CASE REPORT

Arterio-portal Fistula Following Recent Liver Biopsy

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ABSTRACT

Arterio-portal fistula may develop at the biopsy site after percutaneous liver biopsy and demonstrates a characteristic appearance on angiography and Lipiodol computed tomography scan of the liver performed shortly after the biopsy. Radiologists should be familiar with these findings in order to avoid misinterpretation of arterio-portal fistula as hepatoma in hepatitis B carriers.

Key Words: Biopsy, needle, Computed tomography, Fistula, Liver

INTRODUCTION

Hepatitis B related hepatocellular carcinoma (HCC) is a common clinical condition in Hong Kong. Ultrasound scanning of the abdomen, followed by computed tomography (CT), are the initial investigations of choice for suspected HCC in patients with elevated alpha-fetoprotein levels and liver enzymes. Ultrasound guided percutaneous liver biopsy is frequently requested for histological confirmation of the diagnosis, and hepatic arteriography with Lipiodol injection followed by Lipiodol CT scanning, for treatment planning.

We present angiographic findings of an arterio-portal fistula in a patient following core biopsy of the liver. Findings on the Lipiodol CT scan are also described.

CASE REPORT

A 39-year-old Chinese woman, diagnosed with Hepatitis B carrier status, presented with right upper quadrant pain. The upper abdominal sonogram demonstrated a well-defined, rounded, 1.5 cm x 1.0 cm, non-specific hypoechoic nodule in the subdiaphragmatic region of the right lobe of the liver (Figure 1). A three-phase CT scan of the liver was completed approximately 6 weeks later. On the CT scan, the lesion appeared as a well-defined, oval nodule, with an enhancement pattern that was not characteristic of a haemangioma (Figure 2). The size of the lesion had increased to 2.2 cm x 2.0 cm when compared with the previous ultrasound examination. A possible diagnosis of HCC was suggested.

Ultrasound guided liver biopsy was performed. Difficulty was encountered during the procedure due to the high location of the lesion, partially obscured by gas in the right anterior costophrenic recess. The procedure was undertaken initially using a 22 gauge Chiba needle (Cook Inc., Bloomington, USA), followed by a 20 gauge Temno core biopsy needle (Bauer Medical International, Santo Domingo, Dominica Republic). The procedure was deemed unsuccessful after three attempts (two attempts with the Temno needle, and one...
with Chiba needle), due to the location of the nodule. The Temno core biopsy needle was not fired. Selective hepatic arteriography with Lipiodol injection was performed 4 days after the liver biopsy, for further characterisation of the lesion. The early arterial phase demonstrated a direct arterio-portal communication between a branch of the right hepatic artery, and a branch of the portal vein, in the lateral border of the right lobe of the liver. A wedge-shaped, well-demarcated, peripherally located vascular lesion was demonstrated in the late phase angiogram of the same area (Figure 3). This lesion corresponded to the site of liver biopsy. A total of 4 mL Lipiodol (Laboratoire Guerbet, Aulnay-Sous-Bois, France) was injected into the hepatic artery after selective cannulation. A wedge-shaped, well-demarcated, Lipiodol-stained area was noted at the periphery of the right lobe of the liver.

A Lipiodol CT scan was performed 2 weeks later. This showed a subcapsular, wedge-shaped area of intense Lipiodol uptake in the right lobe of the liver (Figure 4).

An ultrasound 1 month later demonstrated no sonographic abnormality in this region. The patient subsequently underwent surgical resection of the liver tumour 3 weeks later. The nodule in the right lobe of
the liver was confirmed histologically to be a hepatocellular carcinoma.

**DISCUSSION**

Hepatitis B related hepatocellular carcinoma (HCC) is common in Hong Kong. HCC is the second leading cause of cancer death in men, and the fourth leading cause of cancer death in women in Hong Kong. Regular screening using alpha-fetoprotein levels and ultrasound are generally recommended for those known to be Hepatitis B carriers. Ultrasound guided liver biopsy and/or Lipiodol CT after hepatic arteriogram are commonly requested if a suspicious nodule is detected on a screening ultrasound. In cases of biopsy–proven HCC, Lipiodol CT scanning can help to detect multifocal disease, which may preclude surgery. If biopsy fails, as in the present case, Lipiodol CT scanning can assist the clinician in planning further management.

The development of an arterio-portal fistula following percutaneous liver biopsy has been reported previously. Hellekant, and Okuda et al, have stated that the incidence of arterio-portal fistulae is variable, depending on the interval between liver biopsy and angiography. The incidence was reported as 61% when the angiogram was performed within one week of liver biopsy, and decreased for longer time intervals between liver biopsy and angiography. This suggests that most iatrogenic arterio-portal fistulae resolve spontaneously over time. The technique of CT following intra-arterial injection of Lipiodol has been well-documented as an accurate method for the detection of HCC since the mid-1980s. Ngan reported the specificity of this method for the detection of HCC as 77%. False positive results were noted to be due to the presence of haemangiomata, focal nodular hyperplasia, or metastasis. The characteristic feature of an arterio-portal fistula on early phase selective hepatic angiography is a direct communication between a small branch of the hepatic artery and a branch of the portal vein. Late phase angiography shows a classical peripherally located, wedge-shaped vascular lesion, with discrete margins. On the post-Lipiodol CT scan, the arterio-portal fistula appears as wedge-shaped Lipiodol staining, with a segmental or subsegmental distribution, extending to the subcapsular regions. This is in contrast to HCC, which is usually oval-shaped or rounded in configuration.

Typically, Lipiodol uptake in an iatrogenic arterio-portal fistula is at the site of biopsy. The pathophysiology of the intense and characteristic Lipiodol uptake at the biopsy site is thought to be due to altered delivery and disturbance of intra-hepatic portal perfusion, arising from abnormal microvascularity. The radiologist should be familiar with angiographic and Lipiodol CT findings of arterio-portal fistula in order to differentiate such fistulae from HCC.

**CONCLUSION**

An arterio-portal fistula may develop at the biopsy site after percutaneous liver biopsy. Such fistulae have a characteristic appearance on both early angiographic imaging and Lipiodol CT scanning of the liver performed shortly after the biopsy. Radiologists should be familiar with these imaging appearances in order to avoid misinterpretation of imaging studies completed in patients with Hepatitis B carrier status who have recently undergone liver biopsy.

**REFERENCES**