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Case Report

Ruptured Intrahepatic Biliary Intraductal Papillary Mucinous Neoplasm in a Jehovah's Witness Patient

Sangchul Yun[1], Dongho Choi[2]

[1]*Department of Surgery, Soonchunhyang University College of Medicine, Seoul, Korea*

[2]*Department of Surgery, Hanyang Medical Center, Hanyang University School of Medicine, Seoul, Korea*

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Intraductal papillary mucinous neoplasm (IPMN) of the bile duct is a rare lesion that is presented as dilated bile ducts filled with papillary or villous neoplastic biliary epithelium. Not infrequently, abundant mucin is produced by neoplastic cells and the bile ducts filled with mucin show tubular or cystic luminal dilatation.[1] We report a patient who showed abdominal pain with a 5.5- × 2.5-cm sized biliary IPMN. The condition was treated by en bloc resection of ruptured cystic tumor with left lateral sectionectomy. It was a challenging surgery to us because the patient's religious beliefs did not permit blood transfusion. However, a major hepatic surgery can be performed without blood transfusion sometimes, including such cases dealing with Jehovah's Witness patients.[2,3] To the best of our knowledge, this is the first report of a successful treatment for ruptured biliary IPMN without blood transfusion in a Jehovah's Witness patient worldwide.

Case Report

A 58-year-old man was admitted to our hospital, who had been suffering from epigastric pain for 2 months. Physical examination showed no specific finding. The laboratory tests—including aspartate transaminase, alanine transaminase, g-glutamyl transpeptidase, total bilirubin, direct bilirubin, alkaline phosphatase, and serum amylase—were within normal ranges. The alpha-fetoprotein level was 0.01 μg/mL, hemoglobin was 12.5 mg/dL, and hematocrit was 36.1%. He didn't have a history of hepatitis B. In computed tomography (CT) of the abdomen, a heterogeneously multilobulated enhancing hepatic mass was noted in the left segment of the liver, and protruding extrahepatic multiple cystic lesions were seen between liver and stomach. For further evaluation of the cystic lesion, magnetic resonance imaging was carried out and the cystic lesion showed high signal intensity on the T1-weighted

Corresponding author: Dongho Choi, Department of Surgery, Hanyang Medical Center, Hanyang University School of Medicine, 222 Wangsimni-ro, Seongdong-gu, Seoul, Republic of Korea.
Tel.: +82-2-2290-8444; Fax: +82-2-2281-0224; E-mail: dhchoi8787@gmail.com

