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CASE REPORT

Littoral cell angiomas of the spleen associated with solid pseudopapillary tumor of the pancreas

Tapan Bhavsar, Congli Wang, Yajue Huang, Andreas Karachristos, Susan Inniss

Tapan Bhavsar, Congli Wang, Yajue Huang, Susan Inniss, Department of Pathology and Laboratory Medicine, Temple University Hospital, Philadelphia, PA 19140, United States
Andreas Karachristos, Department of Surgery, Temple University Hospital, Philadelphia, PA 19140, United States
Author contributions: Bhavsar T conceived the case report, acquired the patient data, searched the literature and drafted the manuscript; Wang C performed the gross examination of the specimen and made revisions to the manuscript; Huang Y performed and evaluated fine needle aspiration cytology, helped with the histopathological evaluation of the specimen and made revisions to the manuscript; Karachristos A operated on the patient, helped with the gross examination, made revisions to the manuscript and sought patient consent for this case report; and Inniss S helped with the gross examination, performed the histopathological and immunohistochemical evaluation of the specimen and made critical revisions to the manuscript. All authors read and approved the final manuscript.
Correspondence to: Tapan Bhavsar, MD, PhD, Department of Pathology and Laboratory Medicine, Temple University Hospital, 3401 N Broad St, Philadelphia, PA 19140, United States. tapan.bhavsar@tuhs.temple.edu
Telephone: +1-215-707-3923 Fax: +1-215-707-2738
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Abstract

Littoral cell angiomas (LCA) of the spleen are vascular tumors of unknown etiology arising from the littoral cells of the splenic red pulp sinuses. Usually a benign and incidental finding, LCA have been repeatedly reported in association with a variety of visceral malignancies and hold the potential for dissemination *per se*. We encountered a case of a 30 year old female who was diagnosed with solid pseudopapillary tumor of the head and distal pancreas by fine needle aspiration cytology. A distal pancreatectomy with splenectomy was performed in addition to a pylorus-preserving Whipple's procedure and cholecystectomy. Histopathological examination confirmed solid pseudopapillary tumor of the pancreas and showed multiple well-circumscribed anastomosing vascular channels in the spleen. The diagnosis of LCA of the spleen was confirmed by immunohistochemistry that revealed co-expression of endothelial cell marker, CD31 and CD34, along with histiocytic marker, CD68 by the vascular lining cells. LCA has been previously reported in association with colorectal and pancreatic adenocarcinoma, malignant lymphoma, myelodysplasia and autoimmune disorders. We report the first case of LCA associated with solid pseudopapillary tumor of the pancreas.

Key words: Littoral cells; Spleen; Vascular tumors; Red pulp

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INTRODUCTION

Littoral cell angiomas (LCA) are rare vascular tumors of the spleen of uncertain biological behavior[1]. First described by Falk *et al* in 1991[2], the majority of LCA are asymptomatic incidental findings with no age or sex predilection[3,4]. Splenomegaly is a common feature of all the LCA and a few of them show symptoms of hypersple-

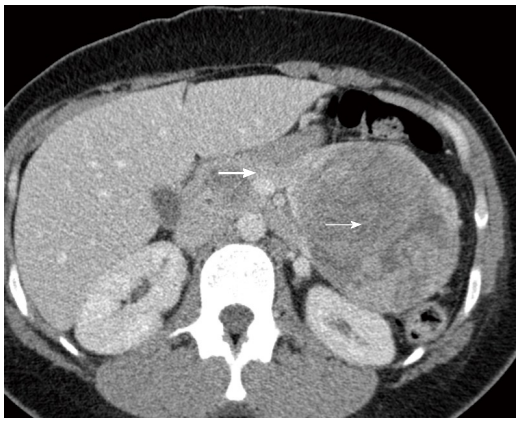

Figure 1 Computed tomography scan of the abdomen showing a large tumor in the pancreatic tail (fine arrow) and a small tumor in the pancreatic head (thick arrow).

nism[5-8]. The unique feature of almost all LCA is its immunohistochemical reactivity to CD31 (endothelial marker) and CD68 (histiocytic marker); the latter suggesting the origin of the tumor as the splenic sinus lining littoral cells. LCA have been associated with a variety of visceral malignancies, including colorectal and pancreatic adenocarcinoma, malignant lymphoma[9] and myelodysplasia[10]. To the best of our knowledge, about 35 cases of LCA have been reported to date in the English literature.

