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[症例報告]Gas gangrene of the liver following surgery for recurrent gastric carcinoma : A case report

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Gas gangrene of the liver following surgery for recurrent gastric carcinoma: A case report

Takumi Miyahira, Mamoru Yamada, Hiroshi Miyazato,
Masayuki Shiraishi, Toshiomi Kusano and Yoshihiro Muto

First Department of Surgery, Faculty of Medicine, University of the Ryukyus

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ABSTRACT

A case of gas gangrene of the liver following neoadjuvant chemotherapy and surgery for recurrent gastric cancer in a 67-years-old female is reported. She was operated on for advanced gastric carcinoma (partial distal gastrectomy) (stage IV) one year prior to this admission. Upper gastrointestinal series demonstrated a large mass (4.5×5.0cm) around the gastroduodenostomy site. Abdominal CT scan revealed several enlarged lymph nodes around the aorta. On May 17, 1994 after completion of neoadjuvant chemotherapy, pancreaticoduodenectomy and partial distal gastrectomy with node dissection, and intra-operative irradiation were performed. On the 7th post-operative day, a pus from pancreaticojejunostomy leakage was observed. Its culture generated *E. coli* and *Staphylococcus aureus* (MRSA). On the 17th day, the patient deteriorated. High fever, leukocytosis and jaundice were observed. On the 21th day, a plain abdominal radiograph showed mottled gas pattern in the liver and CT revealed large low density lesion within the liver. She expired with clinical manifestation of DIC (disseminated intravascular coagulopathy) 24 days after surgery. *Ryukyu Med. J.*, 15(3)139~142, 1995

Key words: gas gangrene, liver, recurrent gastric carcinoma, neoadjuvant chemotherapy

INTRODUCTION

Gas gangrene of the liver due to an accidental ligation of the hepatic artery or its branches is a recognized complication of hepatobiliary, pancreatic and gastric surgery¹⁻⁵⁾. There are three types of gas gangrene in humans: post-traumatic, post-operative and spontaneous¹⁾. Post-operative gas gangrene of the liver in a case such as ours is rare at the present time of the antibiotic era. The disease is usually rapidly progressive, and the reason for the high mortality is the failure to detect it in the early stage. Thus, for early diagnosis and treatment, we present the present case to draw the attention of physicians and increase their awareness of its existence.

CASE REPORT

A 67-year-old female was admitted to the Ryukyu University Hospital for therapy of recurrent gastric carcinoma on March 16, 1994. The patient had partial distal gastrectomy for advanced gastric carcinoma (Borrmann 2 type, antrum, moderately differentiated adenocarcinoma, stage IV according to the late General Rules for the Gastric Cancer Study by Japanese Reserch Society for Gastric Cancer) and post-operative adjuvant chemotherapy one year ago.

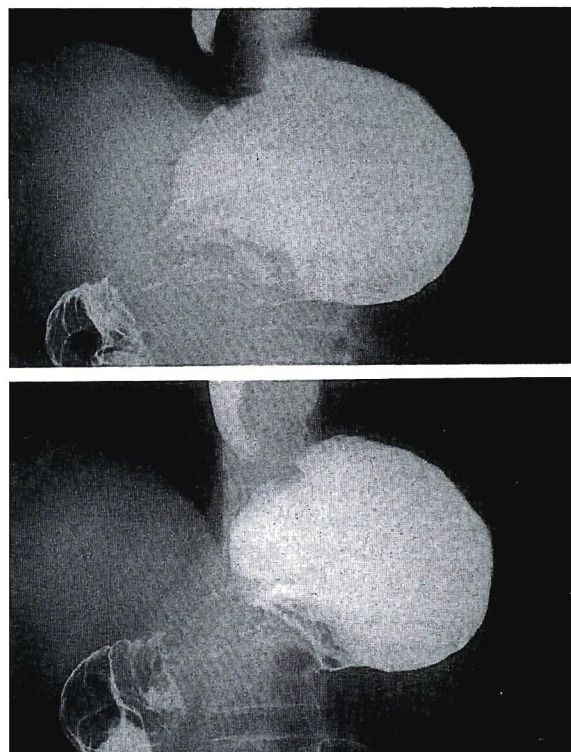


Fig.1 Upper gastrointestinal series demonstrating a large mass (4.5 ×5.0cm) around the gastroduodenostomy site.

