ACG CASE REPORTS JOURNAL

CASE REPORT | LIVER

Pediatric Inflammatory Myofibroblastic Tumor of the Liver: A Rare Cause of Portal Hypertension

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ABSTRACT

Hepatic inflammatory pseudotumors or myofibroblastic tumors are benign neoplasms rarely seen in children. We report a case of a previously healthy 10-year-old girl with prolonged fever and abdominal pain who was found to have hepatosplenomegaly and pancytopenia. Imaging revealed a periportal mass along with thrombosis of portal vein and splenomegaly. Liver biopsy showed normal hepatic architecture with no evidence of cirrhosis. She underwent endoscopic banding of esophageal varices. Biopsy of the mass was suggestive of inflammatory myofibroblastic tumor without malignant changes. She has been successfully managed with nonsteroidal anti-inflammatory drug and pulse steroids with resolution of symptoms and decrease in size of the tumor with more than 2 years of follow-up.

INTRODUCTION

Inflammatory pseudotumors (IPTs) are benign neoplasms of uncertain etiology. They are rare tumors occurring in children and young adults, with lungs being the most common site of origin.[1,2] IPTs of the liver are still a rare entity.[2] We report an interesting case, which has been successfully managed with pulse steroids and nonsteroidal anti-inflammatory drugs.

CASE REPORT

A 10-year-old previously healthy girl presented with persistent high-grade fever, night sweats, myalgia, generalized abdominal pain, and abdominal distension of several months duration. Physical examination revealed significant pallor and hepatosplenomegaly. At presentation, complete blood counts revealed pancytopenia (hemoglobin 8.8 g/dL, white cell count 2,070 cells/μL, and platelet count was 81,000 cells/μL). She had normal renal, liver function tests, inflammatory markers, and alpha-fetoprotein level with evidence of past Epstein-Barr virus (EBV) infection.

Ultrasound examination showed a periportal mass of 3.1 × 2.7 × 3.1 cm size along with partial thrombosis of portal vein along with collateral formation, a patent superior mesenteric vein, and marked splenomegaly. Bone marrow biopsy revealed hypocellular marrow with trilinenage hematopoiesis and no evidence of malignancy. Thrombophilia workup was negative. Computed tomography (CT) scan of the abdomen showed a liver mass along with retroperitoneal and peripancreatic lymphadenopathy with normal CT scans of her head, neck, and chest. She underwent endoscopic banding of grade 2 esophageal varices. Magnetic resonance imaging abdomen confirmed a soft-tissue heterogeneous mass of 5.6 × 4.1 × 4.1 cm size within the porta hepatis demonstrating thin peripheral rim enhancement on T2 along with low T1 intensity and encasement of both right and left hepatic arteries, with splenic vein thrombosis leading to marked splenomegaly and collateral formation (Figure 1). Endoscopic fine-needle aspiration revealed benign hyperplastic lymphoid tissue with mild degree of atypia, likely secondary to inflammation. Positron emission tomography scan performed for continued fever spikes, abdominal pain, and weight loss of 4 lbs in 6 months revealed a fluorodeoxyglucose (FDG)-avid periportal mass (Figure 2). Open laparotomy revealed 2 fibrotic-like hard masses in the porta hepatis, and biopsy showed spindle cell proliferation with a mixed inflammatory infiltrate predominantly comprising lymphocytes and plasma cells, suggestive of fibroinflammatory process likely inflammatory myofibrobalstic tumor (IMT) (Figure 3). Spindle cells often expressed smooth

ACG Case Rep J 2019;6:1–4. doi:10.14309/crj.0000000000000028. Published online: March 27, 2019

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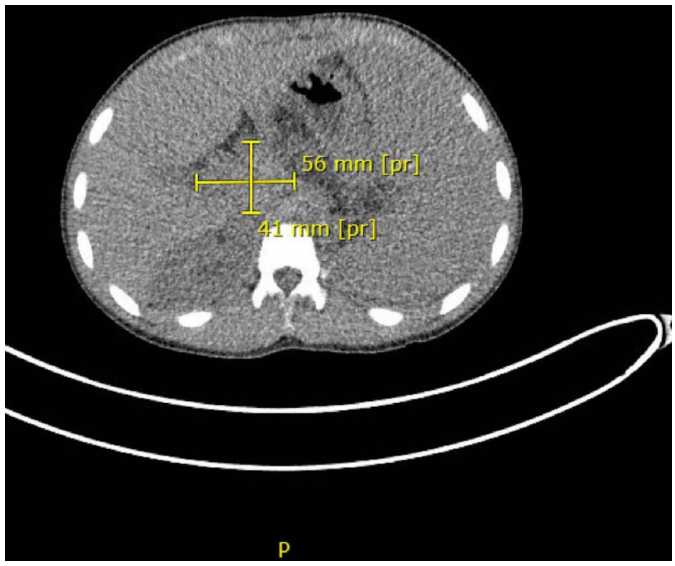

