

Differentiation of Malignant Vertebral Collapse from Osteoporotic and Other Benign Causes Using Magnetic Resonance Imaging

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Abstract

Introduction: Elderly patients presenting with backache and vertebral collapse are a diagnostic challenge. Plain X-rays, computed tomography and radionuclide bone scans have not always reliably distinguished between benign and malignant causes. Magnetic resonance imaging (MRI) may be able to do so. **Materials and Methods:** Patients who underwent MRI evaluation for vertebral collapse were retrospectively studied. Over a 21-month period from January 1995 to September 1996, 47 patients with 58 vertebral collapses were studied. Benign and malignant aetiologies were established by serial imaging, clinical outcome and histology. Imaging was performed with T1 and T2-weighted sequences, with contrast enhancement in some patients. Collapsed vertebrae were examined for appearance of marrow on T1 and T2-weighted sequences and after contrast administration, signal intensity of adjacent discs, degree of marrow involvement, involvement of posterior elements, presence or absence of paraspinal mass and end-plate integrity. Agreement between the final and radiological diagnosis was evaluated. **Results:** There were 36 benign vertebral collapses (20 osteoporotic, 7 post-traumatic, 9 infective) and 22 malignant ones (20 metastatic carcinoma, 2 multiple myeloma). Features which pointed to malignant cause were hypointense marrow on T1-weighted images, marrow enhancement after intravenous contrast, greater than 50% marrow involvement and involvement of posterior elements. Of the vertebral collapses due to infection, 78% showed end-plate disruption. **Conclusions:** This study shows that MRI can be used to accurately differentiate between benign and malignant causes of vertebral collapse. Further differentiation between an osteoporotic, traumatic or infective cause can be done with the help of clinical history and evaluation of end-plate integrity.

Ann Acad Med Singapore 2002; 31:8-14

Key words: Compression fracture, Magnetic resonance imaging, Metastasis, Osteoporosis, Spine

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