Case Reports

Inflammatory Pseudotumor of the Liver in a Patient with Early Gastric Cancer: CT–Histopathological Correlation

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INTRODUCTION

Inflammatory pseudotumor (IPT) of the liver is a rare, benign tumor-like lesion and, although ~60 cases have been reported in the English-language literature, their precise etiology has not been elucidated (1–3). IPT is sometimes misdiagnosed as a malignant tumor based on the imaging findings. In several cases, IPT has been visualized as a hypoattenuating mass with a variable degree of hyperattenuation on enhanced CT scans, with the higher attenuation corresponding to the areas of intense fibrosis, and the areas of lower attenuation corresponding to the predominantly cellular areas (4–8). Differential diagnosis between IPT and malignant neoplasms by imaging methods is difficult, because heterogeneity of CT findings is also often observed in malignant tumors (4).

Some cases of IPT of the liver have been associated with malignant tumors (9–15). Six such cases have been reported in the English-language literature (9–14), and four in the Japanese-language literature (15). Three of the 10 cases have been associated with gastrointestinal tract cancer, and they have all been Japanese (13–15).

Here we report a case of IPT of the liver in a patient with early gastric cancer and discuss the differences between enhanced computed tomography (CT) scan findings in IPT, malignant tumors and abscesses of the liver.

CASE REPORT

A 63-year-old female was admitted to our hospital because of epigastralgia, nausea and increasing appetite loss over a period of 3 months. Stomach cancer was detected by gastroscopy. The CT scan with bolus injection (1 ml/s by mechanical injector) of 100 ml of contrast medium was obtained in the delayed phase (>100 s after the injection). We did not take pre-contrast and arterial dominant phase CT scans, because the scan was carried out for pre-operative searching of metastatic sites of gastric cancer. The CT scan revealed a large, irregularly shaped mass lesion in the left lobe of the liver. The lesion was characterized by peripheral rim-like or septal enhancement and an internal low density area suggesting necrosis (Fig. 1a). Just below that slice, the CT slice showed the gastric lesion protruding into the lumen of the stomach. The lesion in the liver appeared to be a...
metastasis from the gastric cancer, even though the gastric cancer seemed to be an early stage lesion. Magnetic resonance imaging (MRI) and ultrasound examinations of the lesion in the liver were also performed, but did not lead to a diagnosis.

Distal gastrectomy and partial hepatectomy were performed for a pre-operative diagnosis of stomach cancer with liver metastasis. The resected stomach contained a protruding tumor, and the histological diagnosis was papillary adenocarcinoma limited to the mucosa. The surgical specimen from the liver measured 13.0 × 11.0 × 5.0 cm and contained a tumor measuring 5.5 × 5.0 × 4.0 cm. The cut surface revealed a well-circumscribed lesion divided into lobules by fibrous tissue. The mass was yellowish-white, and there was no evidence of necrosis or hemorrhage (Fig. 1b). Histologically, the mass was divided into lobules with fibrous areas and cellular areas, and dense fibrosis was seen at peripheral areas (Fig. 1c). The cellular areas consisted of fascicles of plump spindle cells intermingled with varying numbers of plasma cells, lymphocytes and histiocytes.

**DISCUSSION**

IPT is a relatively benign tumor-like lesion that was originally described in the lung, and the lung remains the most common primary site, with ~350 cases reported in the English-language literature (11). The liver is the second most common site, and ~60 cases have been reported to date (1), but the precise etiology of hepatic IPT has never been elucidated.

Some IPTs of the liver have been associated with malignant tumors. Six such cases have been reported in the English-language literature (9–14): in two cases each of colorectal cancer (13,14) and leukemia (9,12) and one case each of nephroblastoma (10) and Wilms tumor (11). All of the colorectal cancer and leukemia patients were Japanese. Four cases of hepatic IPT associated with malignancy have been reported in the Japanese-language literature (15): one case...
each of colon, ampula Vater, ovarian, and breast cancer. All three cases of gastrointestinal tract cancer reported in the English- and Japanese-language literature have been in Japanese patients (13–15). These findings suggest a possible correlation between IPT of the liver and gastrointestinal tract cancer, especially in Japanese patients. Certain bacteria, e.g., *Escherichia coli* (3), *Staphylococcus aureus* (9) and Gram-positive cocci (3), have been proposed as the causative agent of hepatic IPT. Patients with malignant tumors sometimes have liver abscesses, and colon cancer is suspected of being an underlying cause of pyogenic liver abscess (16). Akiyama et al. reported a case of gallbladder cancer associated with a cystic lesion of the liver with histological findings similar to those of an IPT (17), suggesting that liver abscess and IPT may have the same etiology, bacterial infection, in particular. Thus, our case seems to be one of the cases that suggest a correlation between IPT of the liver and gastrointestinal tract cancer.

Based on the imaging findings, IPT is sometimes misdiagnosed as a malignant tumor, e.g., hepatocellular carcinoma (HCC), cholangiocellular carcinoma (CCC) or metastatic liver tumor, or a liver abscess (2,3). The differing ratios of cellular infiltration and fibrosis observed pathologically in IPT may explain the heterogeneity of the CT and MRI findings (4–8). Heterogeneous enhancement of liver tumors on delayed-phase CT scans has been reported in some malignant tumors, liver abscess and IPT (4), with the higher attenuation corresponding to areas of intense fibrosis, and the areas with lower attenuation corresponding to predominantly cellular areas (4). This delayed enhancement in fibrous tissue is probably caused by extravascular contrast material due to the slow washout rate of the contrast material (4). The delayed peripheral rim-like or septal enhancement with internal low density area seen in our case and some cases reported in the literature (5–8) may be a specific finding of IPT (5–8). On delayed phase CT scan in our case, enhanced areas corresponded to histologically fibrous areas exhibiting lobulation and peripheral fibrosis, and the internal low density area mimicking an abscess corresponded to the cellular areas consisting of spindle cells and inflammatory cells. Hepatic metastasis and CCC with abundant fibrosis also show delayed enhancement on CT scans, but the delayed enhancement is seen in the central part of the tumor (4). In HCC and liver abscess, the delayed enhancement is seen in the peripheral part of the tumor, and the capsule in HCC is thinner and smoother than in IPT (4). CT scans of liver abscesses typically show central near-water density (4), which differs from the solid nature of IPT. However, some liver abscesses which show incomplete liquefaction or have granulation within the abscess may mimic IPT on CT scans. CT–pathological correlation of the internal low density area, specified by the existence of blood supply and histological findings, could have been discussed if we had taken pre-contrast and arterial dominant phase CT scans.

In summary, we have reported a case of IPT of the liver associated with gastric cancer. Enhanced CT scans showed delayed peripheral rim-like or septal enhancement. The enhanced areas on the CT scan corresponded to fibrous areas that were lobulated and peripheral dense fibrosis histologically.

References