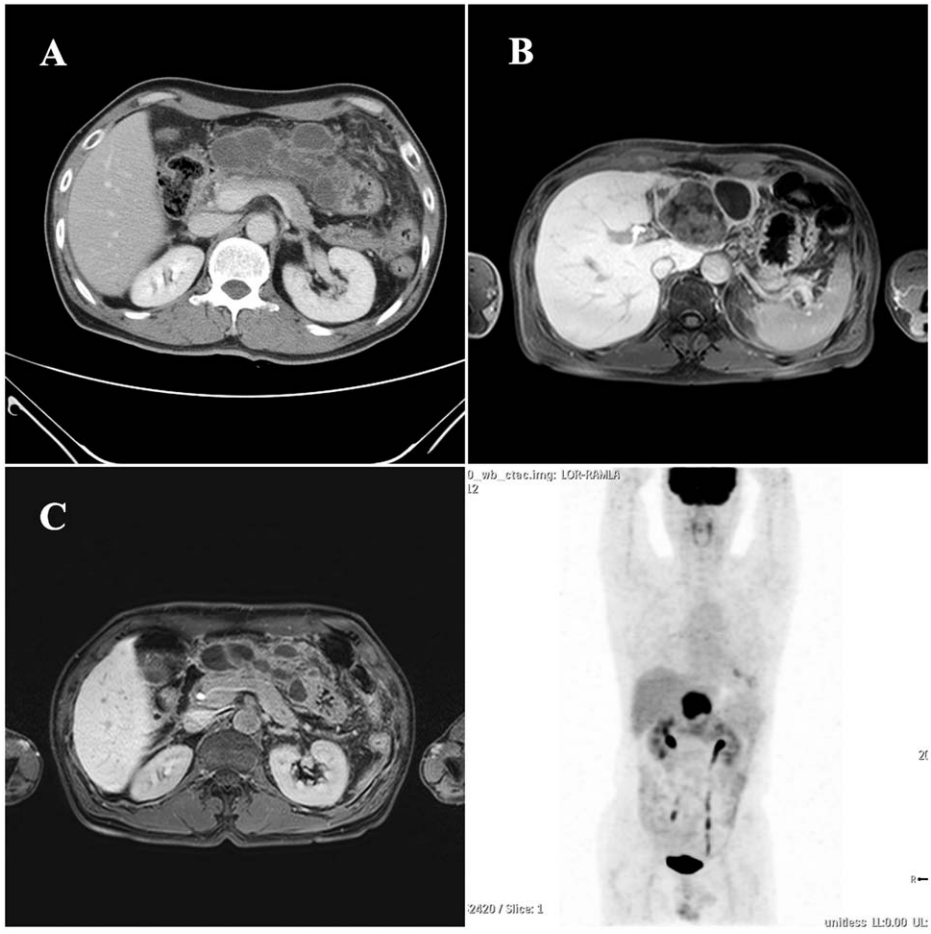

Fig. 1 (A) Contrast-enhanced CT image showed multicystic conglomerated mass around lesser sac. (B, C) Magnetic resonance images revealed the oval mass containing innumerable frond-like papillary tumors and fluid in the lateral segment of the left hepatic lobe. Bile ducts were not dilated evidently. (D) PET/CT scans showed increased uptake of the left lobe of the liver.

image (Fig. 1). After that, positron emission tomography (PET)/CT scan and duodenoscopy were performed. PET/CT suggested the diagnosis of carcinoma and duodenoscopy demonstrated external compression of stomach and duodenum.

Under the diagnosis of bile duct mucinous tumor, we decided to perform an en bloc resection of the tumor with its cystic lesion. For preoperative preparation, 2 ampules of iron hydroxide sucrose complex were injected daily and a total 8 ampules were injected during 10 days prior to surgery. Erythropoietin 8000 IU was given subcutaneously 2 days before surgery. Preoperative indocyanine green (ICG) R15 was 7.5%. The external surface of the dome showed a bulging out mass lesion with adjacent omentum. We performed left lateral sectionectomy of the liver, including the cystic mass and attached omentum without perioperative transfusion (Fig. 2). The cystic mass was multilobulated and filled with yellowish mucin-like materials. Intraoperative chemotherapy was donned using cisplatin 100 mg mixed with saline 300 mL for 4 hours.

Macroscopic examination of the specimen consisted of liver, clinical product of left sectionectomy, weighed 341 g and measured $13 \times 7 \times 6$ cm (Fig. 2D). From sectional view, the mass consisted of an ovoid solid area and an abutted cystic portion showing necrotic materials, totally measuring 5.5×2.5 cm. The solid portion showed a friable and gray cut surface. The cystic portion had a fibrotic wall that extended to the resection margin, grossly. Histological diagnosis was consistent with biliary intraductal papillary mucinous neoplasm with associated invasive carcinoma. Lymphovascular invasions were not identified around this tumor. The resection margin

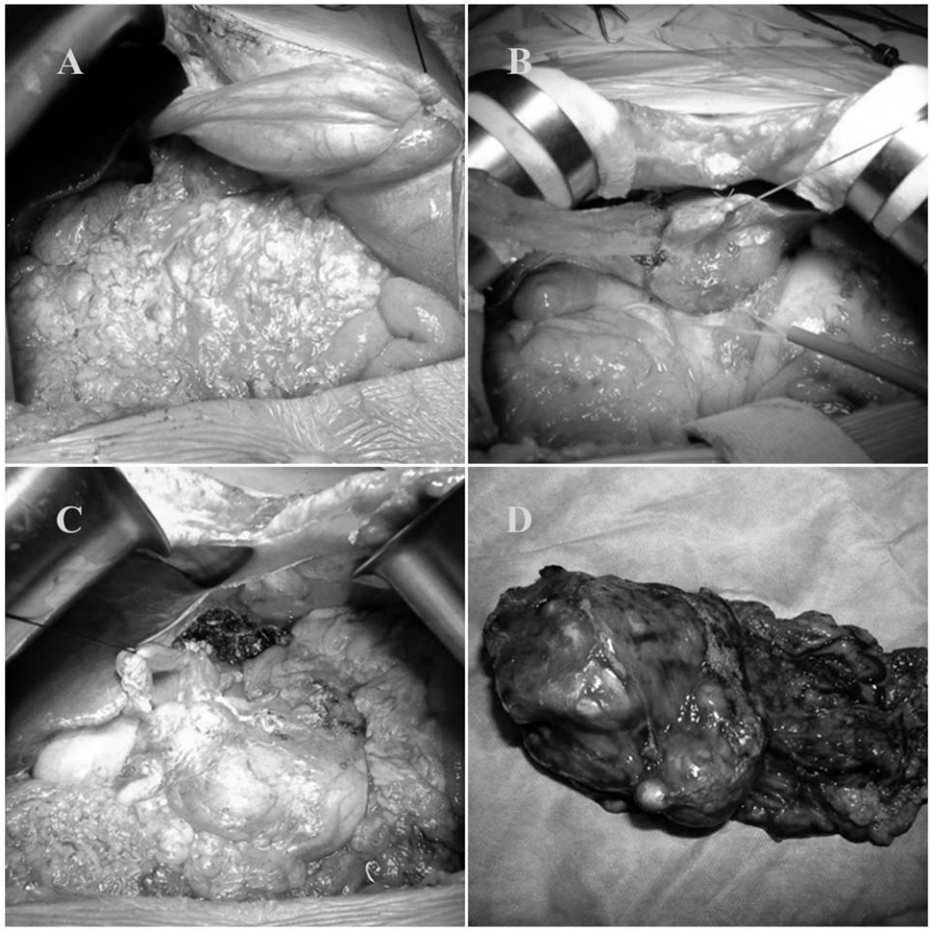

Fig. 2 (A, B) Operative findings presented a bulging-out mass lesion covered with the adjacent omentum. (C) Clean-cut surface of left lateral sectionectomy of the liver is visible. (D) Resected specimen of liver consisted of ovoid solid necrotic tissue and abutted cystic portion filled with necrotic material. The attached omentum revealed several small palpable nodular lesions.

