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Case Report

Generalized lymphangiomatosis—A rare manifestation of lymphatic malformation

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ABSTRACT

Lymphangiomatosis is a rare benign proliferation and dilation of the lymphatic channels that can involve multiple organs with a variety of clinical presentations. We report a case of generalized lymphangiomatosis in a 16-year-old male who presented with a subcutaneous swelling and pain over his lower back area. The patient was diagnosed of generalized lymphangiomatosis with involvement of soft tissues, pulmonary, thoracic and lumbosacral vertebrae, and spinal canal which subsequently confirmed by cytology. In this case report, we aim to discuss radiological features of the relevant differentials, and the patient's symptoms. We also briefly discuss the treatment options as well as prognosis.

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Introduction

Lymphangiomatosis is an uncommon congenital disorder that is characterized by benign, diffuse proliferation, and dilation of lymph vessels [1]. The disease can affect one organ or multiple organs concurrently. The disease is believed to arise from a persistence of dilated lymphatics channel during the second trimester of the fetal development [2]. They mainly

consist of dilated chyle-filled lymphatic spaces along the lymphatic pathways [1].

Generalized lymphangiomatosis is a rare disorder characterized by multisystem involvement, including bony and soft tissue involvement [3]. We report a case of generalized lymphangiomatosis involving soft tissues, vertebrae lesions, and spinal canal occupancy in a 16-year-old male, which subsequently confirmed by histologic examination.

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Case report

A 16-year-old male presented to the orthopedic outpatient department with a large mass over the left lower back area that had grown gradually for 3 months. He also complained of pain in his right pelvic and bilateral lower back pain that got worse during certain activities and radiated into lower limbs. He denied any history of trauma, surgery or other associated events. On clinical examination, a well-circumscribed soft, compressible, and subcutaneous swelling was seen over the left lower back region. Moreover, on abdominal examination, 2 vague masses were palpable at bilateral iliac regions. Sonography of lower back and abdomen showed sizable multiseptated cystic lesions with echogenic fluid content inside both psoas muscles, extending to its whole subcutaneous affected regions and to renal areas. They were abutting the inferior pole of both kidneys. A noncontrast-enhanced computed tomography of the abdomen revealed a large multilocular cystic mass inside the bilateral psoas muscles, left extensor muscles and left posterolateral abdominal wall. The density of the mass was in the +20 to +27 HU range. There was calcification on the lesion's wall and septa. No fatty components were seen. Multiple osteolytic lesions with sharp margin of the lumbar and sacral vertebrae were also noted (Figs. 1 and 2). Magnetic resonance imaging (MRI) revealed a multiloculated mass, grown in both psoas muscle. It extended to the left extensor muscle, left posterolateral abdominal wall, with low signal on T1W, high signal T2W and no restricted diffusion on diffusion-weighted imaging (DWI). After gadolinium administration, peripheral capsular and septal enhancement were present (Fig. 3). Lesions extended into lumbosacral spinal canal and intervertebral foramina, compressing the nerve roots in the cauda equina (Fig. 4). Lung computed tomography (CT) revealed interstitial thickening with interstitial nodules. There was no evidence of pleural effusion and mediastinal adenopathy. Well circumscribed osteolytic lesions of the thoracic vertebrae were also noted (Fig. 5). Fine needle aspiration of the lesion in psoas muscle was obtained under ultrasound guidance. Cytology obtained 1 mL of yellowish fluid, consisting predominantly of a uniform population of small and round lymphocytes without mitosis or atypia and with some histiocytes intermingled with them. Some centrocytes and occasionally centroblasts and plasma cells could also be observed. Cytologic evaluation showed a heterologous population of mature lymphocytes with chylomicrons (Fig. 6). The findings are consistent with generalized lymphangiomatosis. No surgical procedure was considered. The patient was asymptomatic after a month of palliative care. Written informed consent was given by the patient.