Figure 1. Magnetic resonance imaging showing periportal mass before the initiation of therapy.

muscle actin (SMA) but were negative for anaplastic lympho kinase-1 and IgG4 plasma cells. Immunohistochemistry showed the presence of both B and T cells and no evidence of Hodgkin lymphoma. Liver biopsy showed normal hepatic architecture with no evidence of fibrosis/cirrhosis. Normal liver biopsy and thrombosis of portal vein along with collateral formation were suggestive of extrinsic compression of the portal vein, leading to portal hypertension as opposed to other causes of portal hypertension including chronic liver disease, thrombotic disorder, or infection.

After discussion with a pediatric hematologist, it was decided that the patient did not require anticoagulation. We chose an anti-inflammatory regimen with meloxicam (7.5 mg twice daily) and prednisone (40 mg) monthly 5-day pulses to mimic well-tolerated maintenance acute lymphoblastic leukemia therapy. The patient tolerated the regimen well and has remained asymptomatic. Serial endoscopies showed grade 1–2 esophageal varices that did not require further banding. Tumor

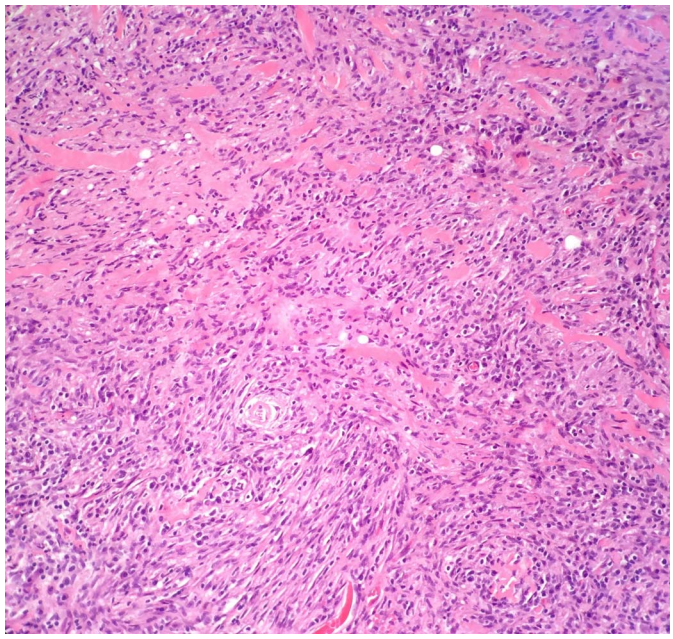

Figure 3. Biopsy of the fibrotic-appearing hard masses in the porta hepatis showing proliferation and focal arrangement of spindle cells admixed with lymphocytes and plasma cells.

dimensions decreased to 2.2 × 2.6 × 3.3 cm after about 2 years of therapy (a >40% reduction in mean diameter) (Figure 4). During follow-up, there was no progression of her splenomegaly, and her platelet counts remained stable. There was no clinical or laboratory evidence suggestive of chronic liver disease. Current plans are to continue therapy for 3 years and then to follow-up.

DISCUSSION

Pack and Baker reported the first ever known case of hepatic inflammatory tumor in 1953.[3] IPTs are typically reported in children and young adults with a male preponderance and are of uncertain etiology.[4] They are usually benign in nature, originate from mesenchymal cells, and can occur in different parts of our body. Infections, especially of the gastrointestinal system, are

