Inflammatory pseudotumor of the spleen: clinical impact in surgical treatment

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SUMMARY **An inflammatory pseudotumor of the spleen is a rare benign tumor and designated as mass-like lesions with histologic features of nonspecific inflammation and mesenchymal repair although its etiopathogenesis still remains unknown. Here we describe the case of an inflammatory pseudotumor of the spleen in a 57-year-old woman, whose lesion was accidentally found and thought to be lymphoma at first. Generally splenic tumors are difficult to diagnose exactly before surgery, then the patient underwent splenectomy, followed by histopathological diagnosis of inflammatory pseudotumor of the spleen. The optimal management of the asymptomastic patient with such disease is still controversial. The clinical and pathological features of previously reported cases are also reviewed in this paper.**

Key Words: Inflammatory pseudotumor, splenic tumor

Introduction

Inflammatory pseudotumors (IPTs) are benign entities of unknown etiology and pathogenesis (*1*). They have been observed in various parts of the body, including the orbit, respiratory tract, gastrointestinal tract and soft tissues, lymph nodes and liver (*2*,*3*). However, an IPT of the spleen is extremely rare and are frequently misdiagnosed as malignant neoplasms or other benign tumors (*4*). To our knowledge, since Cotelingam and Jaffe first reported 2 cases of splenic IPT in 1984, only 76 cases had been reported in the literature till now (*5*). Although recent advances in imaging techniques, such as ultrasonography (US), computed tomography (CT) and magnetic resonance imaging (MRI), have aided in the identification of space-occupying lesions of the spleen, these techniques do not permit preoperative diagnosis of these lesions (*6*).

In this report, we report an IPT of the spleen and pay particular attention to the incidence, differential diagnosis and treatment of such tumors.

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Received July 17, 2007
Accepted August 25, 2007

Case Report

A 57-year-old woman admitted to our hospital, pointed out a splenic tumor incidentally by abdominal ultrasonography in a routine health evaluation. There was no history of constitutional symptoms, overseas travel, intravenous drug ingestion, trauma or alcohol abuse. Physical examination showed no hepatomegaly, splenomegaly or lymphadenopathy and laboratory findings were unremarkable without slight elevation of sIL-2R (soluble interleukin 2 receptor) level. Abdominal US showed a hypoechoic splenic mass, and enhanced abdominal CT scan confirmed the existence of a low density, hypovascular, well-defined, round, smooth mass measuring 3.5 × 3.0 cm (Figure 1A and B). Abdominal MRI also revealed the splenic mass which showed low to isointensity on T1-weighted image (Figure 1C) and irregular intensity on T2-weighted image (Figure 1D). However, no lymph node swelling was detectable by imaging modalities. Under a diagnosis of a malignant lymphoma, laparotomic splenectomy was performed. On abdominal findings, the mass was not adherent to surrounding structures and other organs had not been invaded and finally, the spleen was removed without any accidents. Macroscopically, the mass was round, well-circumscribed, solid, medullary and measured 3.5 × 3.0 × 3.0 cm, and the

