

Evidence Discussion (NUCLEAR MEDICINE Guidelines SP-17)

The American College of Radiology Appropriateness Criteria for low back pain (revised 2021) [1] states that CT or MRI imaging may be considered for patients with spinal issues who have had failed at least 6 weeks of medical management or physical therapy. For most patients with spine issues, MRI and or CT is the study of choice after failed conservative treatments. There is no relevant literature to support the use of bone scan with single-photon emission CT (SPECT) or SPECT/CT in the initial evaluation of acute uncomplicated LBP.

Given the risk of radiation from nuclear medicine imaging it is important to carefully select the proper patient indication. Based on American College of Radiology Appropriateness Criteria for low back pain (revised 2021) and also supported by literature nuclear medicine is used infrequently but is supported for the following indication:

- Structures with abnormal morphology on conventional imaging may not be the cause of LBP. Evidence suggests possible utility of bone scan with SPECT or SPECT/CT as a functional modality to localize the source of LBP, particularly for facet arthropathy [2].
- SPECT bone scan is the reference standard for detection of radiographically occult active spondylolysis in the young patient [3].
- Bone scan with SPECT/CT is usually not used for initial imaging but can be useful for radiographically occult fractures and can be used to evaluate acuity of vertebral fracture.
- Bone scan can be used for suspected loosening of orthopedic implants and failed fusion surgery, when recent plain x-ray is nondiagnostic. MRI evaluation of these patients can be significantly limited due to metal artefact from the implants.
- Bone scan and WBS labeled scans can be used for suspected spinal osteomyelitis.

REFERENCES

1. Patel ND, Broderick DF, Burns J, et. al. Expert Panel on Neurologic Imaging. ACR Appropriateness Criteria® : Low Back Pain. American College of Radiology (ACR); Date of Origin: 1996. Revised: 2021. <https://acsearch.acr.org/docs/69483/Narrative/.29>.

2. Russo VM, Dhawan RT, Baudracco I, Dharmarajah N, Lazzarino AI, Casey AT. Hybrid Bone SPECT/CT Imaging in Evaluation of Chronic Low Back Pain: Correlation with Facet Joint Arthropathy. *World Neurosurg* 2017;107:732-38.

3. Matesan M, Behnia F, Bermo M, Vesselle H. SPECT/CT bone scintigraphy to evaluate low back pain in young athletes: common and uncommon etiologies. *J Orthop Surg Res* 2016;11:76