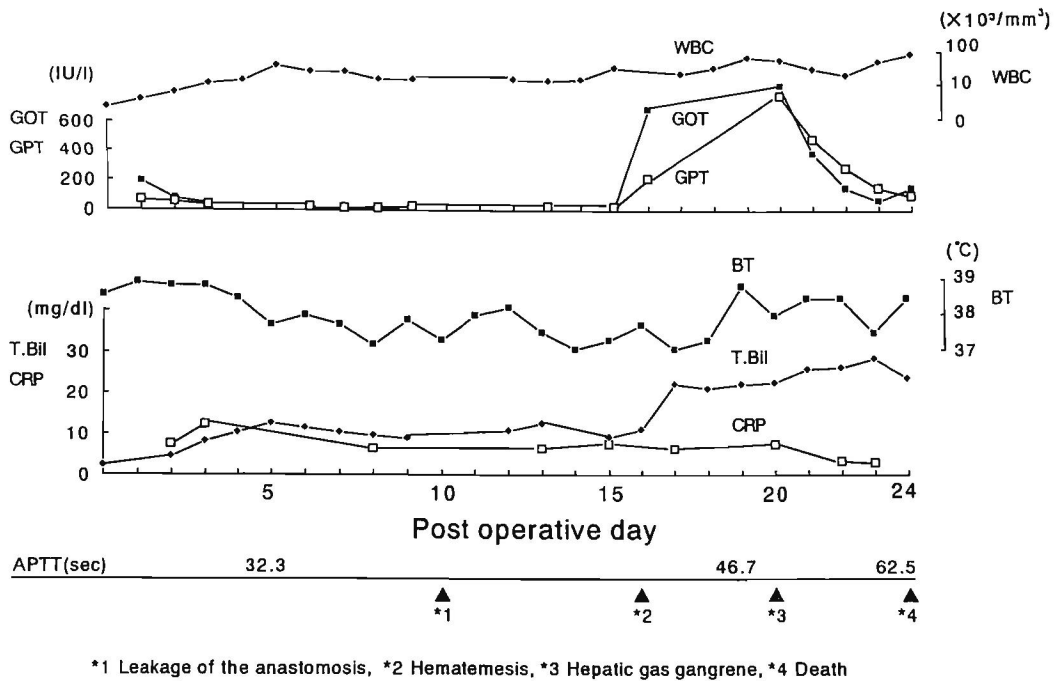


Fig.2 Postoperative clinical course.

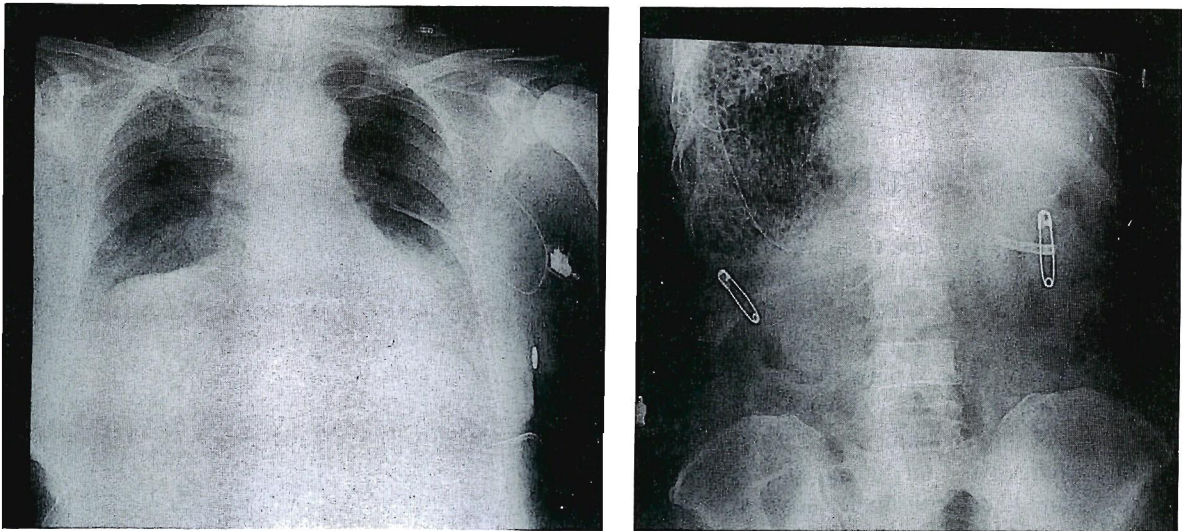


Fig.3 Plain chest and abdominal radiographs disclosed a mottled gas pattern in the liver area (right ; chest) (left ; abdomen).

