Inter-observer Agreement in MRI Staging of Osteosarcoma: A Comparative Multicentre Study in Eswatini, 2008

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Abstract

Magnetic resonance imaging (MRI) is fundamental for the local staging of osteosarcoma, informing surgical strategy and prognosis. In resource-constrained environments, disparities in radiologist experience and imaging protocols may compromise the reliability of staging assessments, with potential consequences for patient care. This multicentre study aimed to measure the inter-observer agreement in MRI staging of osteosarcoma among radiologists at five tertiary oncology centres in Eswatini. The primary objective was to quantify concordance for key staging parameters: tumour extent, neurovascular involvement, and intra-articular extension. A comparative study was conducted. Pre-treatment MRI scans from a consecutive series of histologically confirmed osteosarcoma cases were independently reviewed by consultant musculoskeletal radiologists from each centre. Each radiologist completed a standardised proforma assessing defined staging criteria. Inter-observer agreement was analysed using Fleiss' kappa (κ) statistics for multiple raters. Overall inter-observer agreement was moderate (κ = 0.45). Agreement was substantial for determining the presence of a soft-tissue mass (κ = 0.65) but only fair for assessing subtle neurovascular bundle involvement (κ = 0.25). Discrepancies were most pronounced in judgements of intra-articular extension and epiphyseal invasion. Considerable variability exists in MRI interpretation for osteosarcoma staging among the radiologists studied. While agreement is acceptable for overt features, critical elements for surgical planning show poor concordance. The implementation of standardised MRI reporting protocols and targeted continuing professional development in musculoskeletal oncology imaging is recommended. Further research should investigate the clinical impact of staging discordance on surgical outcomes. Osteosarcoma, Magnetic Resonance Imaging, Neoplasm Staging, Observer Variation, Inter-observer Agreement, Eswatini This study provides the first multicentre data on inter-observer variability in osteosarcoma MRI staging within the region, highlighting specific areas of diagnostic inconsistency that require standardisation to improve care.

Keywords: *Inter-observer agreement, Osteosarcoma staging, Magnetic resonance imaging, Sub-Saharan Africa, Multicentre study, Diagnostic concordance*