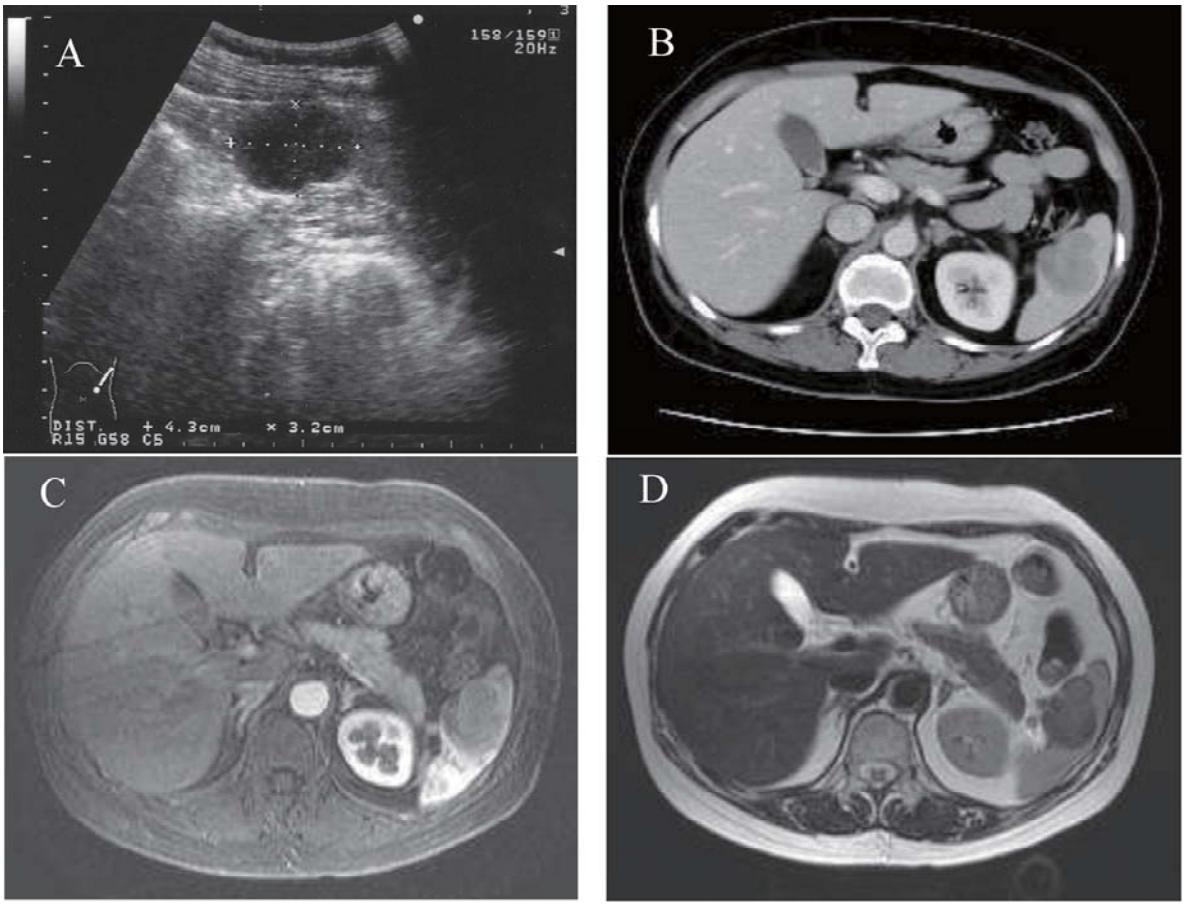

Figure 1. Preoperative findings by imaging modalities. A, US shows hypoechoic 4.3 × 3.2 cm mass in spleen; B, Enhanced CT scan showed intrasplenic homogeneous low-density 3.5-cm mass in the spleen; C and D, Both T1 and T2-weighted MRI shows heterogeneous low-signal intensity mass in spleen.

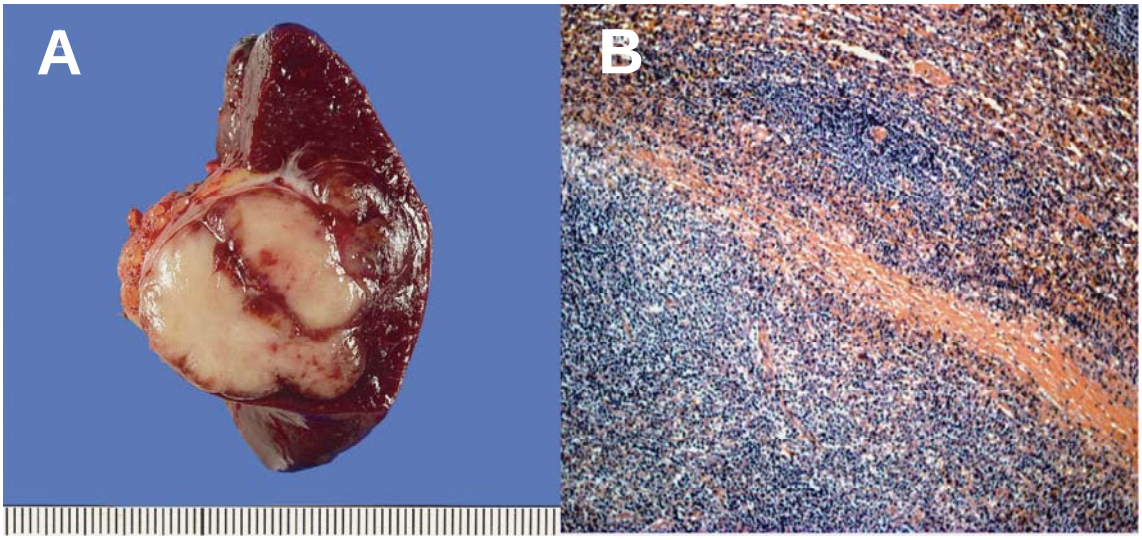

Figure 2. Pathological findings of the inflammatory splenic tumor. A, Cut surface of pseudotumor of spleen was well-circumscribed, and the center of mass showed milky white color; B, Photomicrography shows hyalized medullary lesion with filtration of lymphocytes and plasma cells (× 100).