On admission, she appeared well, but her physical examination revealed a hard tumor (4.5×5.0cm in size) palpable in the upper abdomen. Laboratory data showed that hemoglobin was 10.5g/dl and tumor markers including CEA, AFP and CA19-9 were within normal limits. Upper gastrointestinal series demonstrated an upward-medial compression of the gastroduodenal anastomotic region by a large mass (Fig.1). Abdominal CT scan revealed several enlarged lymph nodes around the aorta from the celiac axis to the superior mesenteric axis.

Neoadjuvant chemotherapy: To observe the usefulness of chemotherapy, we followed a two course of 5-FU 500mg

per day for two weeks and Cis-dichloro-diamino-cisplatin (CDDP) of 10mg per day for 5days. CDDP was given from the first day to the 5th day in each course of 5FU. After completion of the chemotherapy, the size of the tumor and the enlarged node was evaluated. A partial regression was seen. Consequently, surgical intervention was considered appropriate for radical resection of the recurrent gastric carcinoma.

On May 17, pancreaticoduodenectomy and partial gastrectomy with node dissection, and intra-operative irradiation (25 Gy) to the residual tumor tissues were performed. The common hepatic artery, and splenic and

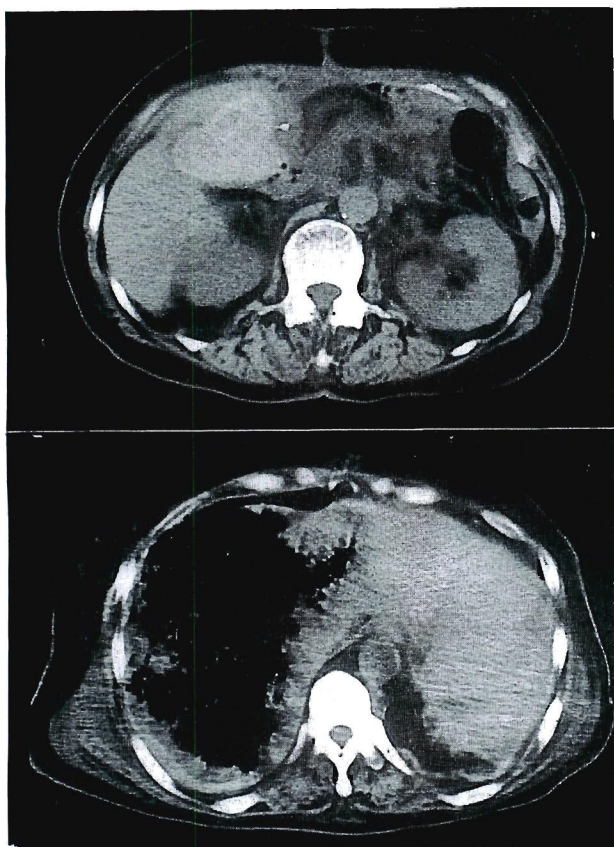


Fig.4 CT scan demonstrated a high density lesion (top) and a large low density lesion (bottom) within the liver.

superior mesenteric veins were intensively involved in the recurrent gastric carcinoma, so the complete resection was not possible and a residual tumor tissue remained. The reconstruction was carried out with modified Child's procedure.

Postoperative course (Fig.2).

On the 7th postoperative day (May 24), the blood sugar was elevated up to 300mg/dl but was controlled with insulin. Slight icterus was noted. Discharge containing intestinal fluid and pus from the penrose drain placed at the pancreaticojejunostomy was observed. The culture of the discharge fluid generated *Enterobacter*, *E. coli* and *Staphylococcus aureus* (MRSA). The antibiotic coverage was changed to Vancomycin.

On the 17th postoperative day (June 3), the patient rapidly deteriorated. Jaundice, high fever and leukocytosis were observed and persisted. Liver function tests revealed that total bilirubin was 11.2mg/dl, GOT 695 IU/L and GPT 205 IU/L. She developed MOF (multiple organ failure) and hepatic coma (grade 2).

