Superscan on both $^{99m}$Tc-MDP and $^{153}$Samarium-EDTMP Bone Scans in a Patient with Breast Cancer

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Keywords: Super scan; Samarium bone scan; Breast cancer

Case Summary

A 64-year old woman with breast cancer was having severe exacerbating pain in her pelvic bones and lower extremities. She had a $^{99m}$Tc-MDP bone scan which showed diffuse osseous metastases in a "superscan" pattern.

Anterior and posterior whole body images of a $^{99m}$Tc-MDP bone scan show diffuse metastatic disease involving the entire axial and appendicular skeleton, a non-visible left kidney, a very faint right kidney and minimal tracer accumulation in the bladder, representing a superscan (a). A superscan is defined as a bone scan which demonstrates markedly increased skeletal radioisotope uptake relative to soft tissues in association with absent or faint genito-urinary tract activity [1]. While a superscan is relatively uncommon, its recognition is important, as it is associated with a number of important underlying diseases [2,3] (Figure 1a).

One month later the patient received 4.22 GBq (114 mCi) $^{153}$Samarium-EDTMP for palliation of severe bone pain. Post treatment, whole body $^{153}$Samarium scan was also a "superscan" showing very similar osseous metastases pattern to the $^{99m}$Tc-MDP bone scan. Anterior and posterior whole body images 24 hours after intravenous administration of $^{153}$Sm-EDTMP demonstrate diffuse osseous metastases in a very similar pattern with the prior bone scan. However on this scan both kidneys and the bladder were not visualized, consistent with a $^{153}$Sm-EDTMP superscan (b). $^{153}$Sm-EDTMP is used for relief of bone pain predominantly in breast cancer patients with painful osteoblastic skeletal metastases. $^{153}$Sm has a half life of 46.3 hours and has a 103 keV gamma emission, suitable for scintigraphic imaging. Superscans on the conventional bone scintigraphy have been described both in metastatic and metabolic bone diseases, with different patterns and appearances of radiotracer uptake [4-8] (Figure 1b).

Presence of "superscan" both on conventional $^{99m}$Tc-MDP bone scan and on the $^{153}$Samarium-EDTMP bone scan of the same patient with almost identical osseous metastatic pattern has yet not been reported. A superscan indicates the extensive presence of osseous metastases. A similar superscan pattern on both conventional and $^{153}$Samarium-EDTMP bone scans may indicate a better outcome for palliation of metastatic bone pain. All the lesions seen on conventional imaging will also be taking up the palliative bone treatment agent "$^{153}$Samarium-EDTMP", leading to efficient palliation of bone pain.

This case is unique with the presence of metastatic "superscan" both on conventional $^{99m}$Tc-MDP bone scan and on the $^{153}$Samarium-EDTMP bone scan of the same patient.

References


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Received February 05, 2012; Accepted April 02, 2012; Published April 08, 2012

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Figure 1: (a) Anterior and posterior whole body images of a $^{99m}$Tc-MDP bone scan.(b) Anterior and posterior whole body images 24 hours after intravenous administration of $^{153}$Sm-EDTMP.