Tuberculosis of the Biliary Tract: A Rare Cause of Biliary Stricture

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Tuberculosis is one of the most widespread diseases worldwide, with an estimated 20% to 43% of the world's population infected with *Mycobacterium tuberculosis*.[1] Approximately 15 million individuals in the United States are infected with the bacterium.[1] In 2005, 14,093 cases of active TB were reported in the United States.[2] The incidence of the disease has increased among persons with HIV, especially among young adults,[3,4] and is high among foreign-born individuals, in whom active disease was reported to occur nearly 9 times more frequently than in persons born in the United States.[2]

The abdomen is one of the more common extrapulmonary sites of infection.[5,6] Although 50% to 80% of cases[7] of pulmonary tuberculosis are associated with concurrent hepatobiliary involvement, biliary tract obstruction caused either by tuberculous adenitis[8] or by intrinsic involvement of the biliary tract remains a rare occurrence.[9] This article reports a case of biliary tuberculosis that presented as a stricture of the biliary tract.

CASE PRESENTATION

Initial History and Presentation

A 40-year-old South Asian woman presented to the emergency department with low-grade fever of 2 weeks' duration and associated severe right upper quadrant pain and jaundice of 2 days' duration. She denied any cough, chest pain, or shortness of breath. There was no history of nausea, vomiting, pruritus, or weight loss and no past history of jaundice or similar complaints. She also denied using alcohol or tobacco. There was no history of similar complaints in the family. Family history was significant for hypertension and coronary artery disease in the patient's father.

Physical Examination

On examination, the patient appeared ill. Vital signs at admission were heart rate of 102 bpm, blood pressure of 118/76 mm Hg, temperature of 99.2°F, and respiratory rate of 22 breaths/min. Otolaryngologic examination revealed a normocephalic, atraumatic head, icteric conjunctiva with pupils equally reactive to light and accommodation, no discharge or tenderness of the ears, no nasal mucosal erythema or sinus tenderness, and pale oral mucosa with dry tongue. Auscultation of the chest revealed decreased breath sounds bilaterally at the bases. The cardiac examination was normal. Examination of the abdomen revealed hepatomegaly 2 cm below the costal margin and splenomegaly but no other palpable masses. There was no pedal edema.

Laboratory Testing and Diagnostic Evaluation

The results of the patient's complete blood count and liver function tests are shown in **Table 1**. Tests of renal function were reported as normal.

Chest radiograph revealed normal heart size and bilateral pleural effusion with underlying compressive atelectasis; no bony abnormality was identified. Pleural fluid analysis revealed straw-colored fluid with a white blood cell count of $1200 \times 10^3/\mu L$ (80% were lymphocytes), protein concentration of 4.5 g/dL, glucose level of 88 mg/dL, and elevated adenosine deaminase levels at 63 U/L (normal, 10–40 U/L); no acid-fast bacilli were found. Pleural fluid culture was positive for *M. tuberculosis*. A tuberculin (purified protein derivative) skin test was positive at 20 mm induration. Ultrasound evaluation of the abdomen revealed hepatomegaly, enlarged gall bladder with no calculi, intrahepatic biliary dilatation, and nodes in the porta hepatis. Endoscopic

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Table 1. Results of Complete Blood Count and Liver Function Tests in Case Patient

Laboratory Test	Result	Normal Range
Complete blood count		
White blood cell count ($\times 10^3/\mu L$)	12.9	4–10
Differential (%)		
Granulocytes	78	40–70
Lymphocytes	19	18–49
Monocytes	2	1–12
Eosinophils	1	0–7
Hemoglobin (g/dL)	11.6	12–14
Hematocrit (%)	34.6	37–47
Mean corpuscular volume (fL)	84	81–99
Platelet count ($\times 10^3/\mu L$)	367	130–400
Erythrocyte sedimentation rate (mm/hr)	80	0–20
Liver function tests		
Total bilirubin (mg/dL)	4.8	0–1
Aspartate aminotransferase (U/L)	141	0–35
Alanine aminotransferase (U/L)	100	0–35
Alkaline phosphatase (U/L)	436	30–120

retrograde cholangiopancreatography (ERCP) was performed and revealed irregular stricture in the mid common bile duct region (**Figure 1**). Brush biopsy and cytology evaluation (**Figure 2**) of a specimen from the site using the Howell biliary introducer system (Wilson-Cook Medical Inc.; Winston-Salem, NC) was positive for tubercular granulomas and giant cells.

