

Mucinous Biliary Cystadenocarcinoma on Hepatobiliary Scintigraphy: A Rare Case Report

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Abstract: A case of biliary cystadenocarcinoma presenting with recurrent cholangitis in a Chinese male is reported. His hepatobiliary scintigraphy revealed a delayed pooling of radioactivity in the central radicles adjoining the photopenic mass, explainable by mucinous obstruction. The patient underwent tumor resection successfully following by adjuvant radiation to secure local control. Histological examination of the tumor showed mucinous biliary cystadenocarcinoma. The literature concerning biliary cystadenocarcinomas is mainly limited to case studies. This report sets forth recognition of the tumor on hepatobiliary scintigraphy which has never been described. Clinical features of cystadenocarcinoma are also reviewed.

Keywords: cholestasis, cystadenocarcinoma, hepatobiliary scan, mucinous bile

INTRODUCTION

Biliary cystadenocarcinoma is a rare tumor arose from the bile ducts, constituting about 0.41% of all epithelial malignancies of the liver [1]. An overall recognition of biliary cystadenocarcinoma is still poor. The tumor is thought to arise from biliary lesions induced by ischemia and carcinogens, or from malignant transformation of a pre-existing cystadenoma [2-5]. The gross morphology, characterized by a multilocular mass containing papillary protrusions, has been observed on most imaging modalities [6]. The scintigraphic feature of mucinous biliary obstruction in cystadenocarcinoma has never been documented. The mucinous bile is assumed to have been responsible for the recurrent jaundice [6]. Its genetic or geographic predisposition remains to be investigated.

CASE REPORT

A 60-year-old Chinese male presented with high fever and RUQ abdominal pain for 1 week duration. Six years earlier he was diagnosed as having a left hepatic cyst in which mucinous fluid had been drained. Recurrent cholangitis and intermittent jaundice developed thereafter. On admission, the patient was

febrile of 39°C and a white cell count of 18,400/mm³ with a shift to left. Abnormal data included creatine kinase 232 U/L (CK, range: 0-14), lactic dehydrogenase 278 U/L (LDH, range: 95-216), gamma-glutamyl transpeptidase 129 U/L (GGT, range: 3-36), carcinoembryonic antigen 8.22 ng/ml (CEA, range: <5), and carbohydrate antigen 19-9 >120 U/L (CA 19-9, range <33). Hepatitis B antibodies (anti-HBs & anti-HBc) were positive. Liver function and alpha-fetoprotein were normal.

Ultrasonography and computed tomography disclosed a multilocular tumor in the left hepatic lobe, and biliary dilatation with intraluminal nodules. In addition to verify the above findings, an endoscopic retrograde cholecysto pancreatico graphy demonstrated that the ampulla of Vater was inflamed and swollen. The patient was referred for scintigraphic evaluation of biliary functions. Tc-99m DISIDA hepatobiliary scan (Figure 1) showed that the tumor area was devoid of radioactivity. There was delayed, regional pooling of tracer in the adjoining portion of the liver, in addition to ductal dilatation. The findings suggested a left hepatic tumor with outflow biliary obstruction.