Discussion

Lymphangiomatosis is a rare disease involving multiple organs characterized by proliferation of lymphatic vessels in a diffuse manner [4]. They consist of endothelial-lined spaces supported by connective tissue stroma of variable thickness containing lymphoid tissue, round cells and smooth mus-

cles [5]. Up to 65% of patients suffering from this disease are infants and children and 90% of cases are diagnosed within the first 2 years of life while it is rarely observed in adults [6]. There has been no reported correlation with gender and familial factors [6]. Multiple organs such as lung, liver, spleen, and particularly bone may be involved concurrently in approximately 75% of cases [7]. Intra-abdominal lymphangiomatosis account for less than 1% of all cases, and typically affect the retroperitoneum. The clinical features are atypical and depend on the anatomical position and the extent of the involved organ [1]. Its symptoms and routine laboratory tests are nonspecific. The clinical findings include abdominal pain, distention or a palpable abdominal mass. However, patients are often asymptomatic and being diagnosed incidentally based on abdominal imaging. Ultrasound is the useful imaging modality for the initial assessment and evaluation of the characteristics of the lesion such as morphology, location, vascularity. Typically, it features a multiloculated cystic lesion with septa. Depending on the fluid content inside, it may show anechoic or echoic imaging which represents blood, pus or chyle [8]. CT scan and MRI provide excellent information about the size, extension, and relationship to adjacent structures. CT scan may reveal multiseptated lesions with near water density and aid in identifying the presence of fatty elements and calcifications. It is reported that small, more linear, thin calcifications along the septa have been more frequently described in intra-abdominal than in superficial lymphangioma [9]. Lung CT may reveal interstitial thickening with pleural effusion and mediastinal adenopathy [4,7]. The MRI features of lesions are variable. According to the variable content, the signal intensity can be heterogeneous, but generally it is hypointense on T1-weighted images and hyperintense on T2-weighted images [1,8]. Differential diagnosis of retroperitoneal lymphangiomatosis includes other retroperitoneal malignant conditions such as pancreatic cystic tumors, retroperitoneal nodal metastases, retroperitoneal sarcoma, lipoma, hematoma, lymphocele, or abscesses. Thanks to the superior tissue contrast, contrast-enhanced MRI is the most reliable modality for detection and differential diagnosis of abdominal lymphangioma [10].

In presented case, beside the multilocular cystic lesions, CT scan and MRI also demonstrated bony lesions. It's necessary to distinguish lymphangiomatosis with bony involvement from Gorham-Stout disease (GSD). These 2 conditions have recently been differentiated on the basis of imaging findings [11]. Contiguous involvement, cortical lost and progressive osteolysis are key features of GSD [12]. On the other hand, osteolytic lesions in lymphangiomatosis are round, noncontiguous, and not progressive [9]. More bones are affected in lymphangiomatosis. Vertebral involvement are more common in lymphangiomatosis than in GSD [13]. In presented case, the majority of the osteolytic lesions were sharply defined with sclerotic margin, however, there were also mixed areas of lesions with and without marginal sclerosis. These bony lesions usually lead to severe bone pain, pathological fractures and joints deformity due to extreme osteolysis [13].

Only a few cases of lymphangiomatosis that lesions occupy the lumbosacral spinal canal have been reported [14,15]. Spinal involvement usually consists of replacement of bone with lymph tissue, resulting in direct neural compression

