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# Tuberculous Hepatic Artery Aneurysm: Multimodality Imaging

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Hepatic artery aneurysms are rare clinical entities which constitute 20% of all visceral aneurysms. They are usually discovered incidentally at autopsy. This report describes tuberculosis as an etiologic agent for hepatic artery aneurysm and also highlights radiologic findings of hepatic artery aneurysm by real time ultrasound, color Doppler imaging (CDI), digital subtraction angiography and computed tomography (CT).

## Case Report

A 30-year-old school teacher who was a known hypertensive, presented to emergency with fever and abdominal pain. He complained of low grade fever and epigastric pain radiating to the back, which he had had for a period of one year. The pain had recently increased, usually after meals. Over the previous month, the patient had anorexia, resulting in the loss of three kg. There was a family history of pulmonary tuberculosis and the patient was on empiric anti-tuberculous therapy.

On examination, the patient appeared weak and pale, and there was no evidence of jaundice. Pulse was 76/min, temperature 37 degrees Celsius and blood pressure was 150/100 mmHg in both arms. Chest examination was unremarkable. He had tender epigastrium. Laboratory findings were: Hb 10.7 gm/dL, WBC 10.2 x 10<sup>9</sup>/L, platelets 528 x 10<sup>9</sup>/L, ESR 59 mm/hr, HBsAg non-reactive, SGPT 63 IU/L (0-55), gamma GT 106 IU/L (3-50), and alkaline phosphatase 212 IU/L (28-124). Chest radiograph was normal.

Real-time ultrasound of the upper abdomen showed a large, well-circumscribed round hypoechoic lesion close to the pancreatic head. There was a peculiar swirling motion of mildly echogenic band-like shadows within the lesion (Figure 1). This was suggestive of an aneurysm from one of the visceral arteries. No evidence of compression of bile ducts due to aneurysm was noticed. Duplex and color Doppler imaging confirmed an aneurysm arising from the common hepatic artery. Color Doppler imaging demonstrated a jet of blood going into the aneurysm from the top, producing an arterial signal in the center. There was no color filling at the periphery compatible with thrombosis (Figure 2).



Figure 1. Ultrasound showing visceral branches of abdominal aorta and aneurysm in relation to hepatic artery.

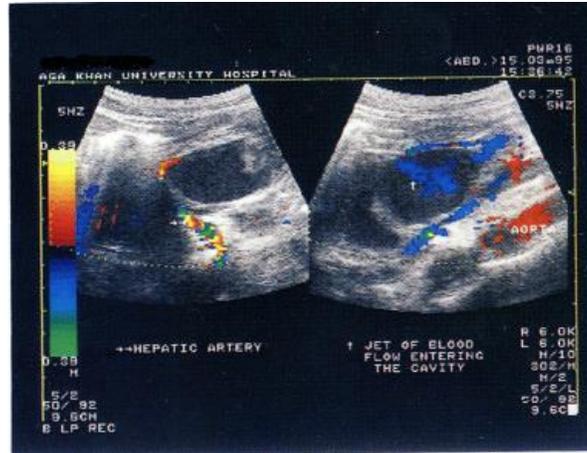


Figure 2. Duplex color image shows arterial waveform and color filling from the center and thrombosis at periphery.

