



A Multidisciplinary Approach to Pain and Function: A Case of Osteomalacia Secondary to a Cervical FGF23 Mesenchymal Tumor

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Introduction

- Tumor induced osteomalacia (TIO) is a rare paraneoplastic syndrome resulting in diffuse osteomalacia secondary to fibroblast growth factor 23 (FGF23) overexpression often presenting with recurrent insufficiency fractures¹
- It is characterized by renal wasting of phosphate leading to hypophosphatemia and reduced 1,25-dihydroxyvitamin D3 synthesis²
- Time from symptom onset to tumor identification is often lengthy (average 5 years) which can lead to prolonged suffering³
- Surgical excision of the associated tumor often leads to resolution of symptoms⁴

Case Description

- A 66 y/o male with a significant history of chronic pain secondary to osteoarthritis, severe diffuse degenerative disc disease and osteoporosis with recurrent bilateral lower extremity stress fractures presented to the pain clinic
- Pain and functional status had recently worsened which forced him to retire on disability and utilize a walker for ambulation
- PET/CT scan for suspected insufficiency fractures demonstrated a somatostatin receptor 2 (SSRT2) expressing lytic lesion at his C2 vertebrae indicative of a FGF23 positive mesenchymal tumor. Multiple insufficiency fractures were also noted (**Image 1**)
- MRI confirmed a mass in C2 with no cord compression (**Image 2**)
- Initial lab abnormalities included hypophosphatemia at 1.7 mg/dL (normal 2.3-4.7), FGF23 elevated at 281 pg/mL (normal < 59) and vitamin D3 deficiency 19.3 pg/mL (normal 19.9-79.3)
- Neurosurgery deferred surgical intervention due to poor bone quality and high risk of instrumentation failure
- The patient underwent 3 rounds of stereotactic body radiation therapy (SBRT) in addition to a transoral C2 vertebroplasty at the site of lytic vertebral destruction (**Image 3**)
- Cervical pain persisted and thus endocrinology recommended burosumab treatment which reduced pain and improved functional status
- Most recent labs demonstrated a resolution of Vitamin D3 deficiency (96.1 pg/mL) and hypophosphatemia (3.3 mg/dL), in addition to improving FGF23 (88 pg/mL)

Optimal pain management in challenging oncologic cases requires a tailored multidisciplinary and multimodal approach.

