

Temple PM&R Case of the Week

56-year-old white male presented to the hospital with ascending paralysis.

MRI of the Lumbar Spine was conducted



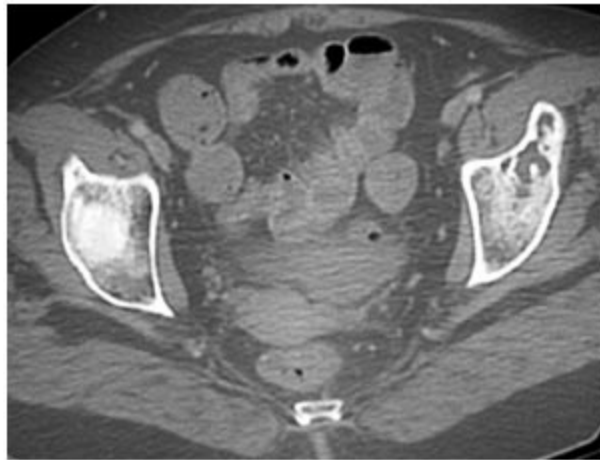
What do you see on the MRI?

What is your differential diagnosis?

Further history of the illness was investigated.

Initially, the patient noticed foot dropping, and then felt weakness spreading over his legs to his thighs, leading to difficulty walking. He also noticed weakness in his hands with difficulty holding objects and writing. His weakness in his legs has been associated with numbness in his feet, denies parasthesias. The patient noted mild abdominal pain, no diarrhea. Patient did state that he has been having problems with penile erections, denies urinary or bowel incontinence. Patient denies any recent infections or recent travels.

CT Scan of Abdomen/Pelvis was conducted.



Further testing revealed these results:

Lumbar puncture = CSF normal

Heavy Metal Screen = Negative

Porphyria Screen = Negative

Connective Tissue Disorder Screen (ANA, dsDNA, SSA, SSB) = Negative

Hormone Levels = Low Testosterone and High TSH

Immunoglobulin Test = High IgG

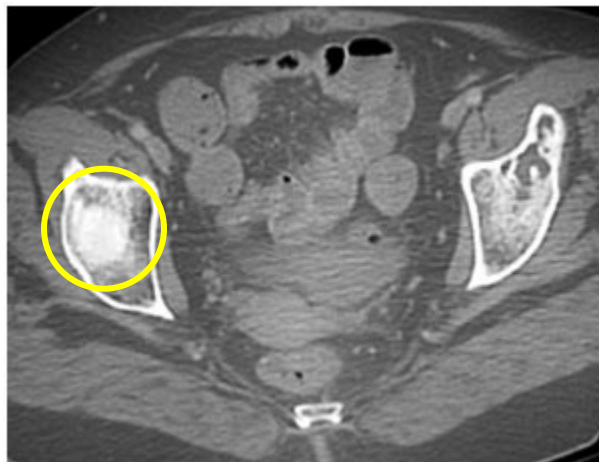
Protein Electrophoresis = M-protein spike

EMG/NCS = Severe axonal polyneuropathy with demyelinating features at the lower extremities. Needle electromyography demonstrated distal fibrillation potentials.

What is your differential diagnosis now?



MRI L-Spine = Multilevel DJD, large disc bulge at L5-S1



The CT abdomen/pelvis scan shows a lytic acetabular lesion with irregular sclerotic margins (yellow circle). In addition, hepatomegaly was also seen on CT.

Bone Marrow Biopsy = 6% plasma cells

Tumor Biopsy = monoclonal plasma cells (plasmacytoma)

Diagnosis

POEMS Syndrome

High Yield Facts

- Characterized by **P**olyneuropathy, **O**rganomegaly, **E**ndocrinopathy, **M**onoclonal gammopathy, and **S**kin changes.
- Polyneuropathy is the most common symptom with both motor and sensory deficits are reported and are characterized by distal, symmetric, and progressive involvement associated with gradual proximal spread.
- POEMS syndrome is almost always associated with sclerotic myelomatous bone lesions.
- Hepatomegaly, splenomegaly, and/or lymphadenopathy are present
- Skin manifestations present with diffuse hyperpigmentation and lower extremity edema are seen in more than 90% of patients.
- EMG/NCS exhibit findings consistent with polyneuropathy, prominent demyelination, and features of axonal degeneration (slowing of nerve conduction, prolonged distal latencies, and severe attenuation of compound muscle action potentials)
- Treatment involves radiation therapy and chemotherapy.

