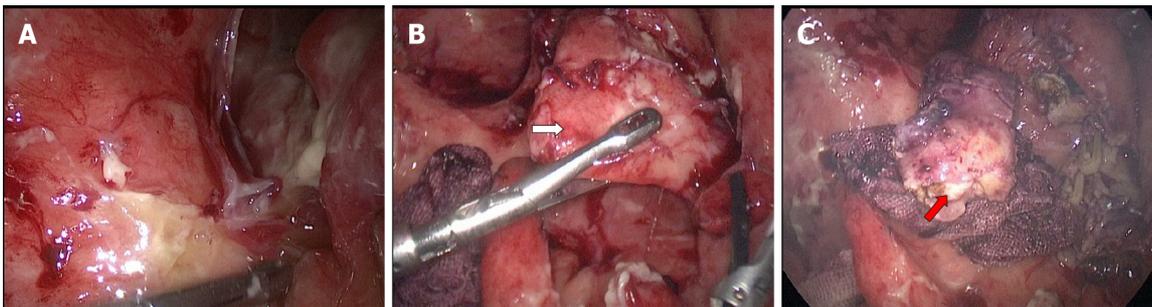
Cholecystitis and pancreatitis are common diseases after radical resection of gastric cancer. Appendicitis occurs rarely, as early as several months later, and perioperative combined episodes of appendicitis are even rarer.

There were several reasons for misdiagnosis in this case. First, we usually used one etiology to explain all the symptoms of the patient; we would focus on postoperative complications but might ignore the possibility of common diseases. Second, the most common abdominal complication after radical gastrectomy is duodenal stump leakage[3]. The patient had a history of diabetes and presented with postoperative right abdominal pain. CT showed hepatorenal and pelvic effusion, and the puncture



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**Figure 5** laparoscopic exploration. A and B: Yellow-green fluid could be found in the perihepatic and pelvic cavities; C: The duodenal stump was wrapped in tissue and did not show leakage.



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**Figure 6** Surgical procedure. A: A large amount of pus moss was seen around the ileocecal region, and the terminal ileum wrapped around the appendix; B: A septic and swollen appendix was seen after careful laparoscopic separation of the adhesions (white arrow); C: Resected appendix (red arrow) and treated appendiceal stump and mesentery.



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**Figure 7** Imaging data of July 12, 2022. Computed tomography showed no significant abnormalities of the duodenal stump, appendiceal stump or pelvic. A: Duodenal stump; B: Appendiceal stump; C: Pelvic.

revealed yellow-green turbid fluid, which could not exclude the occurrence of duodenal stump leakage. This is a successful case in which laparoscopic exploration was promptly performed to clarify the diagnosis. This case is enlightening for the following reasons: (1) For patients with a history of diabetes and postoperative lower right abdominal pain, the possibility of appendicitis must be considered, as diabetes is a high-risk factor for appendicitis[4]; (2) Patients with appendicitis following gastrectomy have atypical abdominal pain due to surgical removal of all or a large part of the stomach, and reconstruction of the digestive tract alters the original physiological structure; (3) The large omentum was removed and could no longer easily confine the acute inflammation of the appendix; thus, as the disease worsened, diffuse peritonitis developed; (4) The occurrence of appendicitis has been reported in conjunction with several other diseases, such as colon cancer, tuberculosis, herniation and gynecological diseases[5-8]; and (5) Gastric cancer combined with appendiceal metastasis would cause symptoms of acute appendicitis, but in this case, there was no peritoneal or appendiceal metastasis[9]. In conclusion, acute appendicitis occurring within a short period after radical gastrectomy has its own characteristics and is easily confused with postoperative complications of gastric cancer; thus, a clear diagnosis and

early surgical treatment are needed.

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## CONCLUSION

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Acute appendicitis in the short term after gastric cancer is rare and easily ignored clinically and needs to be differentiated from duodenal stump leakage.

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## FOOTNOTES

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