was involved with benign intraductal papillary neoplasm. Immunohistochemical examination revealed that cytokeratin 7 (CK-7), cytokeratin 19 (CK-19), carcinoembryonic antigen (poly), carbohydrate antigen 19-9, and mucin 1 (MUC1) were positive. Focal expression of p53 was also observed in some carcinoma cells. The IPMN stained negative for MUC2. The tumor was finally diagnosed as adenocarcinoma arisen from intraductal papillary neoplasm of the bile duct.

The amount of blood loss during operation was 200 mL and the postoperative hemoglobin level was maintained between 12∼13 mg/dL. There was fluid collection at liver resection margin and drainage tube was inserted for perihepatic fluid for 10 days postoperatively. The patient took a sip of water on 3 days and soft diet on postoperative day 5. He was discharged 14 days after operation.

Discussion

The biliary IPMN is rarely encountered and histologically defined as a tumor that shows papillary proliferation of neoplastic biliary epithelial cells with delicate fibrovascular stalks within the bile ducts. Microscopic or macroscopic findings show existence of mucin, variable dilatation, or multilocular cystic changes of the affected bile ducts. Conditions have been described with increasing frequency in recent years.[4,5] The clinical symptoms include jaundice, elevated liver enzymes by duct obstruction, and secondary infection with fever and chills. Biliary IPMN may occur in chronic diseases such as hepatolithiasis or clonorchiasis. However, the patient in our case had no possible risk factors or no symptoms except epigastric pain. It is expected,

due to extrahepatic spillage of cystic material and there were no drainage duct obstruction.

In previous reports, aggressive surgical resection was recommended as treatment of choice for biliary IPMN because positive resection margins were strongly associated with shorter overall survival rates ($P < 0.001$) and recurrence-free survival rates ($P < 0.001$).[5] Complete resection of the biliary IPMN may result in good prognosis and no recurrence. It could be difficult in some cases because biliary IPMN can involve multiple sites[1] and rupture[6] or can have pseudomyxoma peritonei by mucin material spillage.[7] In such cases including ours, it is difficult to carry out R0 resection for ruptured cyst, due to bleeding and extensive multiple cysts. Endoscopic retrograde cholangiogram, percutaneous transhepatic cholangiograms, or intraoperative cholangiography could be a help for the accurate diagnosis of IPMN and complete resection of tumor. However, we did not perform them due to the ruptured cyst, procedural invasiveness, and limited time required to complete the procedure.

Like pancreatic IPMN, the lining epithelium of biliary IPMN can be categorized as pancreatobiliary, intestinal, oncocytic, or gastric type according to the morphology of the papillae and the immunohistochemical features of mucin glycoproteins (MUCs).[8] Immunohistochemical studies showed that the biliary tumor were immunoreactive with CK-7, CK-19, and MUC1. The biliary IPMN negative for MUC2 was compatible with histologically pancreaticobiliary type. The pathologic finding of our case revealed an intraductal papillary neoplasm with invasive carcinoma, and as such, it was classified as stage T1 by the American Joint Committee on Cancer.

Compared with previous reports of biliary IPMN, this case we are reporting is unique because of the ruptured intrahepatic biliary IPMN and because the patient was a Jehovah's Witness. The biliary IPMN in the left lateral segment measured 13 cm in long axis was ruptured and multiple cysts were located at the extrahepatic space. Preoperative liver function values including ICG R15 were normal and the patient had abdominal pain. Although liver resection was the appropriate treatment option, his religious beliefs as a Jehovah's Witness meant that he could never accept blood transfusions, even in a life-threatening situation. Liver resection for biliary malignancy is complex and tends to increase the likelihood of blood transfusion.[9] This required a careful perioperative strategy and a meticulous surgical technique that would minimize the intraoperative blood loss.[2] Preoperative management of these patients may include the use of recombinant human erythropoietin and intravenous iron therapy.[10,11] Intraoperatively, this patient could accept intravenous dextran. In this case, preoperative and postoperative hematocrit levels were 36.1% and 37.6% without blood transfusion. The postoperative course was uneventful except there was some perihepatic fluid collection.

In conclusion, we report a rare case of surgically resected adenocarcinoma arising from ruptured biliary IPMN in a Jehovah's Witness patient. This case suggests that a complicating liver surgery, even in a case with ruptured biliary IPMN, could be performed without blood transfusion in Jehovah's Witness patients.

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