On the 21th postoperative day (June 7), a plain abdominal radiograph disclosed a mottled gas pattern in the liver area which was diagnosed to be gas-containing intrahepatic abscess (Fig.3). CT scan demonstrated a large low density lesion within the liver to be more extensive than visualized on the plain abdominal film (Fig.4),

suggestive of massive necrosis of the liver, and occlusion of the inferior vena cava at the level of the hepatic hilus. Blood-flow scintigrams revealed avascular areas in the medial and anterior segments (S4, S5), indicating occlusion of the right hepatic arterial branches.

On the 24th postoperative day (June 10), she expired with clinical manifestation of DIC. Autopsy was refused.

DISCUSSION

Our patient was clinically characterized by recurrent gastric carcinoma with neoadjuvant chemotherapy, and postoperative status with intra-operative irradiation.

Gas gangrene is usually caused by gas-forming micro-organisms, and with a change in the micro-environment of the tissue (bacterial translocation). The organism is usually found in the gastrointestinal and biliary tracts. There are three types of gas gangrene; the most common type is post-traumatic (49%), followed by post-operative (35%) and spontaneous (16%)¹⁾. Our patient suffered post-operative gas gangrene of the liver. Intestinal necrosis from ischemia may cause gas forming liver abscess, but there was no roentgenographic evidence of intestinal necrosis such as pneumatosis intestinalis or free air in this case. She initially developed postoperative anastomotic leakage (localized peritonitis) and sepsis, then rapidly DIC and finally in MOF before the blood culture was obtained. The disease was diagnosed by the plain abdominal radiograph and CT scan 3 days before death. Therefore, diagnosis and subsequent treatment were delayed.

The reports^{2,3)} suggest that accidental ligation of the hepatic artery may result in gas-forming hepatic abscess. Although it is well known that in dogs, death regularly follows ligation of the hepatic artery and is due to growth of anaerobic gas-forming bacteria, this does not usually happen in monkeys and humans⁵⁾. In clinical practice transcatheter arterial embolization of the hepatic artery has been the modality of the first choice for patients with inoperable liver carcinoma^{7,8)}. Gas gangrene of the liver following arterial embolization has seldom been reported in the literature. Taking these clinical data into consideration, gas gangrene of the liver may not occur secondary to occlusion of the hepatic artery alone. Abdominal CT scan taken on the 21st postoperative day showed thrombosis of main portal vein. Decreased hepatic blood flow due to portal occlusion in addition to hepatic arterial occlusion from tumor involvement may be one of the factors of developing gas gangrene of the liver in this case. It is always associated with a change in the micro-environment of the tissue (bacterial translocation)⁹⁾. There is a strong association between bacterial infections and coexistent malignant neoplasms, and also a marked correlation with immunosuppression, especially leukopenia⁶⁾. Our patient had recurrent gastric carcinoma and was in an immunosuppressive state following neoadjuvant chemotherapy and aggressive surgery.

Regarding the pathogenesis, the bacteria usually gains access to the blood and tissues through mucosal lacerations of the gastrointestinal tract that frequently occur in gastric and colonic carcinomas, leukemia and leukopenia⁶⁾. Our patient was predisposed to mucosal edema, laceration, and leakage as a result of surgery, which enable the bacteria to invade, finally resulting in gas gangrene of the liver.

A brief review of published reports of this subject showed that there were several cases of gas-forming liver abscess. The micro-organisms responsible for the production of gas were *Klebsiella pneumoniae*, *Escherichia coli*, *Clostridium septicum*, *Cl bifementans* and *Cl perfirgens*. The blood culture was not taken, but puss culture from the intestinal leakage supported *E. coli*.

Some authors stressed the importance of early diagnosis in patients with pyogenic abscess and death was attributed to the lack of early diagnosis in these potentially curable patients. With newer radiographic techniques and the antibiotic era the prognosis has improved, but the mortality still remains high because the diagnosis is often not considered and the treatment is delayed. Not only treatment with antibiotics but also percutaneous catheter drainage should be done for these patient as soon as possible. Although the association with malignant neoplasms and immunosuppression⁶⁾, and also the strong association between uncontrolled bacterial dissemination and mutiple organ failure have long been recognized^{9,10)}, no specific preventive measures have been established. Thus, early identification and preventive measures become more important. These are worth keeping in mind in surgical treatment of cancer patients.

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