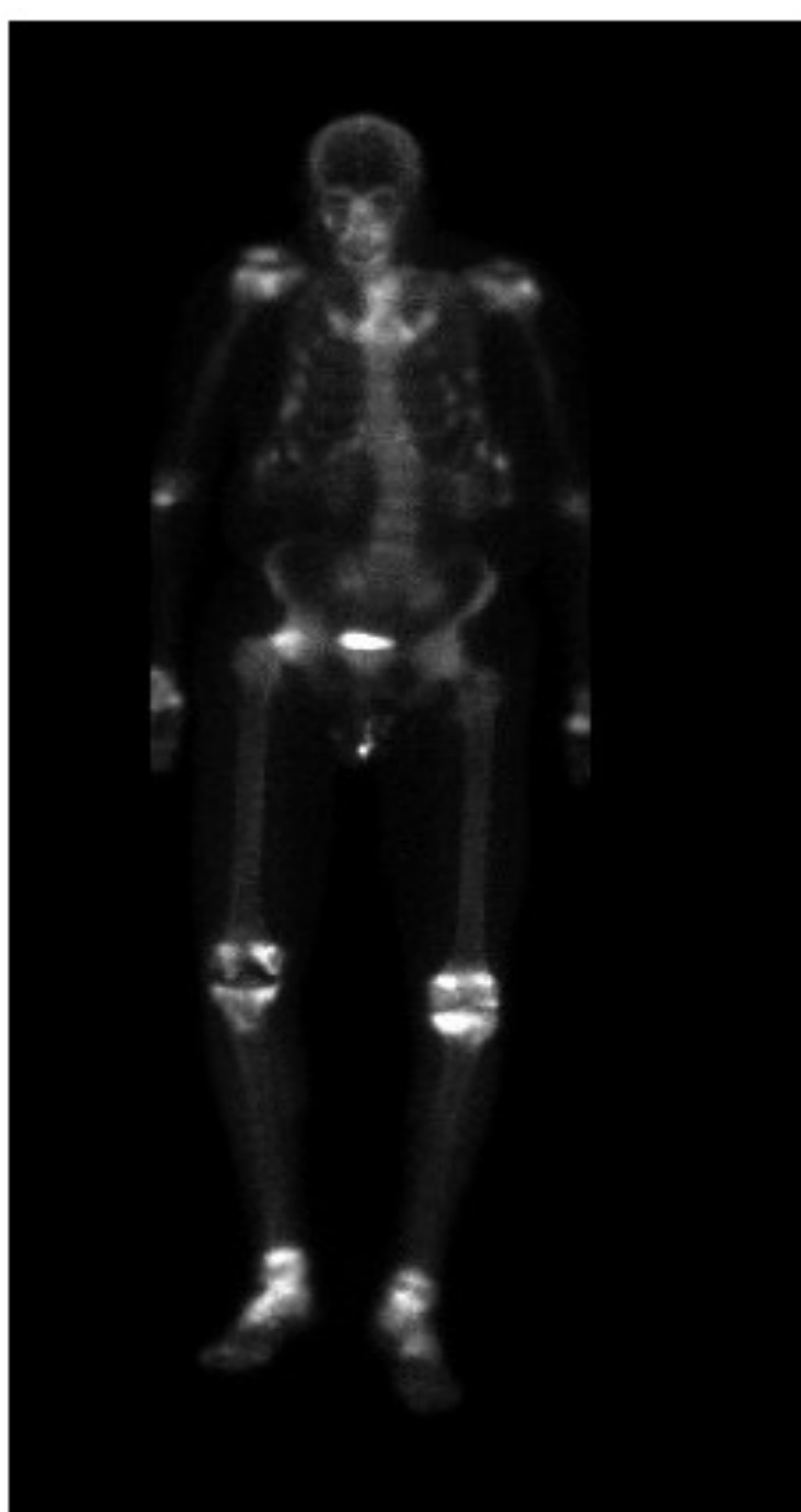
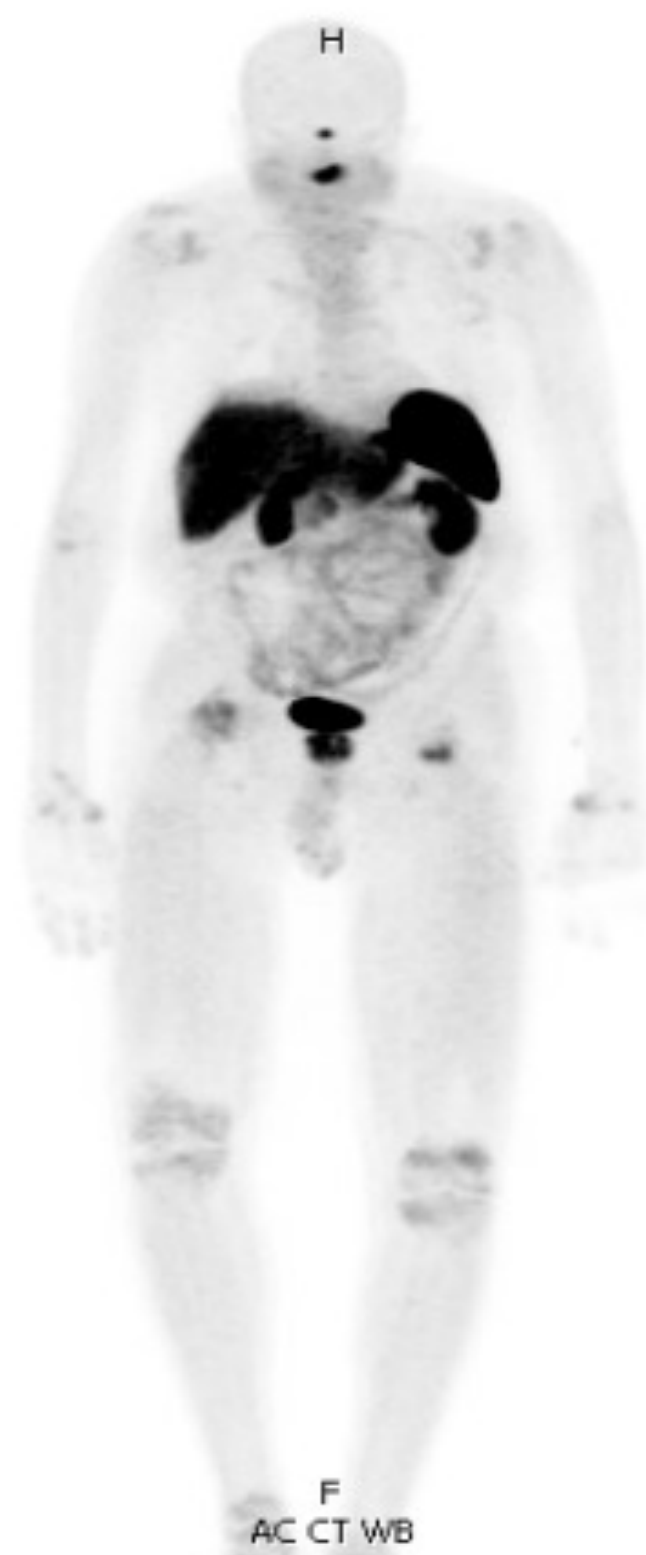