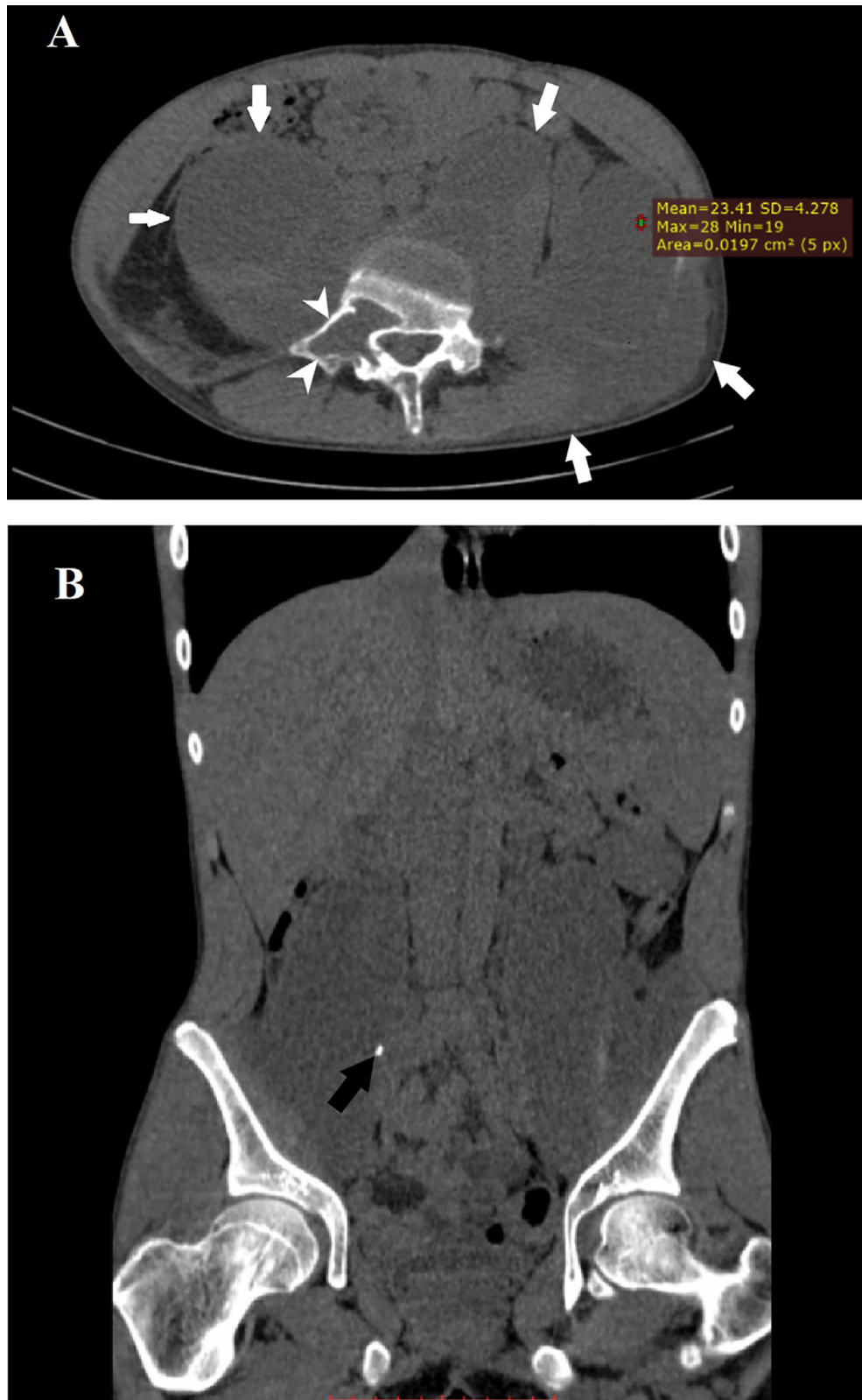


Fig. 1 – Axial (A) and coronal (B) noncontrast CT images showing multilocular cystic lesions within bilateral psoas muscles, left extensor muscles, and left lower back subcutaneous region (white arrows) with calcified node in the right lesion (black arrow). Osteolytic lesion in the vertebral body and pedicle of L5 (arrowheads)

