Growing Pains: *A Case Report on the Impact of Heterotopic Ossification on SCI Rehab Course*

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Introduction

- Heterotrophic ossification (HO) is extra-osseous bone formation in the soft tissues and muscle *(greek roots "hetero" and "topos," meaning "other place").*
- HO most commonly occurs in sites predisposed to trauma, such as the pelvis, shoulders, elbow, head and neck.
- Following tissue injury, an influx of inflammatory cells and subsequent downstream signaling causes activation of osteogenic or osteochondrogenic processes.
- In early stages, HO presents as localized pain and swelling. In later stages, ROM of joints may become restricted due to gradual maturation of bone tissue.
- Those most commonly affected by nongenetic heterotopic ossification are young men, age 20-30, following trauma or surgery.
- Patients with traumatic brain, spinal cord injury, and other neurologic disorders are at increased risk, with up to 50% occurrence in the spinal cord injury population.

Case Description

- 24-year-old male presented to the hospital following GSW to the chest and subsequent fall downstairs in his home.
- On arrival, patient had bilateral upper extremity weakness and inability to move lower extremities.
- CT C-spine significant for C7 and T1 facet fractures. Patient diagnosed with C4 ASIA B incomplete tetraplegia and transferred to inpatient acute rehab.
- During rehab course, patient began to endorse bilateral hip and left knee pain with passive ROM, limiting participation in therapy.
- XR showed calcifications around lateral aspects of hips, and between proximal shaft of left tibia and fibula, consistent with heterotopic ossification.
- Patient started on indomethacin with pain relief, however it was discontinued after 2 weeks due to anemia.
- CT pelvis one month later with progression of HO in bilateral hips. Patient to follow up with orthopedics for surgical reconstruction upon discharge from acute rehab.

Figure 1:
XR pelvis (initial imaging). No evidence of heterotopic ossification identified.

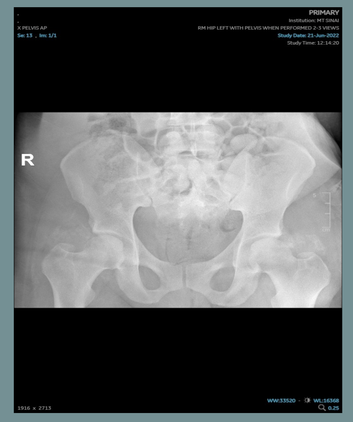

Figure 2:
XR pelvis (one month after initial imaging). Evidence of interval development of calcifications around the lateral aspect of both hips, left more than right, most consistent with heterotopic ossifications.

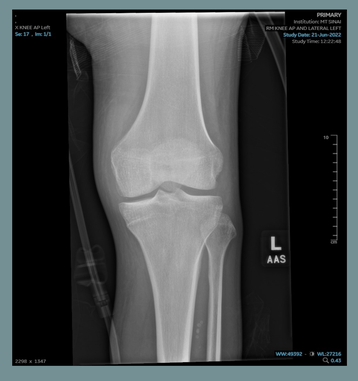

Figure 3:
XR L knee, AP view (one month after initial imaging). Multiple well-corticated calcifications projected in the soft tissues in between the proximal shaft of left tibia and fibula.

Figure 4:
XR L knee, lateral view (one month after initial imaging). Additional similar rounded calcifications project anterior to the proximal tibia.

Discussion

- Plain radiographs are specific for HO, showing circumferential bone formation with a radiolucent center; however, XR is not sensitive in early stages of the disease, and may not be positive until 3-4 weeks after HO appears on bone scan.
- Thus, triple-phase bone scan is the most sensitive imaging for diagnosis of HO, revealing findings as early as 2.5 weeks post-injury.
- Prophylactic treatment includes gentle ROM exercises, spasticity control, low-dose radiation, and NSAIDs, specifically Indomethacin.
- Etidronate was previously shown to be effective in halting the progression of HO, however, was discontinued in the US.
- Definitive treatment of symptomatic HO is limited, and typically requires surgical excision of ectopic bone only once matured to limit the risk of possible recurrence.
- Referral for surgical excision should be considered if HO is limiting a patient's overall function, mobility, or ADLs.
- Patients in acute rehab with active HO may receive limited therapy due to reduced ROM, are at increased risk of pressure injuries, and require more accommodations with equipment, such as wheelchairs with a wider seat-to-back angle.
- This increases cost and complicates discharge for this patient population.

Conclusion

Patients in the acute rehabilitation setting are at increased risk of heterotopic ossification, as a majority of this population are post-trauma or surgery. Thus, awareness of HO and education on its prevention and treatment is essential.

References

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