

ABSENT BONE MARROW EDEMA ON MRI IMAGING IN A PATIENT WITH ACUTE VCF. IMPLICATIONS FOR VERTEBRAL AUGMENTATION THERAPY.

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Introduction

- Early minimally- invasive interventions in the form of percutaneous vertebral augmentation (PVA) (percutaneous vertebroplasty or balloon kyphoplasty) in patients with vertebral compression fractures (VCF), have been shown to improve patients' pain levels, functional outcomes, quality of life, and may confer mortality benefit.^{1,2,5,6}
- Bone marrow edema seen on MRI imaging has been the most important indicator of the acuity of vertebral compression fractures (VCF).
- We present the case of the absent bone marrow edema in a multiple myeloma patient with acute vertebral compression fracture.

The Case

- 49-year-old female with a past medical history of hypertension and multiple myeloma presented with acute mid-back pain present for 1 month.
- Diagnosed with multiple myeloma one year ago and was undergoing chemotherapy treatment.
- Acute onset pain located in the mid-back without radiation to the chest, abdomen, or lower extremities. No recent falls or injuries. The pain was constant and worsened with standing and walking. Patient denied any extremity weakness.
- Physical examination demonstrated percussion tenderness over the lower thoracic spine and 5/5 strength throughout.

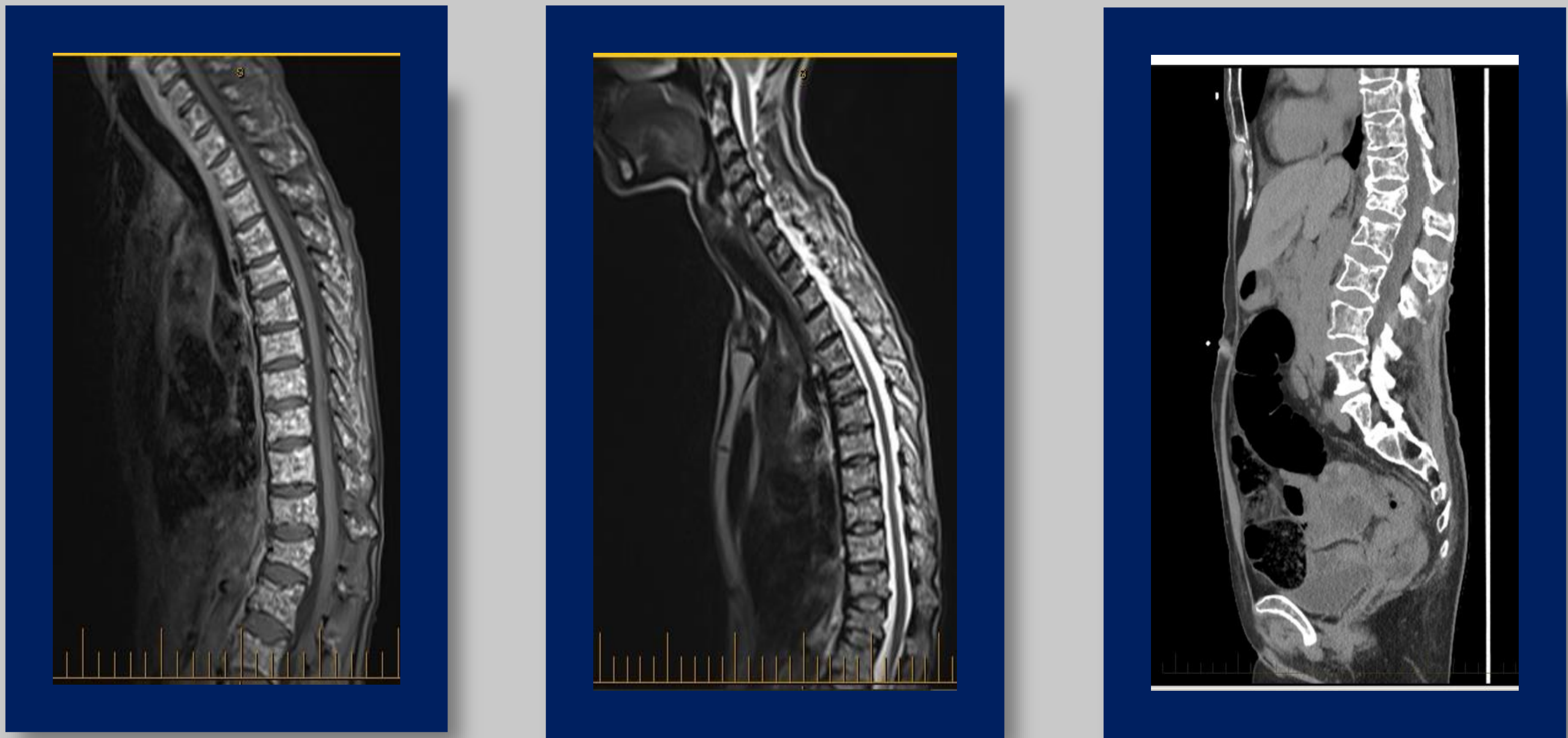
Diagnosis

- Thoracic MRI demonstrated compression fractures at T4, T5, T6, T9, T11, T12, and L1.
- Diffuse heterogeneous marrow signal, punctate T1 hyper intensities and diffuse heterogeneous enhancement throughout the vertebral bodies consistent with myeloma were noted.
- No bone marrow edema was noted and all fractures were determined to be chronic.

Imaging 1 month prior



Imaging on presentation



Treatment

- The patient had undergone several imaging studies one month prior including lumbar and thoracic CT scan and lumbar MRI.
- The most severe fractures located at T11 and T12, were new from one month prior.
- The patient attempted physical therapy however was unable to participate due to severe pain and was on chronic high dose opioid medication due to cancer related pain.
- Patient underwent two level kyphoplasty at T11 and T12 one week later without complication. The patient tolerated the procedure well and had significant, continued pain relief in the lower thoracic spine upon follow-up.

Discussion

- Normal bone marrow signal intensity represents an old/chronic fracture, whereas decreased T1 signal or increased T2 signal represents acute or sub acute fracture, given increase in local water /blood content of the bone.^{3,4}
- Our patient had no discernible bone marrow edema on MRI and fractures were deemed chronic, therefore not amenable to PVA.
- Clinical presentation and available prior imaging, led the treatment team to conclude that patient sustained acute VCF despite the absence of vertebral bone marrow edema on MRI.
- Given the paucity of pathophysiologic explanation, we can only speculate about such an unusual acute VCF presentation in patients with multiple myeloma
- Whether it is the specific disease -related process that inhibits the development of well-visualized bone marrow edema, the type of chemotherapy patient was receiving, or patient -specific factors, remains unknown
- Further research is needed to elucidate the mechanisms responsible for such phenomena

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