Management

The patient underwent therapeutic ERCP with placement of a 10F, 10-cm stent across the stricture and was started on 4-drug antitubercular treatment with isoniazid, rifampin, ethambutol, and pyrazinamide. She was continued on treatment in the hospital for 2 weeks, and during this time her general status improved, including resolution of pain and fever. She was discharged on antitubercular therapy and then followed on a monthly basis. Repeat ERCP performed 4 months after initiation of treatment revealed normal common bile duct and intrahepatic biliary radicals. The stent was removed and the bile duct remained patent. Results of repeat liver function tests and chest radiograph were normal. The patient was continued on treatment for the full course of 9 months (isoniazid, rifampin, ethambutol, and pyrazinamide for 2 months followed by isoniazid and rifampin for 7 months) and responded to this regimen.

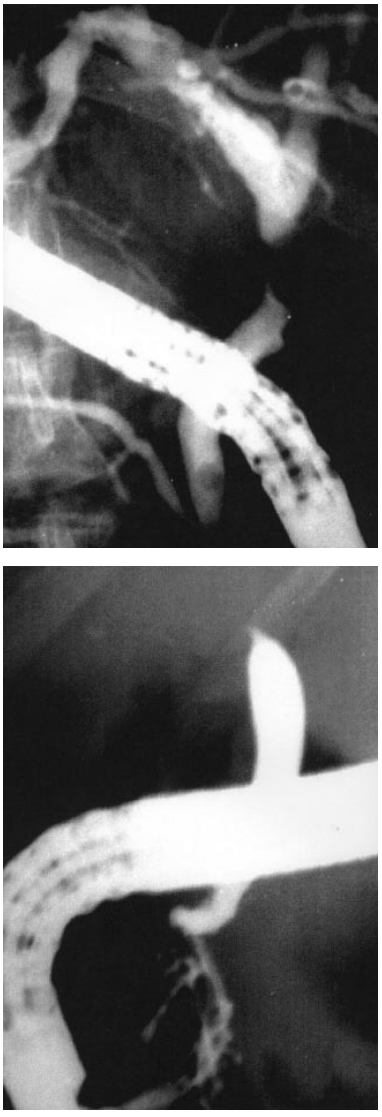

Figure 1. Images obtained by endoscopic retrograde cholangiopancreatography showing irregular stricture of the mid common bile duct with dilatation of intrahepatic biliary radicals.

TUBERCULOSIS OF THE BILIARY TRACT

Presentation and Pathophysiology

Tuberculosis of the biliary tract may have varied presentations but usually presents as a triad of fever, jaundice, and hepatic calcifications.[10,11] Jaundice is due to extrahepatic or intrahepatic strictures, adenopathy, or hepatolithiasis. There are few case reports in which obstructive jaundice is described due to tuberculous lymphadenitis and/or common bile duct stricture.[8,9,12] *M. tuberculosis* reaches the biliary tree by hematogenous spread from the lungs or lymphatic spread from another intra-abdominal source of infection. The involvement of the

