A Case of Solitary Tuberculosis of the Liver

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The liver involvement by tuberculosis in the macronodular form is quite rare and one must know their clinical features and actual imaging to have precise diagnosis. We present a case of the solitary hepatic tuberculosis, of which angiographic findings originally suggested hepatocellular carcinoma (HCC) given Lipiodol Ultra Fluid (LUF). On angiogram the tuberculoma showed marked hypervascularity in a capillary phase. Histological examination of the biopsy specimen disclosed granulomas with central coagulation necrosis. A good clinical response was achieved with a course of Isoniazid and Rifampicin. Angiographic findings of one year later showed hypovascularity. Meanwhile LUF remained long in the tuberculoma marginally, presenting nodular opacities on lipiodolised CT. This finding was different from that of HCC. We also discussed those clinical actual imaging and pathological findings.

Key Words: Hepatic tuberculosis, Angiography, Lipiodol, HCC

Tuberculosis of the liver, especially the nodular form is quite rare and is not often considered in the differential diagnosis of abdominal disorders (1-3). On the other hand, the diagnostic procedures for HCC are having much developed nowadays however most of which are by diagnostic imaging technique. Reports of actual imaging of hepatic tuberculosis are also rare and in fact there's a great variety among reported case, which makes it more difficult to get precise diagnosis (2, 5, 9).

We report the case of solitary hepatic tuberculosis that was at first diagnosed as HCC by its angiographic findings, given LUF into the responsive artery. From this case, we have had some indicative findings in terms of differential diagnosis from HCC.

CASE REPORT

A 42-year-old woman was transferred for an investigation of a tumor of the liver which was pointed out by ultra-sound examinations. There was a two-year history of occasional episodes of cough and high fever rising to 39°C. Her mother had tuberculosis. On admission, she appeared rather florid and well nourished. Temperature was 36.1°C, pulse rate 78/min and blood pressure 120/60mmHg. No rash or lymphadenopathy was found. No abnormality was detected in cardiovascular or respiratory systems.

The abdomen was soft and nontender. The liver and spleen were not palpable. There were no peripheral edema, clubbing or cyanosis. Neurological examination was negative. The urine was normal. The hematocrit was 39 percent, the hemoglobin was 13.2g/dl, the white cell count was 5610, with 59% neutrophiles, 34% lymphocytes and 3% monocytes. The platelet count was 299,000. The erythrocyte sedimentation rate was 43mm per hour. The liver function tests were normal. The HBs antigen and tumor markers were negative. The PPD
skin test was $30 \times 32$mm, gave positive result. An electrocardiogram was normal. An X-ray film of the chest showed several nodular densities with calcification in the left lower lung field.

On the ultrasonography of the abdomen, there was a solitary hypoechoic mass measured $18 \times 25$mm in the right lobe of the liver. It was round, clearly demarcated and inhomogeneous with several hyperechoic strands but predominantly hypoechoic (Fig. 1).

A: Before treatment. The lesion is presented as a clearly demarkated low density area.

B: Lipiodolized CT after one week. LUF is not taken into the center of the lesion.

C: After three weeks. LUF on normal parenchyma has diminished but it remained marginally on the lesion.

D: The tuberculous lesion has reduced after five months but LUF remained marginally, presenting nodular opacities.

Fig. 1. Ultrasonography reveals the circular hypoechoic lesion with several hyperechoic strands.

Fig. 2. Serial CT scans of the solitary tuberculosis of the liver.
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Computed tomography (CT) disclosed a round and clearly demarcated low density area with lower density parts in the center (Fig. 2A).

The contrast enhancement was positive. On the second hospital day the peritoneoscopic examination revealed the liver adhering to the peritoneum and the needle biopsy of the tumor was performed.

On the seventh hospital day, Celiac angiography was performed and on arterial phase it confirmed the presence of a mass in the right lobe with moderate neovascularity. And the capillary phase showed marked hypervascularity with central hypovascular area, making rim sign (Fig. 3A).

As these findings strongly suggested the mass as a hepatocellular carcinoma (HCC) despite the absence of venous tumor vessels or arterio-venous shunts, we administered LUF 5ml through the responsive artery.

Pathological findings of the liver biopsy specimen had turned out two days later, which revealed several granulomas consist of epitheloid cells and Langhan’s giant cells (Fig. 4A).

We made a diagnosis of the solitary hepatic tubercullosis and then antituberculous therapy was instituted. The patient was started on therapy with Isoniazid 300mg and Rifampicin 450mg per day. Lipiodolized CT after one week of injection revealed LUF was not taken into the center of the tuberculous lesion (Fig. 2B).

