Splenial Lymphangioma

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- Splenic lymphangioma is a rare malformation of the splenic lymphatic channels, mostly seen in children. It is characterized by the presence of cysts, resulting from increases in the size and number of thin-walled lymphatic vessels that are abnormally interconnected and dilated. The condition may be restricted to the spleen, but in most cases it involves multiple organs (systemic lymphangiomatosis). The clinical picture is variable; small lesions are often incidentally detected through imaging studies, while larger lesions can result in compression of organs, causing pain or rupture even after minor trauma. Therefore, splenic lymphangiomas should be considered in the differential diagnosis of splenomegaly or left upper quadrant pain even among adults and should be immediately treated with splenectomy; delay in the therapeutic intervention can lead to life-threatening complications.


Lymphangiomas are benign malformations of the lymphatic system, usually found in the neck (75%) and axilla (20%) and less commonly encountered in the orbit, mediastinum, adrenal gland, kidney, bone, omentum, gastrointestinal tract, retroperitoneum, liver, and pancreas. They were first described by Rodender in 1828; however, the first case involving the spleen was reported in 1885 by Frink. Between 1939 and 2010, only 189 cases of splenic lymphangiomas were reported in the literature. Therefore, splenic lymphangiomas are considered uncommon benign tumors, occurring mainly in childhood, with only a few cases reported in adults. In most patients, the lymphangiomatosous process involves additional sites in a diffuse or multifocal fashion such as the liver, mediastinum, and lung, the so-called lymphangiomatosis syndrome. Some cases of splenic lymphangiomas are associated with synchronous or metachronous cystic hygroma of the neck. Isolated splenic lymphangiomas constitute a much rarer form; only 9 cases between 1990 and 2010 were reported. Rarely, splenic lymphangiomas can be part of Klippel-Trenaunay syndrome (characterized by varicose veins, bony and soft tissue hypertrophy, cutaneous hemangiomas, and/or malformations of the lymphatic system). Although no consensus has yet been reached on whether splenic lymphangioma is a neoplasm or a hamartoma, most researchers support the latter opinion; its formation is proposed to be due to abnormal congenital development of lymphatic vessels. It can also be attributed to bleeding or inflammation in the lymphatic system, which causes obstruction and consequent lymphangiectasia.

CLINICAL FEATURES

The clinical manifestations of splenic lymphangiomas are usually related to the size of the spleen. In most cases, isolated splenic lymphangiomas are asymptomatic and incidentally detected through abdominal ultrasonography or abdominal computed tomography. Large cystic lesions can attain sufficient size to cause significant symptoms and signs. The symptoms may include left upper quadrant pain, loss of appetite, nausea, vomiting, and signs of abdominal distension or a palpable mass. Most are usually nonspecific and are due to compression of adjacent organs such as the stomach, diaphragm, or kidney. Infection or rupture of a lymphangioma can present as an acute abdomen. Cases have been reported of larger lymphangiomas complicated by consumptive coagulopathy, bleeding, hypersplenism, and portal hypertension. The pathophysiological consequences of a lymphangioma exceeding 3 to 4 kg can be diaphragmatic immobility and lung atelectasis or pneumonia. Rarely, hypertension due to compression of the renal artery by the splenic mass can be seen.

RADIOGRAPHIC FINDINGS

In terms of imaging characteristics, the spleen may be of normal size, or splenomegaly can be present. Ultrasonography typically reveals cysts of various sizes (ranging from a few millimeters to several centimeters in diameter). These cystic lesions are hypoechoic or anechoic, with possible septations. Minute echogenic calcifications may be identified. In one case report, a lymphangioma presented as a mildly hyperechoic mass in the spleen. Color Doppler ultrasonography can demonstrate the vasculature of the mass (including the intrasplenic arteries and veins along the cyst walls). It may assist in determining the splenic origin by demonstrating the vessels at the splenic hilum.