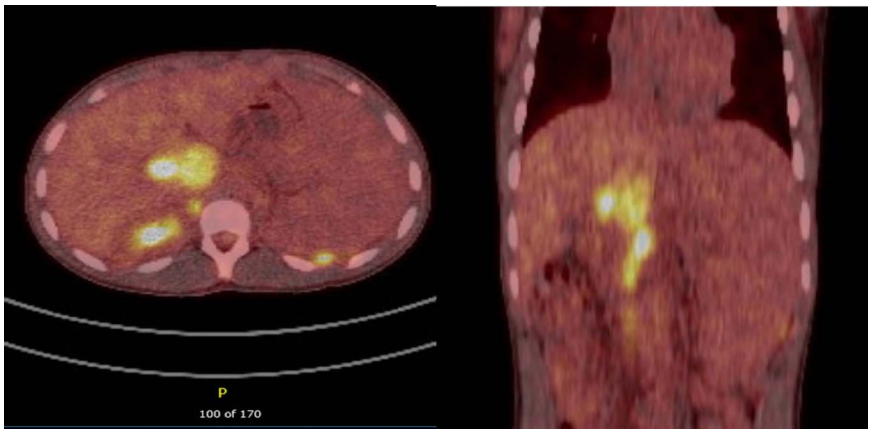

Figure 2. Positron emission tomography scan demonstrating fluorodeoxyglucose-avid periportal mass.