Though LUF of the normal liver had diminished on CT three weeks after injection, it still remained marginally (Fig. 2C). Five months after, the lesion had reduced in size on CT but LUF remained marginally on the lesion, presenting several nodular opacities (Fig. 2D).

One year after when a complicating gallbladder polyp was detected, Celiac angiography, cholecystectomy and lobectomy for the liver were performed. On angiogram the tuberculoma was rather reduced in size and was hypovascular in both arterial and capillary phase (Fig. 3B). The microscopic findings of the resected liver revealed that the tuberculous lesion was clearly demarkated by hyalinized fibrous tissue. In this lesion, there’s a few tuberculcos granulomas with coagulation necrosis surrounded by marked infiltration of lymphocytes and histiocytes including giant cells.

There’s a lot of foci of hyalinized nodules (Fig. 4B). The interstitium was also hyalinized, where obliteration and decrease in number of normal
vascular architecture were observed. Lipid vesicles indicating LUF were found in the interstitium sur-
rounding by phagocytes (Fig. 4C).

**DISCUSSION**

Hepatic involvement of the miliary tuberculosis is found in 80% or more of the patients and almost all of them present miliary or micronodular forms then the macronodular forms are quite rare (1). Until 1984, only 14 cases of solitary hepatic tuberculosis had been reported in Japan (2), and according to Spiegel et al., only 9 cases had been reported (3). Most commonly reported clinical manifestations are fever, chill and hepatomegaly (3, 4). The diagnosis is often very difficult especially when there are no abnormalities on chest X-ray examinations because the primary disease in the lung is often associated with miliary spread to the liver (5, 12).

The ultrasonography or CT scan is often useful for the diagnosis of the liver abscess, typically showing the indiscrete low density area with fine strands inside (2, 6-9).

According to Dwek et al., an angiogram of the hepatic tuberculosis does not have arteriolar abnormalities but demonstrates a very hypervascular capillary phase (10). The present case also demonstrated the hypervascularity in a capillary phase but it was rather inhomogeneous with center hypovascularity, appearing as an indiscrete thick ring. These differences in vascular constitutions may depend on coagulation necrosis which correlate with a stage of tuberculosis at the time when angiography was performed (7, 11).

We have had some intriguing results from LUF administration into the hepatic artery of tuberculosis. As shown in CT scan, LUF remained for more than five months in the solitary hepatic tuberculosis marginally, demonstrating indiscrete and round high density area composed of small nodular opacities except its center.

This is rather different from the way generally LUF remains in HCC (13-15).

It’s still controversial why LUF remains longer in vessels in tumors than in the normal parenchyma of the liver. Nakamura et al. stated that in non-tumorous area, collateral channels developed to communicate with large branches of the artery at an earlier time after ligation of the feeding artery experimentally, which might result in a wash-out of

**Fig. 4.** Microscopic findings of the solitary tuberculosis of the liver.
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LUF (16). On the other hand, the vessels in a tumor might not have sufficient blood flow to wash-out because neoplastic vessels often lack both the muscular layer and elastic lamellae. According to Folkman et al., tumors over a few millimeter in diameter must have neoplastic vessels (17), it follows that they should present remainings of LUF (16).

The washed-out LUF passes into the sinusoidal spaces and slowly permeate the liver cells or it maybe caught by reticuloendthelial systems (14). The present case showed hypervascularity on angiogram. Administered LUF remained in the tuberculosis observed on CT scan for more than five months in rather different way from those of HCC. The operated section disclosed organizations of necrotized tissues and LUF remaining on interstitium of these areas, where oblitervations and also decrease in number of normal vascular architecture observed.

Though the cause of coagulation necrosis is still unidentified and controversial, circulating disturbance and micro-thrombosis in tubercules are considered to be the common mechanism.

They say that when allergic reactions begin, microthrombi develop rapidly, the circulating flow decrease and become static (18, 19).

In our case, the hypervascularity shown on angiogram at first might have reflected inflammatory capillary proliferations. And alterations of vascular constructions after treatment shown as hypovascularity on second time angiogram were considered as results from deterioration of inflammation and organization of necrotized tissues. These are suggestive of vascular constitutions of the solitary hepatic tuberculosis which could be so various related to its stages. In addition, LUF is considered to have remained in the tuberculosis because of impaired wash-out effects mainly by vascular alteration as the organization progressed.

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