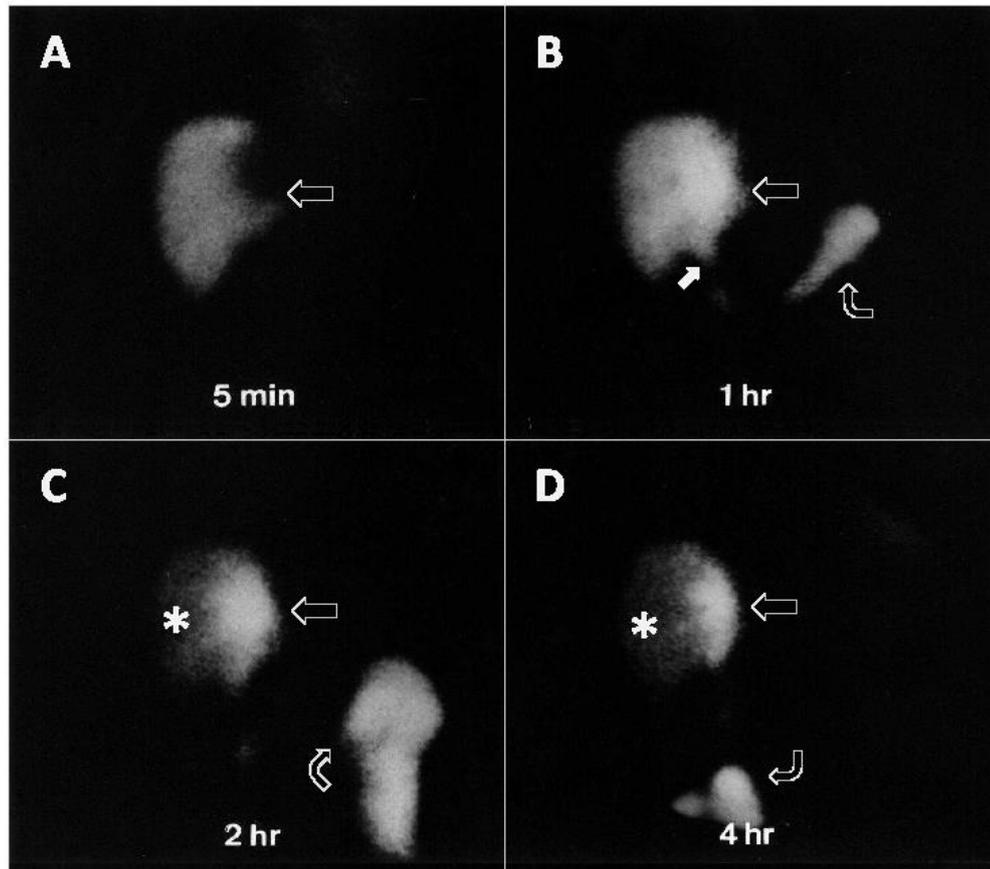


Fig 1: Sequential Tc-99m DISIDA scintigraphy. (A) Prompt hepatic uptake in the right lobe, and a photopenic lesion in lateral segment of the left lobe (*hollow arrow*). **(B)** Note the initial decrease but delayed pooling of tracer (*flip flop*) around the portal area (*hollow arrow*), common duct dilatation (*white arrow*), and physiologic bowel activity (*curved arrow*). **(C & D)** Slow elimination of radiotracer from the larger central radices (*hollow arrow*), compared to the rest of the hepatic parenchyma (*asterisk*), the findings consist with cholestasis. The gall bladder is absent from previous cholecystectomy.

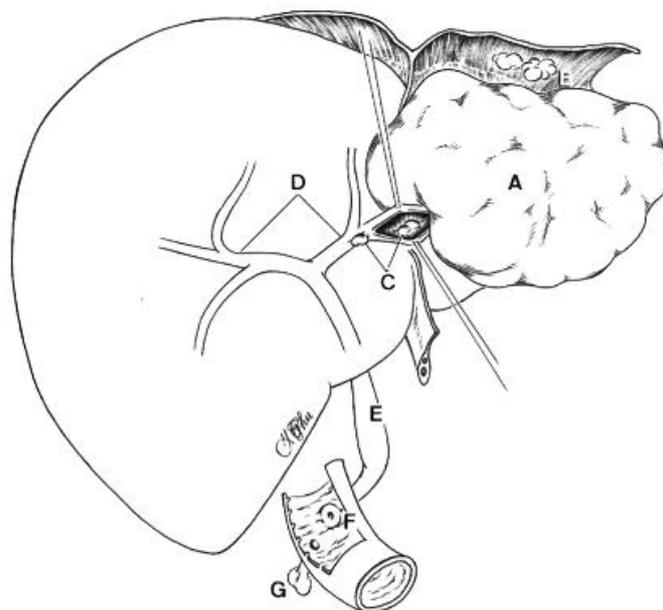


Fig 2: Schematic drawing of operative findings. A: cystic mass filled with sticky mucoid contents and papillary projections on the internal surface, **B:** diaphragmatic deposits, **C:** ductal nodules, **D:** biliary tree dilatation, **E:** common duct dilatation with mucinous bile, **F:** inflamed papilla of Vater, **G:** a diverticulum.

An exploratory laparotomy, choledochotomy, tumor removal and partial left lobectomy of the liver were performed. The tumor was multiloculated and measured about 7×5×4 cm, replacing the lateral segment of the left lobe (Figure 2). The bile duct contained intraluminal nodules and mucinous bile. Bile culture grew *Moraxella catarrhalis*, sensitive to gentamycin and bactrim. Histologic diagnosis was mucinous cystadenocarcinoma of the left hepatic duct. The patient subsequently received adjuvant radiation to secure local control and a course of antibiotic treatment for *Moraxella* infection. He is doing well 2 years after surgery.

