



## Case report

## Spontaneous acalculous gallbladder perforation mimicking duodenal stump leak after gastrectomy for gastric cancer: A case report

Woo Yong Lee

Department of Surgery, Inje University Haeundae Paik Hospital, 875 Haeunda-ro, Haeundae-gu, Busan 48108, Republic of Korea

## ARTICLE INFO

## Keywords:

Gallbladder perforation  
Gastric cancer  
Duodenal stump leak  
Gastrectomy  
Case report

## ABSTRACT

**Introduction and importance:** Spontaneous gallbladder (GB) perforation is a rare and severe condition. Herein, we present a case of spontaneous acalculous gallbladder perforation mimicking duodenal stump leak after a subtotal gastrectomy for gastric cancer.

**Case presentation:** An 83-year-old woman underwent a radical subtotal gastrectomy for advanced gastric cancer. On postoperative day 5, mild leukocytosis was observed. A computed tomography (CT) scan revealed a slightly distended non-thickened GB with minimal air and fluid collection near the duodenal stump, and fluid collection in the abdominal and pelvic cavities. We considered a duodenal stump leak. The effluent of the Barovac located in the abdominal cavity was serosanguinous and the patient was stable, thus we observed and continued using antibiotics. On day 13, the Barovac stopped functioning properly, so we replaced it with a percutaneous catheter drain (PCD) under ultrasonography guidance, aided by the Barovac tract. The PCD drained over 1000 cc of bile daily. On day 16, a follow-up CT showed an increased fluid collection in the abdominopelvic cavity. After comparing this with the previous CT, we rediagnosed as spontaneous GB perforation. An emergency cholecystectomy was performed. Postoperatively, the patient's condition returned to normal and antibiotic therapy continued until day 14. The patient recovered without other complications and was discharged on day 28.

**Clinical discussion:** Spontaneous GB perforation is a rare but serious complication immediately after gastrectomy which should be looked out for.

**Conclusion:** We report a rare case of spontaneous GB perforation mimicking duodenal stump leak after radical subtotal gastrectomy in gastric cancer.

## 1. Introduction

Post-gastrectomy complications related to motility can result in rapid and slow transit. Rapid transit includes dumping syndrome and postvagotomy diarrhea, and slow transit includes gastric stasis, alkaline gastritis, Roux stasis syndrome, and gallstones. Among these conditions, symptomatic and/or asymptomatic gallstones occur in a range from 5.2 % to 25.7 % [1–3]. Although the mechanism is not fully clear, gallstone formation after gastrectomy is thought to result from changing cholecystokinin secretion and gallbladder (GB) functional movement due to vagus nerve resection. Acute acalculous cholecystitis is rare, and spontaneous perforation of GB is rarer. GB perforation has many causes; most of which are serious and fatal and require immediate treatment. The differential diagnoses are not easily apparent, especially if they occur early in the postoperative period. Here, we report a case of spontaneous GB perforation mimicking a duodenal stump leak after a subtotal

gastrectomy in gastric cancer. This case report is written following the Surgical Case Report (SCARE) 2020 criteria [4].

## 2. Case presentation

An 83-year-old Korean female patient presented with a recently worsening epigastric discomfort and pain that had begun one year prior. After receiving treatment for asthma and coronary artery disease in the past, she remained untreated. Gastroduodenoscopy revealed an ulcerofungating mass surrounding the pylorus ring encroaching into the antrum. An endoscopic biopsy showed a poorly differentiated tubular adenocarcinoma. Preoperative staging computer tomography (CT) findings showed a circumferential wall thickening in the antrum and pylorus, however, there were no other abnormal findings in the intra-abdominal organs including the GB and biliary tract. Positron emission tomography (PET) showed no metastasis except for the gastric

Abbreviations: PCD, percutaneous catheter drain; GB, gallbladder; CT, computed tomography.

E-mail address: [yongaaa5972@naver.com](mailto:yongaaa5972@naver.com).