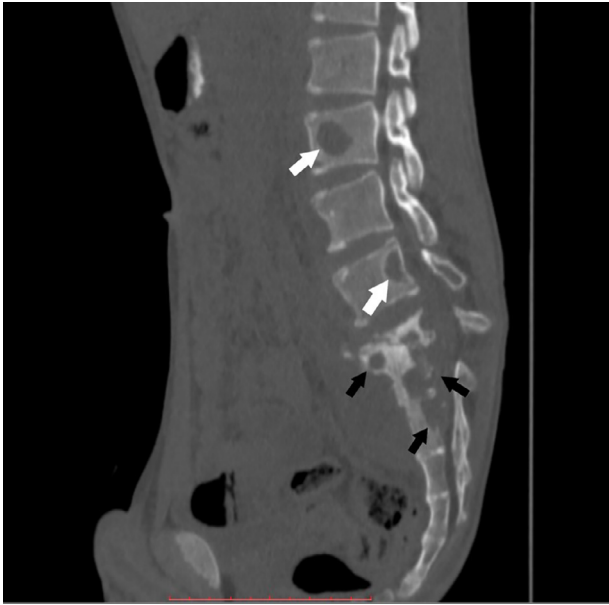


Fig. 2 – Sagittal CT image of the bone window demonstrates sharply defined osteolytic lesions with sclerosis over lumbar vertebrae (white arrows), and a mixed area of osteolysis with and without sclerosis over sacral vertebrae (black arrows)



Fig. 4 – Sagittal T2-weighted MR image shows hyperintense lesions over lumbar and sacral vertebrae, extending into the spinal canal that results in nerve root compression of cauda equina (arrows)

or bony instability [14]. In this patient, the lesions in the lumbosacral vertebrae extended into the spinal canal and intervertebral foramina causing compression of the adjacent nerve roots in the cauda equina. This condition, along with osteolysis, led to severe pain in the patient's lower back area.

Surgery has limited role in lymphangiomatosis because it is difficult to separate affected lymphatic tissue from normal tissue and recurrence rate is considerable high. Current treatments are aimed at managing of chylous fluid accumulations and alleviate symptoms caused by compression of surrounding organs.

The severity of lymphangiomatosis is related to the anatomical site and the extension of lesions. Lymphan-

giomatosis has a favorable prognosis if localized. Vital organs involvement is associated with poor prognosis [16]. Among patients with lung involvement, a higher mortality rate was reported in children less than 16 years old in comparison to adults [17]. Complications such as respiratory failure, infections, and chylous fluid accumulation are reported to be chief causes of death [4].

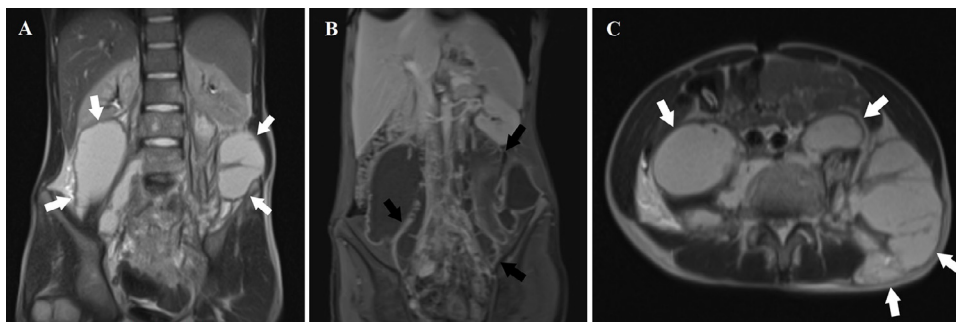


Fig. 3 – Coronal and axial T2W HASTE magnetic resonance (MR) image (A and C) showing markedly hyperintense lesions with septa (white arrows). Coronal T1-weighted postgadolinium MR image (B) showing peripheral capsular and septal enhancement (black arrows)