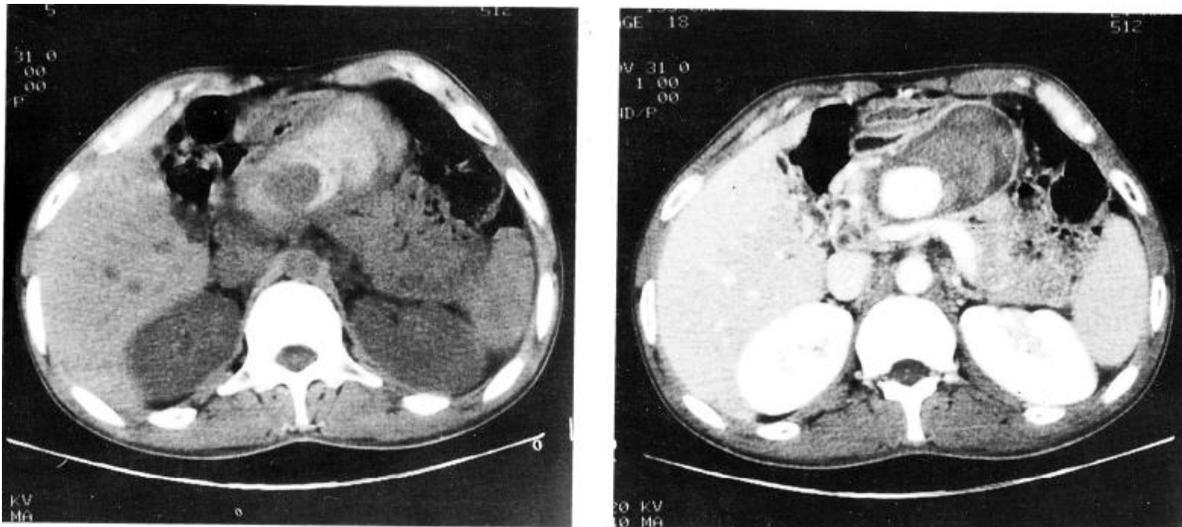


Figure 3a and 3b. Pre- and post-contrast appearance of common hepatic artery aneurysm. High attenuation of thrombus seen at periphery and low attenuation center on unenhanced scan. Post-contrast scan displays reversal of densities due to contrast enhancement in the lumen.

A digital subtraction angiography substantiated color Doppler findings, but obviously could not display the thrombosed portion of the aneurysm. CT clearly depicted the aneurysm and showed its relation with adjacent structures and the extent of thrombosis. Reversal of densities in different parts of the aneurysm on post-contrast examination was also seen (Figures 3A and B).

Enlarged lymph nodes were seen around the superior mesenteric artery with inflammatory changes in the surrounding tissues. Pressure effect resulted in dilated and tortuous splenic vein. Upon surgery, an aneurysm originating from the common hepatic artery was found. The aneurysm cavity was opened and the clot was removed after ligating the common hepatic artery proximal and distal to the aneurysm. Lymph nodes adjacent to the aneurysm on histopathology showed caseating granulomas consistent with tuberculosis.

### Discussion

Advances in diagnostic imaging have made preoperative diagnosis of intra-abdominal aneurysms possible. Color and duplex Doppler is an excellent noninvasive modality which provides definitive evidence by demonstrating the aneurysm with typical blood flow. Wilson was the first to describe hepatic artery aneurysm 250 years ago.<sup>1</sup> Hepatic artery aneurysms represent approximately 20% of all visceral aneurysms.<sup>2</sup> Eighty percent are extrahepatic and the common hepatic artery is the most common site, accounting for 65% of cases. The second most

common site is the right hepatic artery.<sup>3</sup>

Clinical diagnosis of this entity is very difficult and the clinical triad of abdominal pain, obstructive jaundice and hemobilia is seen in only one-third of cases.<sup>1</sup> Seventy percent of the patients complain of right upper quadrant pain.<sup>4</sup> Patients present with abdominal mass and complications such as hemoperitoneum and gastrointestinal bleeding. In the past it has been reported as an incidental finding at laparotomy, with mortality described as 60% because of lack of preoperative diagnosis.<sup>5</sup>

Mycotic etiology was thought to be the sole cause due to septic microemboli, but other causes include atherosclerosis, congenital arterial fibrodysplasia, inflammatory processes in the vessel wall and trauma, including surgery.<sup>2,5</sup> Tuberculosis as a cause of hepatic artery aneurysm has not been described so far. Although angiography is required before surgery, diagnosis can confidently be made on color Doppler imaging. Color Doppler can display a jet of blood into the aneurysm and also thrombosis at the periphery where there is no color filling. It easily differentiates cysts from aneurysms. Enhanced CT displays different components of the aneurysm and changes in adjacent tissues. Komori et al.<sup>6</sup> described a case of hepatic artery aneurysm producing obstructive jaundice shown by subtraction angiography combined with percutaneous cholangiography to demonstrate its pressure effect on common bile duct. They did not define the etiology. Transcatheter embolization of aneurysms can be carried out safely and effectively in patients who are poor surgical risks.<sup>7</sup>

Hepatic artery aneurysms are uncommon and frequently fatal lesions. Most of the patients usually present with exsanguinating hemorrhage. This report demonstrates the strength of CDI, which enabled us to offer preoperative diagnosis of hepatic artery aneurysm. CT and angiography substantiated the initial findings.

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