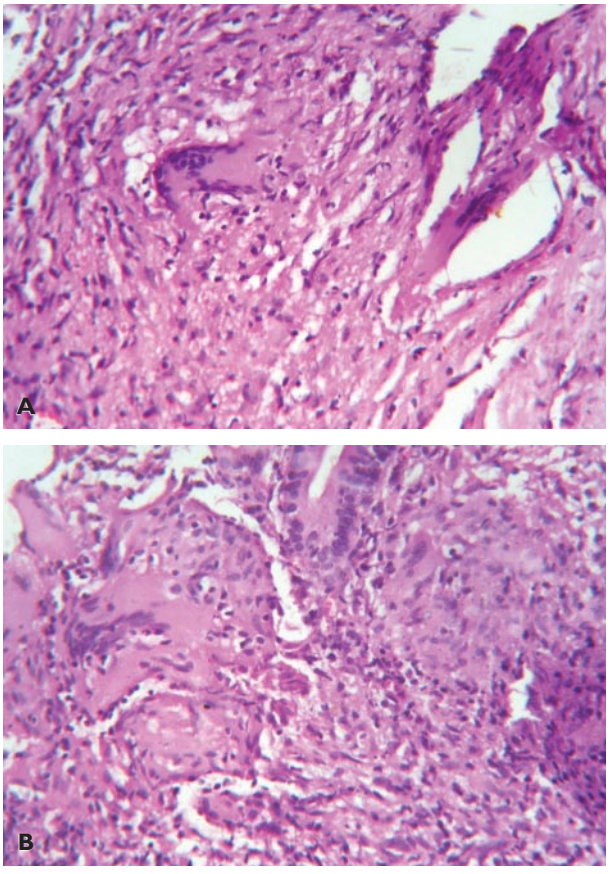

Figure 2. Photomicrographs of histopathology section of common bile duct obtained by endoscopic retrograde cholangiopancreatography showing (**A**) tubercular granuloma and giant cell and (**B**) granuloma with caseation necrosis (hematoxylin and eosin stain, original magnification ×40).

common bile duct is thought to be due to spread of caseous material from the portal tract or secondary inflammation related to periportal adenitis.[12,13] A review of the literature classified tubercular biliary strictures as types 1, 2, and 3, and further as intrinsic or extrinsic based on the location and nature of obstruction (**Table 2**).[13]

Diagnosis and Treatment

The differential diagnosis for biliary obstruction includes common causes such as choledocholithiasis, biliary tract surgery, sclerosing cholangitis, and other infections as well as strictures due to malignancy. Initial evaluation using blood counts and radiographs to search for the source of infection is of utmost importance. Ultrasound is considered the imaging modality of choice for initial screening. The diagnosis of tuberculosis of the biliary tree is confirmed by endoscopic brush cytology/biopsy[14] or by biopsy of involved lymph

Table 2. Tubercular Biliary Strictures

	Intrinsic (Intramural)	Extrinsic (Nodal)
Type 1, Extrahepatic	Common bile duct stricture	Compression by enlarged pericholedochal lymph nodes
Type 2, Intrahepatic	Intrahepatic strictures	Compression by enlarged perihilar lymph nodes
Type 3, Combined	Extrahepatic and intrahepatic strictures	Combination of biliary strictures and lymph node compression

Adapted with permission from Sriram PV, Rao GV, Reddy DN. Endoscopic management of benign biliary obstruction. Available at www.bhj.org/journal/2002_4404_oct/therap_543.htm. Accessed 4 Jan 2007.

nodes. Use of the polymerase chain reaction assay to demonstrate mycobacterial DNA is also helpful.[10,14]

Treatment of biliary tuberculosis is medical therapy (antitubercular treatment) coupled with endoscopic sphincterotomy and dilatation and stenting if biliary obstruction is present.[15–17] Antitubercular therapy for extrapulmonary tuberculosis is based on the recommendations of the World Health Organization as well as the Joint Statement of American Thoracic Society, Centers for Disease Control and Prevention, and the Infectious Diseases Society of America.[18] In general, a 6- to 9-month regimen (2 months of isoniazid, rifampin, pyrazinamide, and ethambutol followed by 4–7 months of isoniazid and rifampin) is the recommended treatment for extrapulmonary tuberculosis. The optimal duration of therapy for tuberculous meningitis has not been established, but some experts recommend 9 to 12 months.[18] The addition of corticosteroids is recommended for tuberculous pericarditis and meningitis.[18] The World Health Organization guidelines recommend 6- to 8-month regimens comprising an initial intensive phase lasting 2 months followed by a continuation phase lasting 4 to 6 months for both pulmonary and extrapulmonary tuberculosis.[19] The guidelines vary in special cases such as relapses, multidrug resistance, and patients with HIV infection. There are no specific recommendations for biliary tuberculosis.

In our case, a biliary stent was placed across the stricture as there was evidence of obstructive cholangitis, which subsided after stent placement. Left untreated, biliary tuberculosis leads to a sequence of events starting with cholestasis, recurrent overt or subclinical cholangitis, secondary biliary cirrhosis, and secondary stone formation.

CONCLUSION

We have presented a rare case of common bile duct stricture due to biliary tuberculosis. This is an important

condition to diagnose because early recognition with prompt treatment results in complete resolution without surgery. As the incidence of extrapulmonary tuberculosis rises, physicians can expect that biliary tuberculosis, sometimes associated with bile duct obstruction, may well become a more common entity. **HP**

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