<https://doi.org/10.1016/j.ijscr.2022.107304>

Received 1 May 2022; Received in revised form 8 June 2022; Accepted 11 June 2022

Available online 14 June 2022

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antral uptake. According to the preoperative staging examination, the clinical stage was T3-4N0M0. The patient underwent radical subtotal gastrectomy and Billroth II (gastrojejunostomy) reconstruction. There were no abnormal findings in the organs after the operation was completed. In particular, there were no abnormal findings in the GB, and no signs of thermal injury. She was able to drink water on postoperative day 3 and ingest liquid foods on day 4. Her vital signs and laboratory findings—including liver function test and amylase—were within normal ranges and she did not feel any discomfort. Although there was dyspnea and mild abdominal distension on day 5, vital signs and laboratory tests showed no specific findings other than mild leukocytosis ( $11.2 \times 10^9/L$ ). CT was performed to identify the short-term post-gastrectomy complications. Emergency abdominopelvic CT showed a slightly distended GB without wall thickening; there was minimal air and fluid collection near the duodenal stump and fluid collection in the abdominal cavity (Fig. 1A and B). We assumed a duodenal stump leak. The color of the effluent from the Barovac, located in the abdominal cavity, was initially serosanguinous and the patient's condition was stable, so we decided to observe and administer antibiotics. There were no changes in the vital signs and Barovac effluent color during follow-up, however, mild elevations in white blood cell count ( $13.74 \times 10^9/L$  on day 9, and  $18.21 \times 10^9/L$  on day 12) persisted. On day 13, we noticed the Barovac was not functioning properly, so we replaced it with a percutaneous catheter drain (PCD) under ultrasonography guidance, following the Barovac tract. This PCD drained over 1000 cc of pure bile daily. On day 16, a follow-up CT showed fluid that the collections in the abdominopelvic cavity had increased (Fig. 2B). After we compared this scan with the previous CT, the patient was rediagnosed with spontaneous GB perforation (Fig. 2A). An emergency exploratory laparotomy carried out showed severe adhesions and a copious amount of bile in the abdomen around the intestines. There was severe inflammation around the GB and no leaks in the duodenal stump. Cholecystectomy was performed. Gross and microscopic pathological examinations showed the size of the GB was about 14.5 cm \* 3.0 cm without stones; there were ulcerations and perforations in the fundus. The final pathology report revealed perforated acalculous cholecystitis. After the operation, the patient's general condition returned to normal, a soft diet was restarted, and antibiotic therapy was continued through day 14. She recovered without additional complications and was discharged on day 28.

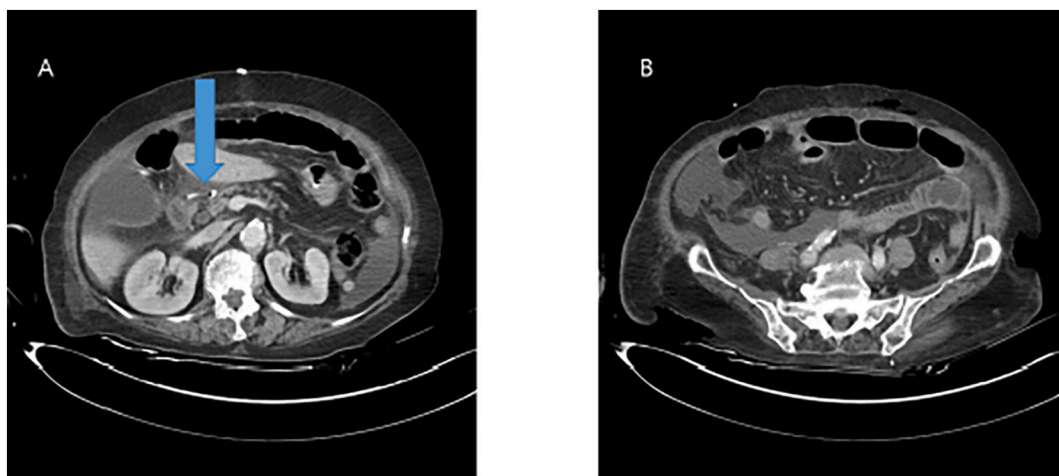
### 3. Discussion

Spontaneous GB perforation is a rare but severe complication of acute cholecystitis with or/and without gallstones. Specifically, acute

