Two Hepatic Inflammatory Pseudotumors with Spontaneous Regression in a Patient: a case report

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We report a patient with two hepatic inflammatory pseudotumors (IPT) that regressed spontaneously without treatment. The imaging findings of the two hepatic IPTs including delayed enhancement, relatively decreased uptake of superparamagnetic iron oxide agent by the tumors and an interval change of regression. An image-guided core biopsy is essential in establishing accurate diagnosis to avoid unnecessary surgery.

CASE REPORT

A 57-year-old female has suffered from right upper abdominal pain, fever and malaise for three days. So she visited a local clinic where a liver mass was detected by ultrasonography. She was referred to a local hospital and tentative diagnosis of cholangiocarcinoma involving segment 7 and lateral segment of liver was made after computed tomography (CT) study. Physical examination on admission in our hospital was unremarkable. The laboratory data including serum α-fetoprotein, HBsAg, anti-HCV, CEA and CA-199 were all within normal limit. Ultrasonography of the liver in our hospital revealed a hypoechogenic mass in segment 2 that was 4.7 cm in maximal diameter (Fig. 1) and a hypoechogenic nodule in segment 7 that was 1.4 cm in diameter. Triphasic dynamic CT disclosed two hepatic lesions, the one in segment 2 which measured 5.4 cm in diameter was homogeneously hypotenuated before enhancement (Fig. 2a) and the majority of the mass was enhanced in the dynamic scan (Fig. 2b, 2c, 2d) with two central low attenuations. The peripheral hypodensity at arterial and portal venous phases was progressively enhanced in delayed scan (Fig. 2b, 2c, 2d). The 1.4
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A 40-cm nodule in segment 7 was hypoattenuated before enhancement, isoattenuated during arterial phase, hypoattenuated during portal venous phase, and iso- to hyperattenuated in delayed scan (Fig. 2). Both two IPTs were relatively hyperintense on Resovist (Schering, Berlin, Germany) enhanced T2*-fast low angle shot (FLASH) MR images in delayed scan (Fig. 3, 4), suggesting decreased uptake of the super-paramagnetic iron oxide agent by the tumor.

Ultrasonography-guided core biopsy using an 18-gauge needle was done for the lesion in segment 2. The pathology revealed a fibrous tumor infiltrated by a mixture of lymphocytes, histiocytes and plasma cells. Further immunohistochemistry revealed positive for CD3 and L26 at few areas, and extensively positive for CD68 histiocytes. There was negative for CD21 and CD23. The final pathological diagnosis was inflammatory pseudotumor. Thus no surgical intervention nor medical treatment was done because there was no clinical symptom and sign in our hospital. The follow-up ultrasonography 2 months later showed marked regression of the mass in segment 2 (Fig. 5), and the nodule in segment 7 was no longer visualized.

**DISCUSSION**

The IPTs in this case were spontaneously regressed without administration of antibiotics or anti-inflammatory agents. Both lesions in segment 2 and segment 7 revealed delayed enhancement, which could be elucidated by the presence of abundant fibrous stroma in IPT as proved by pathology. It is assumed that slow wash in and wash out rate of the interstitial contrast medium in fibrotic tissue plays a major role [7].

Focal scarring may develop in tumors with abundant fibrous stroma as occurred in our patient, as well as in large tumors that outgrow their blood supply during the process of tissue repairment, and in focal nodular hyperplasia after obliteration of central tumor vessels [7, 8]. Scars within hepatic tumors are usually hypodense in CT before or after intravenous administration of contrast medium. A characteristic feature of fibrous scar within hepatic tumors is delayed and prolonged enhancement in CT [7-9]. The central low density observed in this case in delayed scan has been described in a previous report [5], it could probably be attributed to central necrosis or cellular infiltration [10, 11]. Yoon et al described that the appearance of IPT at contrast-enhanced CT may depend on the amount of fibrous tissue and the degree of cellular infiltration. Delayed higher attenuation corresponds to areas of concentrated fibrous tissue, whereas delayed hypo- or isoattenuating areas correspond to predominantly cellular infiltration [11].

