The Utility of Three-Phase Bone Scintigraphy in the Diagnosis and Evaluation of Complex Regional Pain Syndrome: A Case Report

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Introduction

Complex regional pain syndrome (CRPS) is characterized by diffuse regional limb pain with sensory, vasomotor, and motor changes.

Three-phase bone scintigraphy (TPBS) may support the clinical diagnosis, but its diagnostic performance varies.[2,3]

Case Report

A 52-year-old man with a history of right basal ganglia stroke developed **persistent left hand and wrist pain** after a ground-level fall. Initial radiographs were negative.

The patient endorsed 10/10 left hand and wrist pain with allodynia, hyperalgesia, edema, erythema, reported temperature asymmetry, weakness, and restricted hand function.

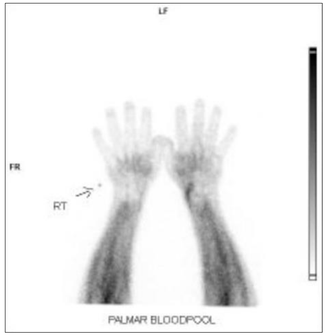
The patient's symptoms were refractory to gabapentin, pregabalin, topical therapies, physical therapy, massage, acupuncture, and two stellate ganglion blocks.

MRI showed flexor carpi radialis fluid, flexor tenosynovitis extending into the carpal tunnel, and a subtle extensor carpi radialis longus split tear. These findings prompted hand-specialist referral and further diagnostic evaluation.

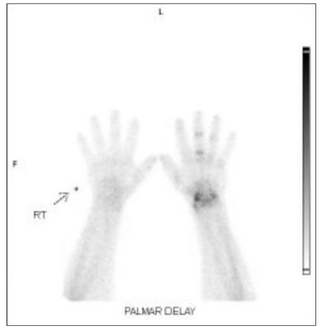
Treatment & Outcome

After TPBS supported the diagnosis, left infraclavicular brachial plexus peripheral nerve stimulation produced a reported 80% improvement in pain. Pain was 3–4/10 at follow-up, with residual finger and wrist edema.

Three-Phase Bone Scintigraphy



A Blood pool · palmar view



B Delayed · palmar view



C Delayed · oblique view

Figure 1. Blood-pool images show increased left wrist and palm hyperemia. Delayed views show focal uptake at the left wrist and interphalangeal joints compared with the right.

Increased uptake across all three phases supported the clinical diagnosis of CRPS.

Discussion

TPBS provides adjunctive evidence when periarticular uptake is increased, particularly when structural abnormalities complicate evaluation.[1,3]

A systematic review found lower sensitivity when Budapest criteria served as the reference standard, while specificity remained comparatively high.[2]

In 41 patients, including 26 meeting Budapest criteria, TPBS had an **AUROC of 0.560 (95% CI 0.400–0.721)** and did not demonstrate significant diagnostic discrimination.[4]

A positive TPBS can support CRPS but cannot independently establish the diagnosis. Other imaging modalities such as infrared thermography may provide additional diagnostic confidence.

Conclusion

TPBS can help corroborate a clinical diagnosis of CRPS in a medically complex patient with refractory limb pain and competing structural findings. Imaging should be interpreted alongside the clinical presentation.

Methods & Ethics

Focused PubMed/MEDLINE review of TPBS diagnostic utility in CRPS. Patient consent obtained. The de-identified case was exempt from IRB review under UCI policy. No off-label indications included.

References

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CRPS, complex regional pain syndrome; TPBS, three-phase bone scintigraphy; MRI, magnetic resonance imaging; IRB, institutional review board.