Image 1: PET/CT (L) and NM Bone Scan (R) - L: SSRT2 expressing lytic lesion C2 vertebral body and left pedicle R: Increased uptake in the right femoral head, bilateral feet and ribs demonstrating insufficiency fractures.

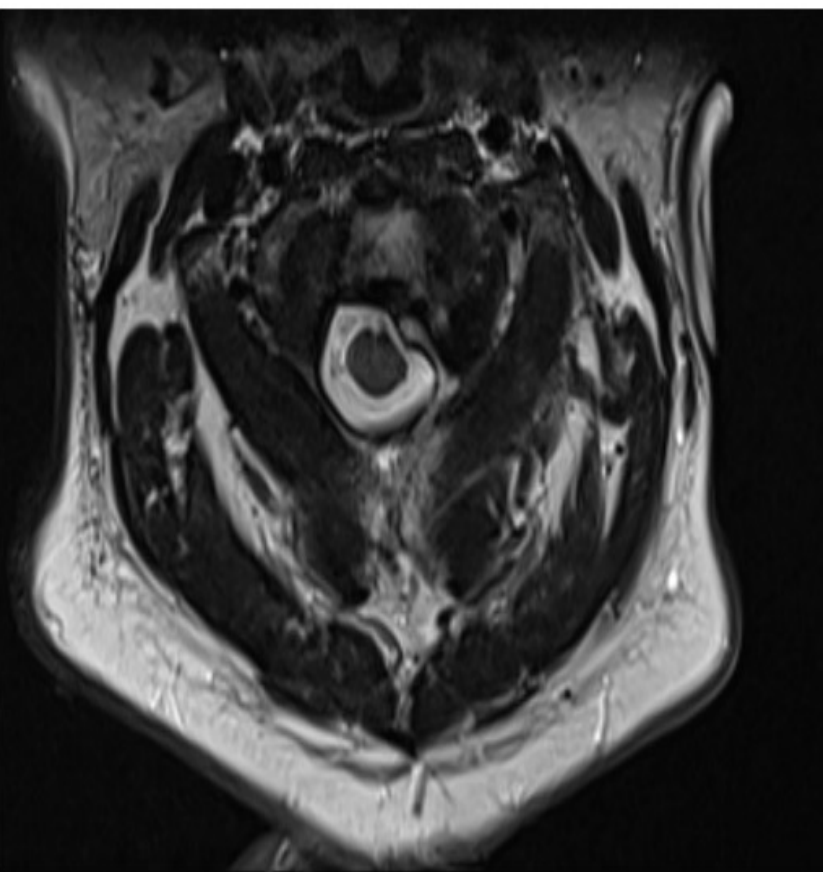
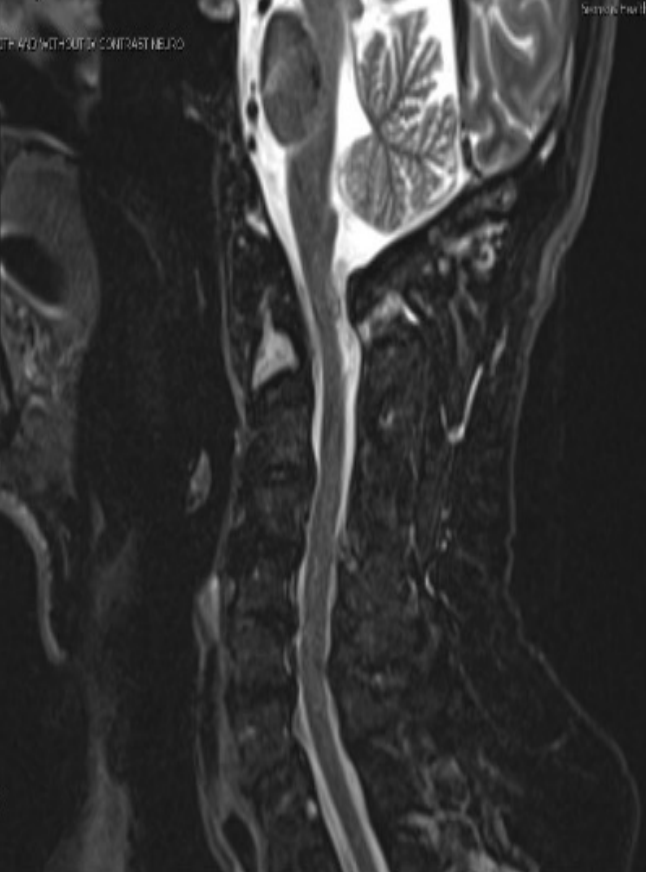