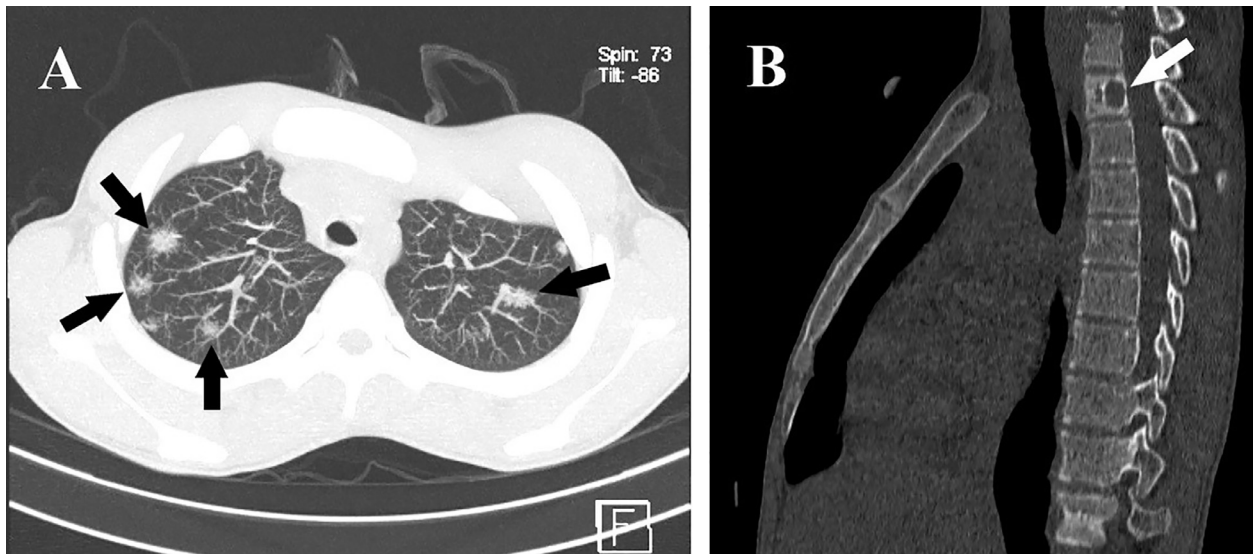


Fig. 5 – Lung CT shows interstitial thickening with interstitial nodules (black arrows). Well circumscribed osteolytic lesions of the thoracic vertebrae were also noted (white arrow). No evident of pleural effusion and mediastinum adenopathy

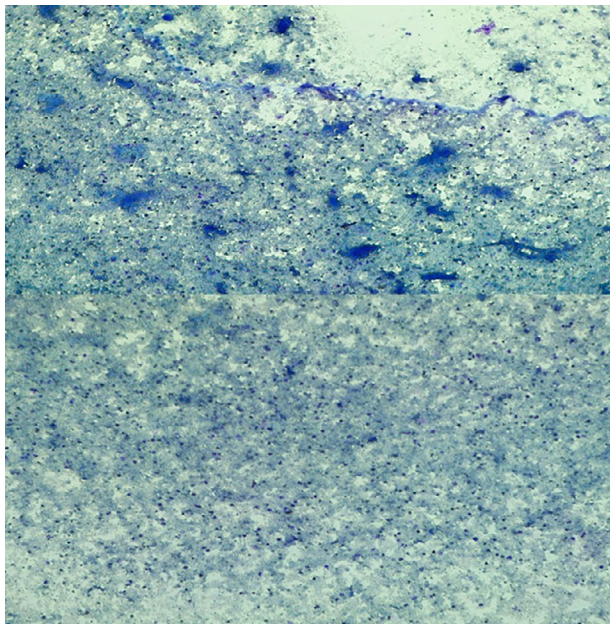


Fig. 6 – Cytologic evaluation showed a heterogeneous population of mature lymphocytes with chylomicrons without suspected malignant cells (Giemsa stain, at 40x magnification)

Conclusion

Generalized lymphangiomatosis is an uncommon disease in children and young adults. Delayed diagnosis or misdiagnosis is quite common due to its rarity and nonspecific clinical presentation. Radiological examination is crucial for early

diagnosis. Radiologists should keep in mind its imaging characteristics in order not to miss this rare entity.

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