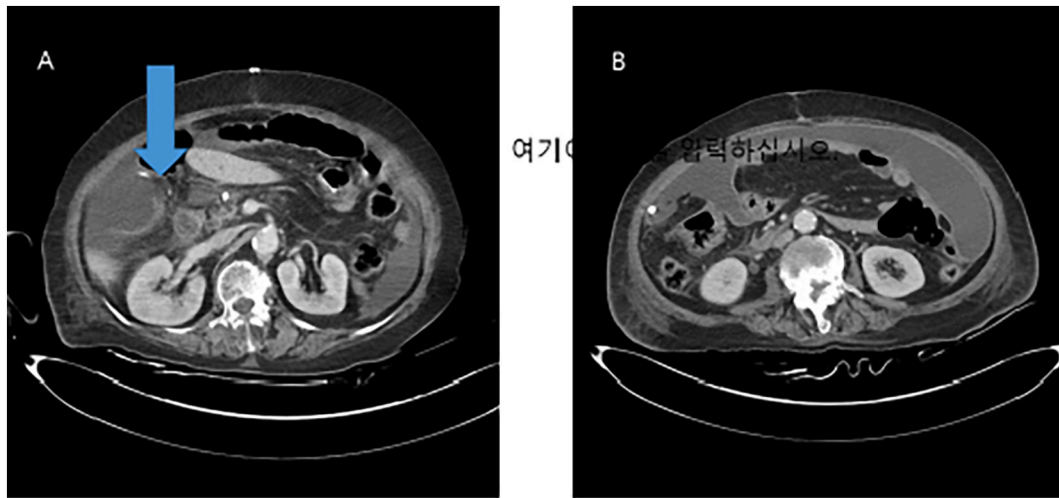
acalculous cholecystitis occurs for a variety of reasons. The causal factors for this include critical illness, surgery, trauma, burn, total parenteral nutrition, bile stasis, and ischemia of GB [5]. After gastrectomy, bile stasis can occur as a result of a variety of factors such as persistent fasting, total parenteral nutrition, ileus, and vagus nerve ligation [6]. It is reported that bile stasis alone does not cause GB perforation, but it is plausible that ischemic changes occur as inflammation progresses. This usually occurs in the fundus, in the portion most distant from the main feeding artery [7]. Symptoms of acute acalculous cholecystitis that occur immediately after gastrectomy are non-specific. Surgeons first suspect complications such as duodenal stump leakage, anastomotic leakage, early ileus, intra-abdominal infection, and wound infection. This case occurred immediately after the gastrectomy, so the signs and symptoms were first considered to be from the common complications following gastrectomy, and thus the error in diagnosis and the direction of treatment. CT and clinical findings pointed to a duodenal stump leak, therefore, we continued conservative management—continuous drainage, antibiotics, and TPN. Also, the patient's symptoms and laboratory findings differed from the typical acute cholecystitis and perforated GB. According to reports, the symptoms and onset of acalculous cholecystitis immediately after gastrectomy are different from typical symptoms [8]. Therefore, the diagnosis of acute acalculous cholecystitis immediately after gastrectomy is often delayed and mortality increases. The delayed diagnosis or misdiagnosis of acute acalculous cholecystitis can lead to sepsis and shock, or spontaneous perforation of the GB leading to peritonitis. Acute acalculous cholecystitis after gastrectomy causes more gangrenous changes and thus mortality rates are high in elderly patients (>75 years) and comorbid states like diabetes [9,10].

CT and ultrasonography are useful in making the diagnosis of GB perforation. Common findings include pericholecystic or/and hepaticoduodenal ligament fluid collection, streaky omentum or mesentery, and GB wall thickening; however, this is not much different from the findings of duodenal stump leak. If there is a stone or sludge in the GB lumen the possibility of GB perforation may be considered; however, when the stones are not observed, as in this case, it is likely the duodenal stump leak will be clinically considered first.

Treatment of GB perforation includes urgent cholecystectomy and conservative treatment including drainage, total parenteral nutrition, and intravenous antibiotics [11]. Surgery is the first line of treatment. If the patient has stable vital signs and no symptoms of peritonitis, conservative treatment may be considered. In this case, the patient was stable and had no symptoms of peritonitis, so conservative treatment was performed. There was no recovery observed after 1 week, and the procedure to change the drainage tube provided temporary symptom



**Fig. 1.** A post-operative day 5 abdominal computer tomography scan. Computer tomography (CT) showed a slightly distended gallbladder without wall thickening; there was minimal air and fluid collection near the duodenal stump and fluid collection in the abdominal cavity (A, B).



**Fig. 2.** A follow abdominal computer tomography scan on postoperative day 13. On follow-up CT scan, the abdominal fluid collection increased and the patient was re-diagnosed with gallbladder (GB) perforation rather than duodenal stump leak. CT showed slightly distended GB with suspected wall defect at GB fundus (A, B).

relief. However, after the follow-up CT, the possibility of GB perforation was diagnosed over the duodenal stump leak, and emergency diagnostic laparotomy and cholecystectomy were performed. According to findings from the operating room, the duodenal stump was secure and was thus diagnosed as fundus perforation of the GB. Afterward, the patient slowly recovered well without any specific complications and was discharged from the hospital.

#### 4. Conclusion

Spontaneous GB perforation immediately after gastric surgery is difficult to distinguish from a duodenal stump leak. Since the progression of GB perforation can increase the rate of serious complications and mortality, clinicians should consider this disorder as a complication in post-operative gastric surgery.

#### Sources of funding

This study did not receive any funding support.

#### Ethical approval

This is a case report; therefore it did not require ethical approval from ethics committee.

#### 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.

#### Author contribution

Lee WY was this patient's attending physician. Lee WY organized the report and wrote the paper.

#### Registration of research studies

Not applicable.

#### Guarantor

Woo Yong Lee.

#### Provenance and peer review

Not commissioned, externally peer-reviewed.

#### Declaration of competing interest

The author declares no conflict of interest.

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