Image 2: MRI Sagittal Stir (L) & T2 Axial (R) - Demonstrating an enhancing mass in the body of C2 involving the dens and left lateral recess with mild epidural extension into the spinal canal and possibly the left neural foramen. No cord compression.

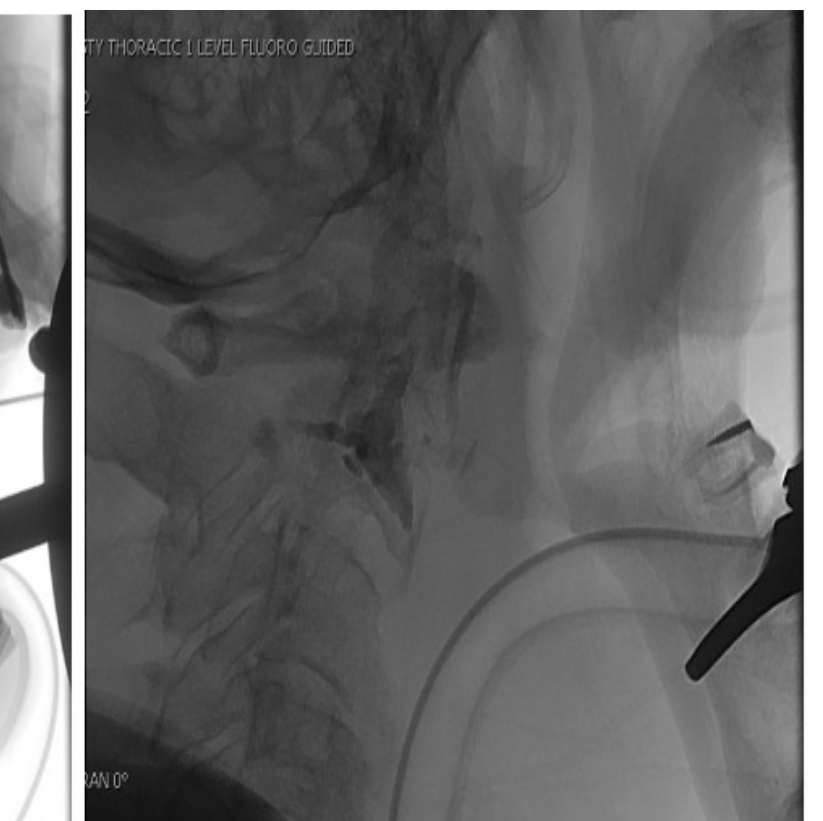


Image 3: Fluoroscopy Cervical Spine - Demonstrating C2 vertebrae pre (L) and post (R) vertebroplasty

Discussion

- TIO can be a particularly painful oncologic condition due to recurrent insufficiency fractures, generalized bone pain, muscle weakness and prolonged time to identification
- While surgical excision is often curative, in select inoperable cases such as this, a multidisciplinary and multimodal approach tailored to the patient is warranted for optimal pain management
- Alternative treatment strategies such as radiotherapy are novel and only discussed in case reports detailing similar inoperable tumors causing TIO⁴, we urge more investigation into such modalities
- SBRT was offered in conjunction with a vertebroplasty in order to preserve vertebral architecture
- Burosumab, an anti-FGF23 monoclonal antibody, has been utilized in similar cases of inoperable TIO⁵
- Significant pain relief was achieved with these modalities and the patient continues ongoing care with physiatry for functional optimization

References

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