

## The Value of Bone SPECT/CT in Bony Metastatic Disease

Standard bone scanning has long been regarded as a sensitive tool for the investigation of bony metastases. The advantages of this technique are covered in Panel 1 (right). However, while it is a sensitive technique, the specificity can be an issue as the bone scan detects increased osteoblastic activity but not necessarily the cause of the increased activity. Panel 2 includes a variety of conditions that may look similar on the bone scan.

Previously, we have relied on performing conventional “hot spot” x-rays or CT scans to resolve these diagnostic dilemmas. As our gamma cameras now have the capability of SPECT/CT, we are in a unique position to combine the high “sensitivity” of the bone scan with a high “specificity” of the fused SPECT/CT data to make a diagnosis at the time of the nuclear medicine investigation, without the need for additional imaging +/- visits and time delays in arriving at the correct diagnosis.

A number of studies have been published in recent times demonstrating the value of SPECT/CT in this situation. All have shown that SPECT/CT dramatically reduces the number of equivocal/indeterminate bone scans.

Sharma et al (2013)(1) looked at 99 pts with 108 isolated vertebral lesions visible on planar imaging. 49/108 were considered indeterminate on planar scintigraphy, but with the addition of SPECT/CT only one was still indeterminate.

Palmedo et al (2014)(2) looked at 308 patients with either breast or prostate cancer. Specificity and PPV were significantly better with SPECT, with downstaging possible in 32.1%. Further diagnostic imaging procedures for unclear scintigraphic findings were necessary in only 2.5% of patients.

### References

1. Sharma et al Diagn Interv Radiol 2013;19:33-40
2. Palmedo et al EuJNM 2014;41(1):59-67

This means that patients being evaluated for unexplained bony pain, particularly with a past history of cancer, are likely to have a definite assessment of the cause of their symptoms and whether bony metastases are present following a single nuclear medicine investigation.

### PANEL 1

#### Advantages of Bone Scanning in Metastatic disease

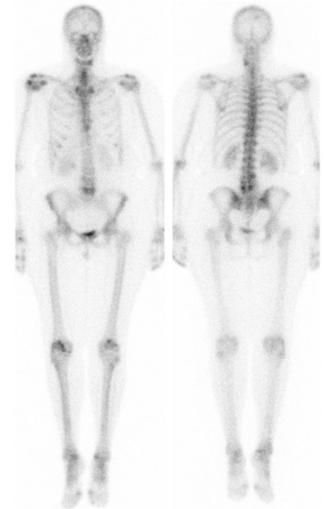
- + Whole body screening.
- + Good sensitivity.
- + Easy to compare with prior or future bone scans.
- + Easy to visualise.
- + Very low adverse event rate.
- + No issues with contrast allergy, renal impairment etc.

### PANEL 2

#### Conditions that may mimic bone metastases

- + Degenerative arthritis.
- + Trauma.
- + Infection/inflammation.
- + Paget's disease.
- + Benign bony lesions eg fibrous dysplasia, enchondromas, bone infarcts.

SPECT/CT increases the diagnostic accuracy of bone scans and significantly decreases the likelihood of a non-diagnostic study requiring further imaging.



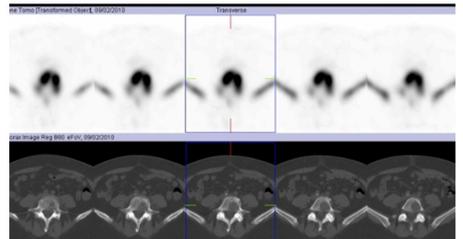
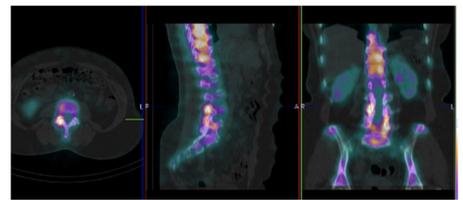
## Case Study 01

### Clinical History

- + 53 year old woman with newly diagnosed breast cancer
- + Describes non-specific aches and pains in the neck and lower back
- + Referred for exclusion of bony metastases

### Findings

- + The planar whole body images show widespread arthritic reaction
- + While some of the changes in the lumbar spine appear degenerative, there is a slightly atypical appearance of L5.
- + The SPECT/CT study was then performed while the patient remained on the scanning bed. This has confirmed facet joint arthritis at the L3/4 level on the right but in addition demonstrates a single "lytic" lesion in L5, with adjacent bony reaction



## Case Study 02

### Clinical History

- + Known Prostate cancer
- + Mild rise in PSA
- + Widespread aches and pains. ? degenerative, ? metastatic. For further evaluation

### Findings

- + The planar whole body images show multiple irregularities throughout the axial skeleton
- + The fused SPECT/CT images show that several osteoblastic abnormalities are associated with sclerotic foci on the low-dose CT images, indicative of prostate bony metastases, while other foci are related to degenerative activity

