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Tc-99m MIBI Scintigraphy to Differentiate Malignant from Benign Lesions, Detected on Planar Bone Scan

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Abstract : The aim of this study was to evaluate the effectiveness of Tc-99m MIBI (Technetium 99-methoxy-iso-butyl-isonitrile) scintigraphy to differentiate malignancies from benign lesions, which were detected on planar bone scans. Materials and Methods: 59 patients with bone lesions were enrolled in the study. The scintigraphic findings were compared with the clinical, radiological and the histological findings. Each patient initially underwent a three-phase bone scan with Tc-99m MDP (Methylene Diphosphonate) and if evidence of lesion found, the patient then underwent a dynamic and static MIBI scintigraphy after three to four days. The MDP and MIBI scans were evaluated visually and quantitatively. For quantitative analysis count ratios of lesions and contralateral normal side (L/C) were taken by region of interests drawn on scans. The Student T test was applied to assess the significant difference between benign and malignant lesions p-value < 0.05 was considered significant. Result: The MDP scans showed the increase tracer uptake, but there was no significant difference between benign and malignant uptake of the radiotracer. However significant difference (p-value 0.015), in uptake was seen in malignant (L/C = 3.51 ± 1.02) and benign lesion (L/C = 2.50±0.42) on MIBI scan. Three of thirty benign lesions did not show significant MIBI uptake. Seven malignant appeared as false negatives. Specificity of the scan was 86.66%, and its Negative Predictive Value (NPV) was 81.25% whereas the sensitivity of scan was 79.31%. In excluding the axial metastasis from the lesions, the sensitivity of MIBI scan increased to 91.66% and the NPV also increased to 92.85%. Conclusion: MIBI scintigraphy provides its usefulness by distinguishing malignant from benign lesions. MIBI also correctly identifies metastatic lesions. The negative predictive value of the scan points towards its ability to accurately diagnose the normal (benign) cases. However, biopsy remains the gold standard and a definitive diagnostic modality in musculoskeletal tumors. MIBI scan provides useful information in preoperative assessment and in distinguishing between malignant and benign lesions.

Keywords : benign, malignancies, MDP bone scan, MIBI scintigraphy
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