Inflammatory Pseudotumor of the Liver: Sonographic and Computed Tomographic Features with Complete Regression

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An inflammatory pseudotumor is a rare benign lesion consisting of fibrous tissue and inflammatory cells. Although it can appear anywhere in the body, the most common site for this lesion is the lung. The hepatic counterpart was first described in 1953 by Pack and Baker. Since then only about 50 cases have been reported in the literature. The clinical and pathologic features have been well described. The imaging appearances have also been reported but to a lesser extent. We report a case with a hepatic inflammatory pseudotumor in a patient with fever and weight loss whose ultrasonographic scan initially showed no evidence of disease but subsequently became “positive” for a space occupying lesion. Histologic diagnosis was made by percutaneous fine needle aspiration and percutaneous needle biopsy. Follow-up ultrasonography and CT after treatment showed total regression of the pseudotumor.

CASE REPORT

A 76 year old man was admitted to our hospital on July 15, 1998, complaining of fever, chills, and abdominal pain for 4 days and a weight loss of 7 kg over a period of 2 months. His medical history was significant for ischemic heart disease, including coronary angioplasty and stent insertion, hypertension, type 2 diabetes mellitus, carotid endarterectomy 2 months prior to admission, and left nephrectomy many years before due to an infection.

On admission the patient had fever and right upper quadrant tenderness. His laboratory results included an elevated white blood cell count (14,400/ml) and elevated liver enzymes (AST, 87 U/L; ALT, 122 U/L; GGT, 89 U/L). Serum levels of cancer markers alpha-fetoprotein, CEA, and CA 19-9 were negative. His temperature rose to 106.7°F, and he developed chills. Streptococcus intermedius was found in his blood culture, and the patient was treated intravenously by 5 million units of crystalline penicillin units four times a day. Within 1 week he became afebrile.

Abdominal ultrasonography (Acuson 128xp/10, Mountain View, CA) performed on the fourth day of hospitalization revealed borderline hepatosplenomegaly. The

ABBREVIATIONS
CT, Computed tomography; AST, Aspartate aminotransferase; ALT, Alanine aminotransferase; GGT, Gamma-glutamyltransferase; CEA, Carcinoembryonic antigen; CA, Carbohydrate antigen; IPT, Inflammatory pseudotumor of the liver
hepatic echotexture was normal, with no focal lesions (Fig. 1). Transthoracic and transesophageal cardiac echograms showed normal results. CT (Elscint CT Twin Flash Scanner, Haifa, Israel) of the abdomen performed 5 days after the initial abdominal ultrasonography demonstrated an enlarged caudate lobe containing a hypodense lesion 5 by 8 cm that extended into the right lobe and stranding of the fat in the adjacent retroperitoneum (Fig. 2A). Because of mild renal failure, contrast material was not injected. The patient underwent a second abdominal ultrasonogram (HDI 3000, Advanced Technology Laboratories, Bothell, WA) 2 days later in preparation for fine needle aspiration. This time the examination revealed an enlarged caudate lobe embodying a subtle, poorly defined mass of inhomogeneous echotexture that measured 4 by 10 cm (Fig. 2B). Cytologic examination by fine needle aspiration showed normal liver cells with numerous leukocytes. CT guided liver needle biopsy disclosed small fragments of liver tissue rich in myofibroblasts and infiltrated by plasma cells, lymphocytes, and neutrophils. Spindle cells were seen in the collagenized stroma (Fig. 3). The diagnosis was consistent with IPT. The patient completed the intravenous antibiotic treatment as an outpatient, his body temperature returned to normal, he regained weight, and his general well-being improved. Follow-up ultrasonography and CT scan of the abdomen 5 months later demonstrated a caudate lobe of normal texture with no mass lesion, whose size, when compared to the original ultrasonographic scan, had actually decreased, suggesting shrinkage of the caudate lobe (Fig. 4A, B).

**DISCUSSION**

IPT, or hepatic inflammatory pseudotumor, is a rare lesion that has been described in the literature under numerous names, including plasma cell granuloma, histiocytoma, pseudolymphoma, fibroxanthoma, plasmacytoma, and myofibroblastic tumor. The diversity of terms is most likely due to the variable histologic picture.4,5

IPT can occur at all ages and is more common in young men.4 Common symptoms and signs include fever, abdominal pain, weight loss, and malaise.4,6 Elevated erythrocyte sedimentation rate, leukocytosis, and mildly elevated levels of hepatic transaminases and bilirubin are often found.

**Figure 2** A, CT scan demonstrates an enlarged hypodense caudate lobe and stranding of the retroperitoneal fat. B, The caudate lobe has expanded and become hypoechoic. This scan was not obtained at the exact same level as in A but was chosen because it best shows the changes in the caudate lobe.
The cause and pathogenesis of IPT are unknown. Infection, immune reaction, necrosis, phlebitis, and reaction to bile have all been postulated, but little scientific support exists for each of these mechanisms. In our review of the literature we found only two reports in which an infectious agent was actually cultured from the lesion and no reports with a positive blood culture during evolution of the lesion. Unfortunately, the biopsy specimen was not cultured in our case. The presence of a positive blood culture and a clinical response to antibiotic treatment in our case, however, support an infectious cause.

Macroscopic examination shows an encapsulated firm mass. Histologic examination shows a dense collagenous tissue infiltrated with plasma cells and other inflammatory cells, and spindle cells and often foamy histiocytes.

The prognosis of IPT is considered good. Although most of the earlier reported IPTs were diagnosed as such only after surgical removal, the present trend is to treat conservatively.

The CT features of this lesion are variable, and no consistent enhancement pattern appears. This is most likely due to the variable vascularity of the lesion, which ranges from avascular to hypervascular. The ultrasonographic findings of IPT are also variable. Most lesions reported were described as well circumscribed, with either hypoechoogenicity or hyperechoogenicity. Posterior enhancement was observed in one case, and another case showed thickening of a portal vein draining the lesion. Although some reports mention a decrease in the size of the lesions as shown by follow-up imaging studies, we found no other case in the literature with imaging before, during, and after. Moreover, in our follow-up ultrasonographic and CT scans the caudate lobe appears to have shrunk. This may be due to postinflammatory fibrosis and can hypothetically represent the healing process of this lesion. The protean radiologic manifestations of IPT may be the result not only of the variable morphologic structure but of the dynamic, rapidly changing nature of an inflammatory process. Our case, displaying rapid, almost sudden, appearance and total resolution of the lesion, supports this hypothesis.

Figure 3 Loosely arranged stellate and spindle shaped myofibroblasts in myxoid edematous matrix, with multiple blood vessels and lymphocytic, plasmocytic, and eosinophilic infiltrate (H&E stain, magnification 400×).

Figure 4 Follow-up ultrasonogram (A) and CT scan (B) show a small caudate lobe isoechoic to the rest of the liver. The small size may be a result of postinflammatory fibrosis.
REFERENCES