CASE REPORT

A 30 year old female with a history of sickle cell disease, SC trait presented with a 2 d history of gradual onset of back and bilateral lower extremity pain with fever and chills. The patient was diagnosed with solid pseudopapillary neoplasm of the pancreas by endoscopic ultrasonography-guided fine needle aspiration cytology. The diagnosis was confirmed by immunohistochemistry that showed a positive reactivity to CD56, synaptophysin, CD10 and alpha-1 antitrypsin. A CT-scan imaging of the abdomen identified an 11 cm tumor in the distal pancreas and a 2 cm tumor of the head of the pancreas with a bridge of preserved pancreatic tissue between the two tumors (Figure 1). A preoperative angiogram showed the dorsal pancreatic artery supplying the distal tumor and the patient underwent a distal pancreatectomy and splenectomy along with a Whipple's procedure to prevent the overt diabetes. Gross examination of the pancreas showed a yellow-tan, lobulated, well-circumscribed mass located on the anterior aspect of the pancreatic tail (Figure 2) measuring 13 cm × 10 cm × 7.5 cm and a hemorrhagic, focally cystic red-brown tumor measuring 2 cm × 1.5 cm × 1 cm in the supero-anterior aspect of the pancreatic head. Histopathological examination of the tumor in the head and the distal pancreas revealed morphological changes of solid pseudopapillary tumor. Gross examination of the spleen showed a 113 g yellowish-brown nodular organ measuring 10 cm × 6.5 cm × 3 cm. Two dark-brown, well-circumscribed nodules were identified; one measuring 1.1 × 0.7 × 0.4 cm near to the hilum and other measuring 2.5 × 0.7 × 0.3 cm just underneath the capsule. Histopathological examination showed multiple, anastomosing vascular lesions that vaguely resembled splenic sinusoids lined by tall endothelial cells (Figure 3). The vascular lesions were well delimited from the surrounding splenic parenchyma. Immunohistochemistry revealed the co-expression of CD31 (Figure 4A), CD68 (Figure 4B) and CD34 (Figure 5) by the vascular lining cells, confirming the lesion as LCA of the spleen.

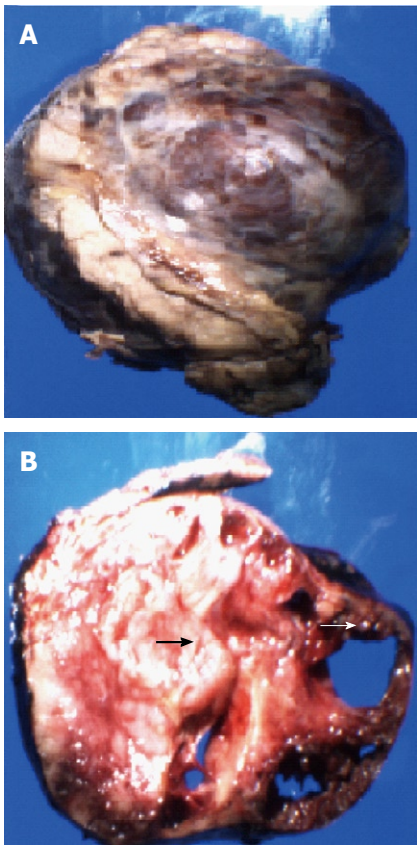

Figure 2 Gross photograph of the pancreatic tail tumor (A) and the corresponding cut surface (B) showing solid (thick arrow) and cystic areas (fine arrow)

DISCUSSION

Since the identification of LCA by Falk *et al* in 1991[2], these vascular tumors have been periodically reported[5-8] in the literature. Two forms of LCA have been described; the more commonly encountered diffuse multiple nodular form as in our case and the rare solitary form[11].