Discussion

POEMS syndrome, also known as the Crow-Fukase syndrome or osteosclerotic myeloma, is a rare multisystemic disease that occurs in the setting of a plasma cell disorder with characterization of polyneuropathy, organomegaly, endocrinopathy, monoclonal gammopathy, and skin changes.

The pathogenesis of this syndrome is not clear. The suggested pathogenesis is minute changes in the vessel wall leading to increased vascular permeability, which this is probably mediated by cytokines, such as VEGF. Due to the uncertainty of the pathogenesis, treatment strategies and prognosis are heterogeneous. No discrete diagnostic criteria exist, but at least one small series of patients with clinically diagnosed POEMS syndrome suggested a set of major and minor criteria for diagnosis. The proposed major criteria included polyneuropathy and a clonal plasma cell proliferative disorder, both of which, in addition to one minor criterion, were proposed necessary for diagnosis. Although the five syndrome components are essential for absolute diagnosis of POEMS syndrome, varying combinations of symptoms are present in many reported cases.

Polyneuropathy is the most common symptom and is required for the diagnosis of POEMS syndrome. Most patients with this symptom have symmetrical motor and sensory deficiency in the extremities. It usually starts in the lower extremities with progressive proximal extension. Decreased deep tendon reflexes associated

with various combinations of sensory symptoms are found. EMG shows signs of both demyelination and axonal degeneration. Nerve conduction abnormalities exhibit characteristic patterns that can be summarized by a number of features including (1) slow nerve conduction diffusely distributed in the intermediate nerve segment, (2) relatively preserved nerve conduction near the distal nerve terminals, (3) prominent axonal loss in distal lower extremity nerves, and (4) no conduction blocks (5) lower limbs having absent or attenuated amplitudes of compound muscle action potentials and absent sensory nerve action potentials compared with upper limbs. Distal fibrillation potentials are found on needle electromyography. These features are useful in differential diagnosis of POEMS syndrome from chronic inflammatory demyelinating polyneuropathy (CIDP), where CIDP has the presence multifocal conduction blocks. Nerve biopsies usually reveal evidence of both axonal degeneration and demyelination, characterized by uncompact myelin lamina without immunoglobulin deposition and minimal cellular infiltration.

Organomegaly involving the liver occurs with varying nonspecific pathologic features. In addition, the presence of splenomegaly or lymphadenopathy is also seen. **Endocrinopathy** usually manifests as impotence and gynecomastia. Other disturbances include diabetes mellitus, hypothyroidism, hyperprolactinemia, and amenorrhea. **Monoclonal gammopathy** or monoclonal plasma cell disorder is present in patients with POEMS. The presence of a monoclonal immunoglobulin in the serum or urine, or increased numbers of monoclonal plasma cells in biopsy specimen of the bone marrow or osteosclerotic lesion demonstrates monoclonal gammopathy. **Skin manifestations** present with diffuse hyperpigmentation and lower extremity edema are seen in more than 90% of patients.

Imaging: Plain film radiographs are useful for locating lytic bone lesions caused by osteosclerotic myeloma. At least 95% of patients have osteosclerotic lesions, with more than half the patients having multiple lesions. Both osteosclerotic and osteolytic lesions may be present and may be of modest size.

Treatment: Radiation therapy to the osteosclerotic lesions has been beneficial, where systemic and skin symptoms and even polyneuropathy improve. In addition, chemotherapy (melphalan and prednisone) is administered in patients with widespread osteosclerotic lesions. Often times, concurrent treatment is applied to POEMS patients.

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