DISCUSSION

Mucinous cystadenocarcinoma of the biliary system is rare, comprising only 0.41% of all hepatic epithelial malignancies [1]. Since it was first reported in 1943 [7], less than 100 cases reported worldwide [8]. The World Health Organization (WHO) in 2010 had recategorized biliary cystadenocarcinoma into mucinous cystic neoplasms with an associated invasive carcinoma [9]. However, most authors in the recent literature continue using cystadenocarcinoma to describe this rare disease. Biliary cystadenocarcinoma affects men and women with essentially equal frequency and the mean age at presentation is the late fifties [8]. The etiology of the tumor remains unclear. The development of cystadenocarcinoma in normal bile ducts exposed to carcinogen experimentally has been observed [10]. It is noteworthy that most biliary cystadenocarcinomas arise from pre-existing cystadenoma [2-4, 10], or hepatic cyst [7, 10, 11], as demonstrated in our case. In the pathologic review of 70 cases of cystadenoma, Devaney *et al.*; observed that 18 (25%) contained cystadenocarcinomas [3]. Its histologic resemblance to embryonic tissue suggests that the tumor may be a neoplastic of ectopic rests [4, 11]. In this case, the intraluminal nodules and mucinous bile recognized by ductal exploration strongly suggest that the tumor is ductal origin.

The patient's complaints are atypical and include abdominal pain, palpable mass, biliary infection and jaundice, etc., which are attributable to tumor compression [12]. Elevation of cholestatic parameters in the blood is secondary to obstruction or compression of the biliary system. CA-19-9, a serum marker normally synthesized by normal pancreatic and biliary ductal epithelium, may be elevated in the presence of cholestasis and are therefore used as a parameter of tumor activity [13]. Grossly, the tumor is multilocular cystic and lined by mucus-secreting epithelium with papillary infoldings. The mucinous content may be clear, bloody, or bile-stained [4]. Regarding radiological characteristics, large multilocular cystic lesions with internal septations and mural nodules are the major features detected both in cystadenoma and in cystadenocarcinoma. Sonographic features may reflect

similar morphology [1, 6]. On MRI, the cyst fluid has variable signal on T1 and T2-weighted images and variable attenuation, respectively, depending on the fluid contents, i.e., hemorrhagic versus serous or mucinous [14]. The liver scintigram demonstrates a photopenic region in the liver [4, 15, 16]. More recently liver scan is recognized as a useful modality for assessing hepatic function reserve for patients undergoing hepatic surgery [16]. However, cystadenoma and cystadenocarcinoma are difficult to differentiate on imaging and often make accurate diagnosis challenging. An exact diagnosis of the tumor is still difficult without histologic examination. As most cystadenocarcinomas contain areas of histologically benign components, extensive sampling is necessary.

Although hepatobiliary scintigraphy is a good tool for evaluating the biliary system, none for a biliary cystadenocarcinoma has been documented. Following intravenous injection, normally the hepatobiliary agent enters the hepatic sinusoids and is transported into the hepatocytes. Scanning at this time shows the liver image. The agent then is eliminated to the bile, follows the bile pathway and delineates the biliary tract. As bile excretion continues, the liver image fades and the agent is confined to the bowel. In this case studied with 7 mCi of Tc-99m diisopropyl-iminodiacetic acid (DISIDA), the tumor itself was photopenic, due to parenchymal replacement by cystic structures (Fig. 1A). Area adjoining the tumor showed an initial reduction but delayed pooling of radioactivity (flip flop), owing to hepatocyte dysfunction and biliary stasis (Fig. 1, B & C). Ductal dilatation and regional pooling of radioactivity are the hallmarks of biliary obstruction on chole scintigraphy. In addition to mass compression effect and ductal invasion, mucinous bile played an important role in biliary obstruction in this case. Mucinous shunting from the cystic tumor to the biliary ducts results in the formation of sticky bile that acts to functionally obstruct the biliary tract, namely, mucinous obstruction [6, 17].

Because of the risk of cholestatic jaundice, recurrent infection, local spread, and distant metastasis, radical resection is the definitive treatment [8]. Conservative methods including interval follow-up, percutaneous aspiration, Roux-en-Y drainage, marsupialization, or sclerosis are ineffective. These methods have been associated with high rate of complications, including sepsis, continued growth, and delay treatment of a malignant condition [18]. The role of adjuvant radiation or chemotherapy for patients who undergo surgical resection cannot be evaluated at this time. In general, biliary cystadenocarcinoma appears to be low grade cancer and carries a good prognosis with total resection [15].

CONCLUSION

Because biliary cystadenocarcinomas are rare, they are not easy to diagnose preoperatively and cannot be accurately distinguished from each other merely by imaging. This case is reported to elucidate that hepatobiliary cystadenocarcinoma needs to be considered in patients with cholestatic jaundice in the presence of a cystic liver lesion. Long-term good outcomes are expected with total ablative treatment. Misdiagnosis of pseudocyst subsequent to delayed or inappropriate treatment may jeopardize the chances for cure.

COMPETING INTEREST

The authors declare that they have no competing interests.

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