The differential diagnosis of splenic neoplasm with a radiological imaging similar to LCA is extensive and includes hemangiomatosis, lymphangiomatosis, hamartoma, hemangiopericytoma, hemangioendothelioma, angiosarcoma[1], lymphoma, metastasis and sarcoidosis.

Clinically, LCA can present as an abdominal mass, mostly due to splenomegaly, with symptoms of hypersplenism with ensuing anemia and/or thrombocytopenia, pulmonary hypertension and pyrexia of unknown origin[5-8],

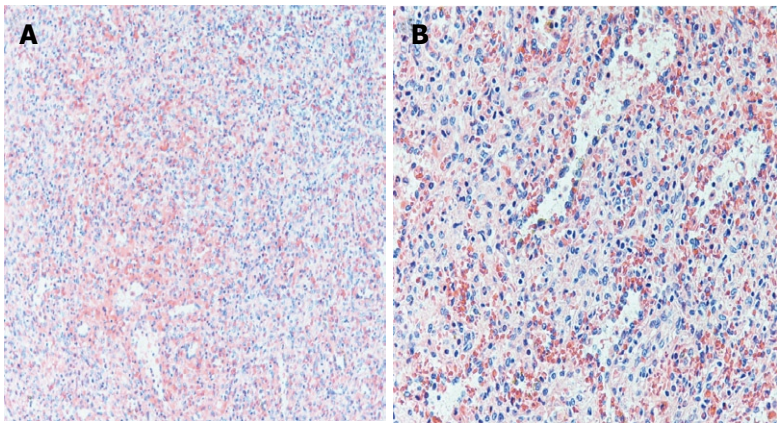

Figure 3 Histopathology of splenic nodule showing proliferation of spindle cells with anastomosing vascular channels and congestion of large vessels suggestive of LCA (Hematoxylin and Eosin stain). A: ×40; B: ×100.

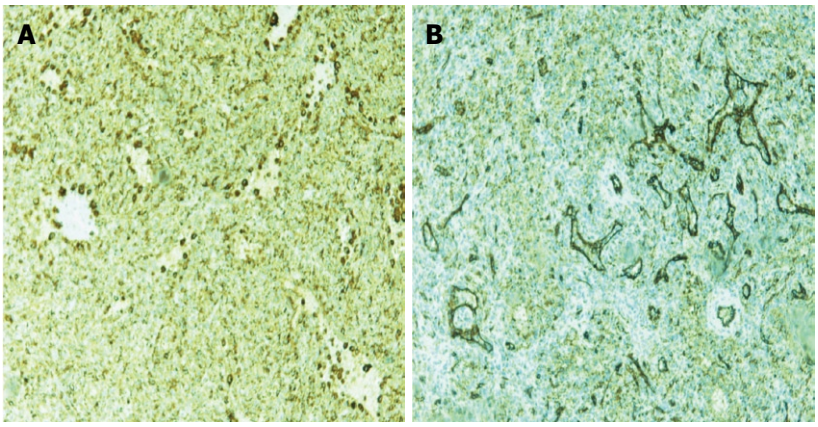

Figure 4 Immunohistochemistry of splenic nodule showing vascular lining cells reactive to CD31 (A) and CD68 (B), ×100.

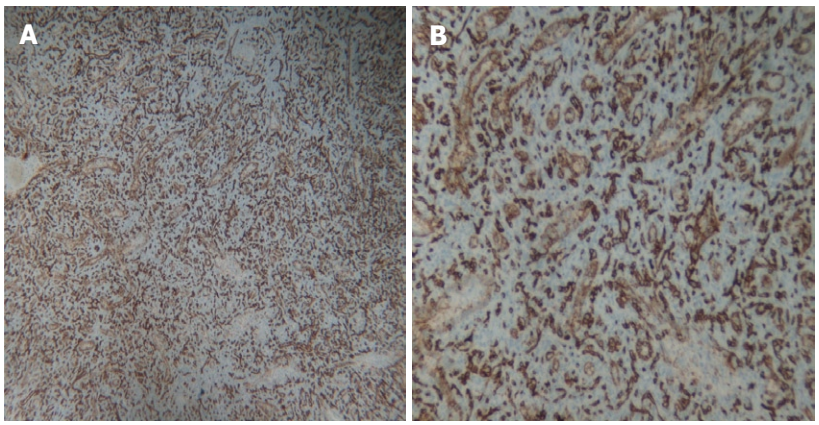

Figure 5 Immunohistochemistry of splenic nodule showing vascular lining cells reactive to CD34. A: ×40; B: ×100.