Computed tomography usually shows low-density single or multiple thin-walled sharply margined subcapsular cysts (Figure 1). Although no significant contrast enhance-
ment is typically seen, rare cases are reported in the literature in which computed tomography of solid cystic lymphangiomas showed no enhancement of the cysts but demonstrated prominent enhancement of the solid components.16 The presence of curvilinear peripheral mural calcifications is suggestive of cystic lymphangiomas but is not a specific finding because it can also be seen in hydatid cysts.8,17

On T1-weighted magnetic resonance imaging, the cystic lesions can appear hypointense relative to the surrounding viscera or hyperintense when filled with hemorrhagic or proteinaceous material.7,8 On T2-weighted images, the mass is characterized by multiloculated hyperintense areas that correspond to the dilated lymphatic channels.7 The intervening septa are demonstrated as hypointense bands because they bear abundant amounts of fibrous connective tissue.8 The curvilinear peripheral mural calcifications seen on computed tomography are difficult to identify on magnetic resonance imaging. However, the high contrast resolution of magnetic resonance imaging may help detect the solid elements within the cystic lumen in the extremely rare case in which malignant elements can be present.16 In one case report,19 instead of the usual pattern of multiple well-defined cystic lesions, there was diffuse involvement replacing the entire spleen, with heterogeneous signal intensities on T2-weighted images and heterogeneous enhancement.

Finally, positron emission tomography is not routinely used for the diagnosis of splenic lymphangiomas. However, in a patient with 2 synchronous colon cancers that presented with concomitant splenic mass (initially suspected to be metastatic), it helped confirm that the lesion was benign by revealing no fludeoxyglucose uptake.16

GROSS FINDINGS

Depending on the size of the lesion, the spleen may be significantly enlarged or within normal limits. The macroscopic appearance of splenic lymphangioma is characterized by a broad spectrum, including solitary nodules, multiple nodules, and diffuse lymphangiomatosis.8 Because lymphatics are only found in the subcapsular region or in large trabeculae, a solitary focal lymphangioma is most commonly subcapsular and in some instances intraparenchymal. The nodule usually consists of a single large cyst with a thick fibrous wall or multiple various-sized thin-walled cysts with honeycombing filled with clear fluid. Solid areas may be seen, usually due to central scarring.4,20 Lymphangiomas presenting as multiple nodules have similar-appearing satellite lesions surrounding a larger lesion, are separated by distinct residual splenic tissue, and can cause the spleen to be nodular and enlarged.8 Cases of diffuse lymphangiomatosis can replace the spleen with expanding cysts that result in little remaining normal parenchyma (Figure 2).15,21 Based on the size of the dilated lymphatic channels,

Figure 1. Computed tomography showing an enlarged spleen diffusely involving multiple low-attenuation lesions.

Figure 2. A, Diffuse splenic lymphangiomatosis presenting with multiple nodules that involve the entire splenic parenchyma. B, Cross-sections reveal multiple cystic spaces of various diameters filled with serous fluid.
lymphangiomas can be classified as capillary (supermicrocystic), cavernous (microcystic), or cystic (macrocystic). Therefore, if the lymphangioma consists of lymphatics that have the size of capillaries, it is classified as capillary (microcystic), and if it consists of lymphatics that approach the size of venules or veins, it is classified as cavernous (microcystic) or cystic (macrocystic), respectively. This nomenclature can be confusing as it is reminiscent of the classification of hemangiomas, and because the distinction is not always clear, it is not uniformly accepted among pathologists.16,22

MICROSCOPIC FINDINGS

Histologic analysis reveals a single cyst or multiple cystic structures (Figure 3, A) filled with eosinophilic amorphous proteinaceous material (Figure 3, B) and lined by a flat layer of attenuated endothelial cells (Figure 3, C). Rarely, the lining of the cysts may form papillary projections. The wall of the cysts ranges from thin and delicate to thick and obviously fibrous. A varying number of macrophages or lymphocytes can be found in the cystic spaces. The surrounding parenchyma may be normal or show evidence of congestion and fibrosis. Very few cases of splenic lymphangiomas transforming into malignant lymphangiosarcomas have been reported.2 When atypical morphology of the endothelium is present, careful long-term follow-up observation of affected patients is recommended to determine whether these features indicate malignancy or simply an unusual morphologic appearance of the endothelial cells.8