**Figure 1.** Sagittal a. and transverse b. sonograms of the left lobe liver show a hypoechoic mass (white arrows) in the segment 2 of liver.
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Delayed enhancement can be delineated in hemangioma, central scar and peripheral cholangiocarcinoma [7-10, 12, 13]. It occurs in peripheral cholangiocarcinoma in 86% of cases and less frequently in other hepatic neoplasms, this include 6% of HCCs, 6% of metastatic colon cancer, and 24% of other tumors including epithelioid hemangioendothelioma, neuroendocrine tumor and metastatic breast cancer [13].

In this patient, the peripheral hypodensity of the IPT in segment 2 at arterial and portal venous phases showed enhancement in the delayed scan (Fig. 2). In contrary, ring enhancement at arterial or portal venous phases can be identified in cholangiocarcinoma, abscess and metastases [14]. Hemangioma is usually characterized by peripheral puddling and centripetal enhancement [14]. It has been reported that the IPT appears as early, intense, and peripheral enhancement, followed by a homogeneous, complete, and persistent enhancement [15]. The IPTs in this case, similar to the previous report on post-gadolinium gradient-echo images [15], showed decreased uptake of the superparamagnetic iron oxide (SPIO) agent.

**Figure 2.** Triphasic dynamic CT shows a mass in segment 2 (white arrows) that measures 5.4 cm in diameter with suspicious extension beyond the liver capsule. The mass shows a. homogeneously hypoattenuating before enhancement, and progressively enhanced in the majority of the mass at arterial to delayed phases (b, c, d) with two central low attenuations. The peripheral hypodense halo at arterial and portal venous phases is enhanced at delayed scan (d). The 1.4 cm nodule in segment 7 (black arrows) shows (a) hypoattenuating before enhancement, b. isovvattenuating at arterial phase, c. hypoattenuating at portal venous phase, and d. iso- to hyperattenuating in delayed scan.
The IPTs in our case regressed spontaneously without administration of antibiotics or nonsteroid anti-inflammatory drugs. It has been described that surgery should be considered in the following conditions: first, persistent systemic symptoms with fever despite conservative therapy. Second, progressive enlargement of the lesion on serial examinations; and the third, involvement of the hepatic hilum by the tumor leading to biliary obstruction or portal hypertension [16].

In summary, the imaging findings of both two hepatic IPTs in this patient include delayed enhancement, relatively decreased uptake of the SPIO by the tumor and an interval change of regression. An image-guided core biopsy is essential in establishing accurate diagnosis to avoid unnecessary surgery.

**Figure 3.** Delayed enhanced MR image after intravenous administration of superparamagnetic iron oxide (SPIO) agent Resovist using T2*-fast low angle shot (FLASH) sequence (TR/TE/excitations/flip angle: 154/10/1/65) showed that the mass in segment 2 (arrow) showed decreased uptake of the SPIO agent resulting in relatively high signal intensity of the lesion.

**Figure 4.** Superparamagnetic iron oxide (SPIO) or Resovist-enhanced MR image using T2*-fast low angle shot (FLASH) sequence (TR/TE/excitations/flip angle: 154/10/1/65) demonstrated that the nodule (arrow) in segment 7 is hyperintense at delayed scan.

**Figure 5.** Sagittal a. and transverse b. sonograms of the left lobe liver obtained 2 months after the initial sonography (Figure 1) show that the mass in segment 2 had regressed significantly.
REFERENCES

病例報告：兩個肝臟發炎性假性腫瘤同時在一
個病人出現且自發性消退

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報告一位病人有兩個肝臟發炎性假性腫瘤同時自發性消退。在動態電腦斷層檢查，兩個腫
塊皆呈現延遲性顯影，且較大之腫塊直徑達 5.4 公分，此較大腫塊在顯影後影像有局部低密度
病灶，且在動脈期和肝門靜脈期腫塊周邊有低密度環，此低密度環在延緩期呈現延遲性顯影。
在使用超順磁性氧化鐵顯影劑（SPIO）的延遲顯影之磁振造影上腫塊呈現高訊號。兩個肝臟腫
塊在兩個月後之超音波掃描中有明顯變小或消失。提出此病例主要是提醒臨床醫師與放射科醫
師都應該熟悉肝臟發炎性假性腫瘤的影像表現以避免不必要的手術。