Erdheim-Chester Disease: A Case Study

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Introduction

Erdheim-Chester disease (ECD) is a rare form of non-Langerhans histiocytosis of unknown etiology with a wide range of systemic manifestations and poor spontaneous prognosis. Less than 400 cases have been reported worldwide. First described in 1930, this disease is pathologically characterized by tissue infiltration of lipid-laden histiocytes. Radiographical manifestation of ECD includes symmetric medullary sclerosis of the bone, with predilection for the appendicular skeleton, particularly the long bone diaphyses of the upper and lower extremities. Diagnosis of ECD is based on biopsy for histology assessment and bone scan for radiological osteosclerosis (Figure 1).

ECD typically affects adult patients in their fifth decade, although children as young as four years old may get the disease.

Common sites of involvement include the peripheric soft tissues, medistinum, and pulmonary interstitium, with subsequent renal failure, cardiomyopathy, and respiratory failure from interstitial lung disease. The pattern of interstitial lung disease involves diffuse interstitial septal thickening, peribronchovascular thickening, centrilobular nodular opacities, and pleural effusion due to interstitial histiocytic infiltration and fibrosis. Other clinical presentations include bone pain due to bone marrow infiltration, exophthalmos, xanthelasma, perirenal or ureteral obstruction, renal failure from retroperitoneal fibrosis, dysneea, pneumothorax, diabetes insipidus, hypopituitarism, and pericardial effusion.

ECD of the central nervous system is especially debilitating. Patients can present with ataxia, dizziness, dysarthria, dysmetria, dyssyndochinexia. Lesions in the cerebral hemispheres, hypophysis, cerebellum, brain stem, and meninges are seen in ECD. To date, there is no cure for ECD. Treatment options include immunosuppressant, chemotherapy, and radiation therapy. The current recommended first line treatment for ECD is interferon α.

Materials and Methods

Tissue Samples and Immunohistochemistry

Biopsies were obtained from the lungs, the brain, and the bone at different years since the onset of the patient’s symptoms. Bone biopsy was stained for both S-100 protein and CD68.

Radiographic Studies

X-ray, CT, bone scan, and MRI imaging studies were used to assess the skeleton, the central nervous system, and the pulmonary system.

Other Diagnostic Tests

Lung function was assessed using pulmonary function tests. Differential workup for lymphangioleiomyomatosis (LAM), neurofibromatosis, syringocystis, cryptococcosis, histoplasmosis, coccidioidomycosis, Lyme disease, systemic lupus erythematosus (SLE), Epstein-Barr Virus, Tuberous Sclerosis, multiple sclerosis and sarcoidosis were undertaken.

Results

Histological Findings

- Lung biopsy - 2007 VATS lung biopsy at ST. Luke’s Hospital: inconclusive, negative staining for lymphangioleiomyomatosis (LAM)
- Brain biopsy - 2006 craniotomy for resection of benign venous angiomata: inconclusive: 2009 cerebellum and brain stem: positive staining for CD68, positive staining for Ki-67 (proliferation)
- Bone biopsy - 2011 biopsy of the right distal femur: negative staining for S-100, CD68 staining inconclusive

Radiological Findings

- Lungs – multiples cysts and bullae.
- Brain – slightly left-sided lesion (16 mm sagittal, 14 mm AP, 14 mm transverse) along the postero medial brachium pontis extending to ventral midbrain and right superior cerebellar peduncle with mass effect upon right lateral margin of fourth ventricle, volume loss within posterior fossa (Figure 2).
- Bones – bilateral and symmetric increased radiotracer uptake within the metaphysis of the proximal humerus, proximal femur, distal femur, and proximal tibia on bone scan (Figure 3).

Discussion

Erdheim-Chester Disease is the most likely diagnosis given the patient’s clinical presentation and laboratory results at this time. The patient’s clinical condition continues to deteriorate. Efforts are now underway to secure a third brain biopsy which we hope will clarify and finalize this diagnosis.

References