Immunohistochemistry

When the histologic characteristics are not clear, the endothelial origin of the cyst may be established with immunohistochemical techniques to demonstrate reactivity for CD31, CD34, factor VIII, podoplanin (D2-40), or vascular endothelial growth factor receptor 3 (VEGFR-3). D2-40 is a monoclonal antibody against dysgerminoma, observed to selectively stain lymphatic endothelium. The D2-40 antibody was also found to positively stain lymphangiomas but not benign tumors of blood vessels. It has been suggested that VEGFR-3 immunopositivity indicates partial lymphatic endothelial differentiation or, alternatively, vascular endothelial growth factor C production by the tumor cells that stimulate proliferation of adjacent lymphatics. On the other hand, factor VIII, CD31, or CD34
highlight endothelial cells in lymphatics and in blood vessels.24

Electron Microscopy

Electron microscopy may assist in determining the endothelial origin of the cells lining the cyst. It can highlight the presence of rod-shaped microtubulated bodies (Weibel-Palade bodies), which are the storage granules of endothelial cells.23

DIFFERENTIAL DIAGNOSIS

The differential diagnosis of splenic lymphangiomas includes hemangiomas, true (splenic) epidermoid cysts, mesothelial cysts, and parasitic cysts (most commonly due to Echinococcus granulosus).25 Hemangiomas are characterized by vascular channels lined by endothelium, but they are extensively filled with red blood cells instead of the amorphous proteinaceous material of lymphangiomas. D2-40 positivity can assist in highlighting the lymphatic endothelial differentiation; however, attention should be given to the fact that D2-40 can also stain myoepithelial cells of blood vessels.24 True splenic cysts will have definite epithelial lining and will be positive for cytokeratin, while the cells lining a mesothelial cyst will be positive for mesothelial cell markers such as Wilms tumor 1 (WT-1) and calretinin.26 To exclude a hydatid cyst in a patient with a cystic splenic mass, a serologic test for Echinococcus should be performed. If removed, the cyst will consist of 3 layers (innermost germinal layer, intermediate laminated membrane, and outer fibrous layer) and contain protoscolices (attached or separated) with a double row of refractile, birefringent, acid-fast hooklets 22 to 40 μm in size and 4 round suckers that comprise the “hydatid sand.” Finally, in a young patient with splenic lymphangioma, the diagnostic evaluation should be extended to include extrasplicenic organs because it has been observed that in younger patients the likelihood of multiorgan involvement is greater.24

TREATMENT AND PROGNOSIS

The treatment of choice for splenic lymphangiomas is complete surgical resection because other therapeutic modalities (aspiration, drainage, and irradiation) have shown unsatisfactory results.27,28 Some investigators prefer conservative treatment in the case of small asymptomatic lesions detected incidentally, reserving splenectomy for conservative treatment in the case of small asymptomatic hemorrhage, rupture, intestinal obstruction, and tumor established to avoid complications such as infection, hemorrhage, and morbidity.

Laparoscopic splenectomy is emerging as the procedure of choice in patients with a normal to moderately enlarged spleen but is considered a contraindication in patients with massive splenomegaly.30 The most important aspect when considering treatment options is that surgery should be recommended immediately after the diagnosis has been established to avoid complications such as infection, hemorrhage, rupture, intestinal obstruction, and tumor enlargement that may eventually prevent complete removal.27 The prognosis of splenic lymphangioma after resection is favorable. The main complication is recurrence, which is demonstrated in 9.5% of patients, frequently after incomplete resection.5

CONCLUSION

Splenic lymphangioma is a rare malformation of the splenic lymphatic system, mostly seen in children and rarely in adults. Although the etiology is still unclear, it is considered more likely a hamartomatous process rather than a neoplasm. Histologically, splenic lymphangioma is characterized by the presence of cysts lined by attenuated endothelial cells. The condition may involve only the spleen, but in most cases it is part of a systemic malformation of lymphatic channels that affects multiple organs (systemic lymphangiomatosis). Most lesions are incidentally detected through imaging studies, while larger lesions can cause compression of adjacent organs, with various symptoms. Therefore, splenic lymphangiomas should be considered in the differential diagnosis of splenomegaly or left upper quadrant pain even among adults because they are amenable to curative treatment. Delay in their surgical intervention may lead to severe complications such as infection, rupture, and hemorrhage.

References


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