center of mass had a milky white color (Figure 2A). Hisotological findings showed that the mass was infiltrated by many lymphocytes, plasma cells with a fibrous change. No abnormal infiltrated lymphocytes were detected and immunohistochemistrial stain on light chain showed mixed κ,λ chain positive cells. Also it was seen that follicular dendritic cells (FDC) in which Epstein-Barr virus (EBV) was detected by *in situ* hybridization with probes for EBER (small EBV RNA molecules) increased, leading us to diagnose an IPT of

the spleen (Figure 2B). The postoperative course was uneventful and the patient is currently asymptomatic, 3 years after surgery.

Discussion

IPT of the spleen are rare lesions that are usually discovered incidentally. The clinical symptoms are mostly diverse and some patients complain of pain in the left flank or left upper quadrant, with or without fever and splenomegaly, while others are asymptomatic. Laboratory data may show hypercalcemia (*7*), monoclonal peaks in the proteinogram (*8*) and polyclonal hypergammaglobulinemia (*9*) that disappear after splenectomy.

Recent advances in imaging with ultrasound, CT scan, and MRI are helpful in the identification of space occupying lesions of the spleen, and differential diagnosis must be made such as abscess, hemangioma, angiosarcoma, malignant lymphoma and hamartoma (*8*). Splenic abscesses are considered less likely because of lack of inflammatory response or fluid component. The lack of calcification and fatty elements argues against splenic hemangioma or angiosarcoma, whereas the lack of a cystic configuration argues against lymphangioma. As a result, primary splenic lymphoma or hamartoma remain in the differential diagnosis (*10*). Most frequently CT, US and MRI have been used to detect IPT of the spleen in previously reported cases, which shows noncharacteristic findings that are homogeneous low-density area in enhanced CT, heterogeneous low intensity mass in MRI (T2-weighted image). However, these findings were not specific to differentiate this type of lesion from other neoplasms (*9,12,13*). Some insist that histopathologic examination of a specimen obtained using sonographically guided Tru-cut needle biopsy can reveal IPT of the spleen. But needle biopsy has uncertainness of detection of the disease, risk of metastases if the mass is a malignant neoplasm and potential hemorrhagic complications of the procedure. Therefore, histological examination of resected specimens is the gold standard for diagnosing tumors of the spleen (*8*).

The microscopic findings are characteristic and IPT can be diagnosed by identifying the reactive nature of the cells. An IPT of the spleen shows some resemblance to granulation tissue, normal lymphocytes and plasma cells are constant features and should be distinguished from two other tumors: the IPT-like FDC tumor, which is consistently associated with EBV; and an inflammatory myofibroblastic tumor. These two lesions are neoplastic and therefore have a potentially worse prognosis than IPT.

Although the pathogenesis of this entity is unknown, infections, vascular causes and autoimmune disorders have been hypothesized (*9,12,14,15*). Infection is thought to be one of the causes because of the presence of granulomas and giant cells. Some cases were reported to be due to EBV-positive inflammatory FDC tumors (*16*). Vascular causes are another hypothesis of pathogenesis since these lesions may be due to intraparencymatous hemorrhage secondary to traumatism or coagulopathy. Cotelingam and Jaffe (*13*) suggested the main initial event may have been a focal parenchymal necrosis with hemorrhage. Another hypothesis of immunological origin is presumed from high content of plasma cells in this lesion (*17*). Someren supports this idea because this entity is histologically similar to processes of recognized autoimmune origin (*18*). In our case, the specimen consists of high density of plasma cells, no underlying vascular changes and FDC positive by EBER-*in situ* hybridization, we assume the mass resulted from the process of inflammation from cytokine induced by EBV infection.

According to the previously published cases, the prognosis of IPT of the spleen has generally been considered favorable after splenectomy. After removal of the lesion, there have been no reports of metastatic disease, local invasion or recurrence. However, careful follow-up after removal is necessary in case of neoplasm, since some patients with IPT of the liver are reported to have died probably as a result of the disease (*19*) and there have been some reports of IPT of the spleen containing a monoclonal population of EBV-infected tumor cells. The presence of clonal EBV DNA suggests that some IPT of the spleen may be true neoplasms (*1,20*).

In summary, we report a case of an IPT of the speen found during a physical exam. The establishment of the diagnosis of a splenic tumor is often difficult and such lesions are occasionally malignant. Therefore, when a splenic tumor is found, it should be resected.

Acknowledgements

This work was supported by a Grant-in-Aid for Scientific Research (C) 19591601 (Y.M.).

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