or can be an incidental finding. However, in our case the patient did not have a splenomegaly associated with solid pseudopapillary tumor of the pancreas. More dramatically, LCA has been reported to present as splenic rupture and hemoperitoneum[12,13].

Radiological studies by CT scan, MRI, sonography or nuclear medicine studies, although not conclusive[14], can contribute to diagnosing LCA. A CT-scan imaging shows LCA as hypoattenuating nodules of varying size. Delayed phase imaging on CT-scan reveals the nodules to be isodense to surrounding splenic parenchyma due to delayed filling of the nodules. MRI of the spleen shows hypodense lesions on T1 and T2 weighted scan due to the hemosiderin content of the tumor[1]. However, no hypodense nodules in the spleen were evident on CT-scan imaging in our case. Sonography is rarely helpful as findings vary greatly from isoechoic to hypo- and hyperechoic lesions[15]. Tc-99m labeled RBC scintigraphy can differentiate splenic lesions from splenic hemangiomas[16].

The pathogenesis of LCA remains unclear but, given its association with autoimmune disorders such as Crohn's disease and inborn metabolic diseases such as Gaucher's disease, immune system dysfunction has been postulated as a possible pathogenic mechanism[17,18]. Supporting this hypothesis, other reports have suggested that chronic infection and systemic immunosuppression may contribute to the development of LCA[12,19]. Interestingly, once thought of as a benign and incidental lesion, one third of the reported cases are associated with malignancies of visceral organs including adenocarcinoma of colorectum (most

common), kidney, liver[20], lung[21], pancreas, hepatocellular carcinoma and malignant lymphoma[9]. It has also been associated with myelodysplasia[10] and aplastic anemia[22]. Interestingly, this is the first report of a LCA of the spleen associated with a solid pseudopapillary tumor of the pancreas. The strong association of LCA with various malignancies necessitates splenectomy in most of the cases. The splenectomy in our case, however, was a part of the distal pancreatic tumor excision.

Two subtypes of LCA, angiosarcoma and hemangioendothelioma, have been reported to have malignant potential. In two rare cases[23,24], distant metastasis with neoplastic cells consistent with the morphology of LCA have been identified after splenectomy. There was no evidence of any distant metastasis of the LCA in our case.

The definite diagnosis of LCA is made at pathology after splenectomy which remains the gold-standard of the treatment[13]. Grossly, the spleen shows nodules with blood/blood products of variable color, usually dark-red to brown/black depending upon the chronicity of blood in these lesions[16]. Histopathology reveals proliferation of anastomosing vascular channels lined by tall endothelial cells with papillary fronds extending into the vascular channels. Some exfoliated cells may be seen in the vascular spaces and atypical cells and mitoses are rare. LCA shares morphological and immunohistochemical features with hemangiomas at other locations such as immunoreactivity for vascular endothelial marker CD31 and factor Ⅷ. Even although they are usually negative for markers highlighting the red pulp sinusoidal epithelium such as CD8 and CD34, the LCA in our case expressed the endothelial marker, CD34 (Figure 5). The expression of endothelial marker CD31 and histiocytic marker CD68 by the vascular cells is unique and diagnostic of LCA[1], as in our case.

In conclusion, LCA are primary vascular neoplasms of the spleen and are usually an incidental finding. Even though the vast majority of these are benign, malignant association and potential have been documented prompting close evaluation and surveillance in patients with LCA for development of other malignancies. We report the first case of an incidental LCA of the spleen associated with a solid pseudopapillary tumor of the pancreas.

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