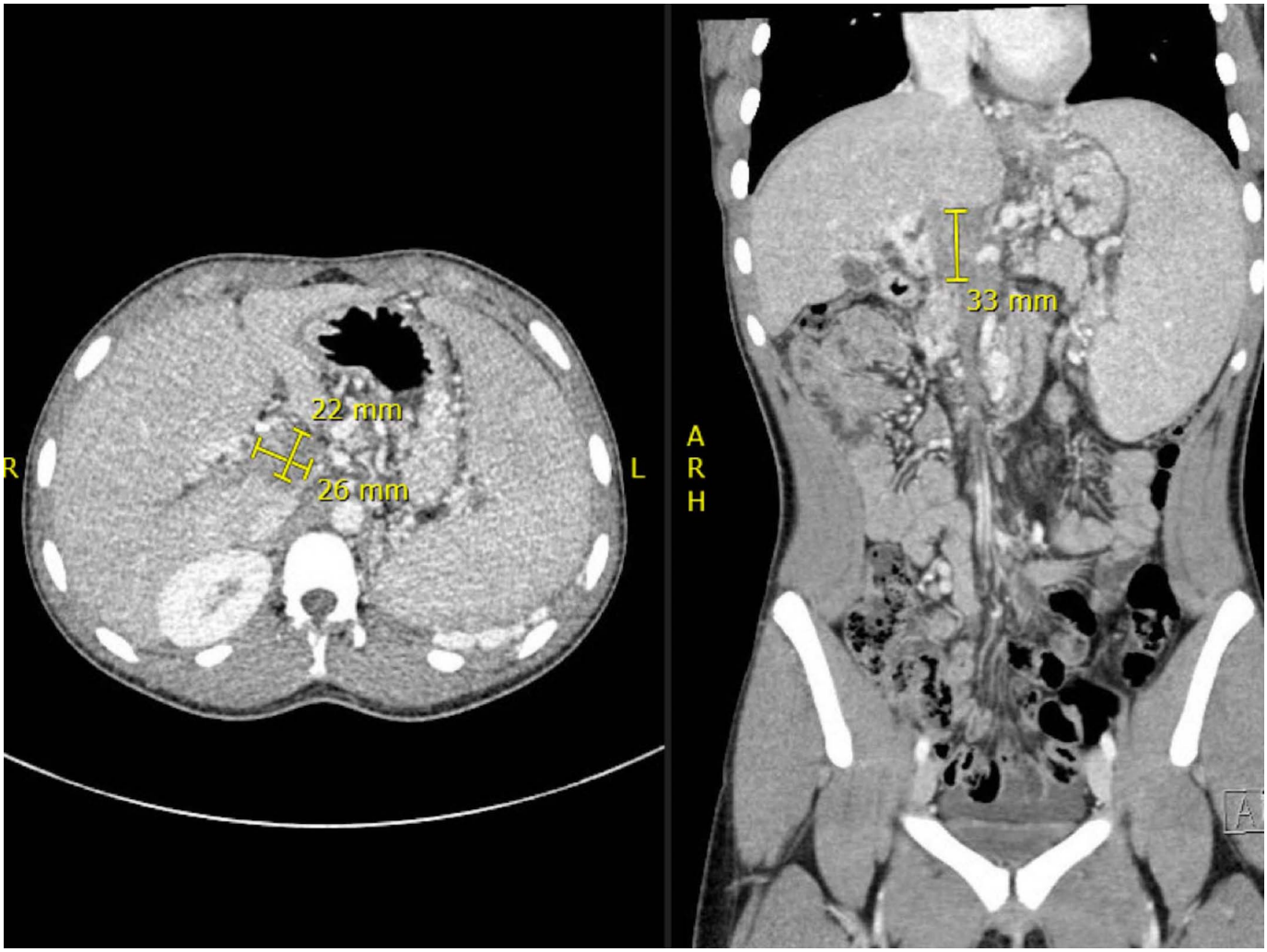

Figure 4. Repeat magnetic resonance imaging demonstrating decrease in size of the tumor after 2 years of therapy.

believed to provoke an inflammatory response in the liver, leading to the development of hepatic IPTs. Gram-positive cocci, *Escherichia coli*, *bacteroides*, schistosoma, and EBV infection have been reported as possible triggering factors.[5] There are various reports of EBV association with IPTs occurring in various sites including the liver and spleen and in other organs.[6,7] Further, EBV infection is also associated with the development of follicular dendritic cell tumor, which resembles closely with IPT.[8] Other causes implicated in the development of IPT include autoimmune conditions, trauma, and surgical inflammation.[2,9] In the literature, the term IPT has been used synonymously with IMT and plasma cell granuloma. But recently, IMTs have been recognized as a distinct solid tumor, showing spindle cell proliferation in a myxoid or collagenous stroma along with inflammatory infiltrates.[10]

Hepatic IMTs typically present with fever, fatigue, malaise, and weight loss, as well as with jaundice, abdominal pain, and signs of portal hypertension, or may remain asymptomatic. Radiological features, although not pathognomonic, can provide valuable information regarding the location and extent of the lesion. On ultrasound, they can be hyperechoic or hypoechoic with septations.[4] The pattern of enhancement is often variable on CT scan, and these lesions appear as hypointensities on T1-attenuated and hyperintensities on T2-attenuated magnetic resonance imaging scans.[4,11] Anatomically, there are two types of hepatic IPTs: in the first type, they present as large centrally located solitary mass, and in the second type, they present as relatively smaller multiple hepatic nodules involving both lobes.[12] Large tumors could be locally aggressive and can lead to compression of biliary tree or can obstruct vascular structures causing portal hypertension and cirrhosis.[13] Accurate diagnosis of IPT/IMT is often not possible because of its nonspecific clinical course, radiological appearance, and the inability to rule out a malignant process. Percutaneous biopsy of the tumor could be attempted, although surgical resection or open biopsy of the tumor is often required for histopathological and immunochemical analysis to make a precise diagnosis. Histologically, they are characterized by bundles of hyalinizing collagen or whorl-like patterns infiltrated with inflammatory cells (both

B and T lymphocytes) and plasma cells and no suggestion of a malignant neoplasm.[2,14]

Management of hepatic IMTs is still under debate. They are essentially benign tumors whose natural course is variable including spontaneous resolution without any treatment.[15] However therapeutic interventions are often required for symptomatic lesions. Medical management of hepatic IMT includes antibiotics, nonsteroidal anti-inflammatory drugs, or corticosteroids.[2] Surgical resection of the tumor is needed especially when they present with obstructive or pressure symptoms over the surrounding structures leading to cholestasis or portal hypertension. Surgical procedures including wide excision, lobectomy, and liver transplant for significant liver involvement not amenable to less extensive management have been used.[15,16] Total resection of the tumors is often not possible because of its close proximity to the major blood vessels in the liver. Recurrences have been reported after both medical and surgical management, and the treatment for recurrence has to be decided on a case-to-case basis. Malignant transformation of hepatic IPT into sarcomas and non-Hodgkin lymphoma has been reported with limited longitudinal data.[17,18] Hepatic IMT should be considered a possibility in children with unexplained hepatic non-malignant tumor and features of biliary obstruction or portal hypertension.

DISCLOSURES

Author contributions: A. Thavamani drafted the manuscript and reviewed the literature. C. Mandelia reviewed the literature. P. Anderson revised the manuscript. K. Radhakrishnan revised the manuscript and is the article guarantor.

Financial disclosure: None to report.

Informed consent from the patient's parent was obtained for this case report.

Received July 4, 2018; Accepted December 20, 2018

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