

TITLE: MR imaging of bone marrow oedema associated with focal bone lesions

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ABSTRACT:

Aim: To identify the relationship between bone marrow edema pattern on MR imaging and histological diagnosis in a range of benign and malignant neoplastic and non-neoplastic focal lesions of bone.

Method: Ethics review board approval and informed patient consent was not required for this study involving retrospective image review. 392 of 1998 patients included on our Orthopaedic Oncology database between September 1998 and March 2005 demonstrated bone marrow edema and were included in the study. There were 227 males and 165 females, with patient age ranging from 1-87 years (Mean 29 years). MR images were retrospectively reviewed and assessed for the presence and extent of bone marrow edema. The amount of edema was graded: Grade 1 - edema present but smaller than the lesion size; Grade 2 - edema equivalent to the lesion size; Grade 3 - edema greater than the lesion size. Histological correlation of the nature of the lesion was obtained in benign and malignant neoplastic conditions.

Results: Where bone marrow edema was identified, there were 192 Grade 1 lesions of which 56% were malignant, 32% were benign and 12% were non-neoplastic; 74 Grade 2 lesions of which 19% were malignant, 50% were benign and 31% were non-neoplastic and 126 Grade 3 lesions of which 10% were malignant, 45% were benign and 45% were non-neoplastic. There was a significant relationship between edema grade and final diagnosis ($p < 0.0005$).

Conclusion: As the amount of bone marrow edema increases relative to the size of the underlying lesion, it is increasingly likely that the underlying lesion is benign.