

Imaging of Musculoskeletal Tumors with Anatomic, Functional and Metabolic Techniques: The Pre-treatment Setting

Laura M Fayad¹, Fillipo Del Grande², Ney Tatzawa-Shiga², Xin Wang³, Peter B Barker², Michael A Jacobs², John A Carrino², and David A Bluemke⁴

¹Radiology, Orthopaedic Surgery and Oncology, Johns Hopkins University, Baltimore, MD, United States, ²Radiology, Johns Hopkins University, ³Johns Hopkins University, ⁴Radiology, NIH

PURPOSE

The purpose of this exhibit is to examine the particular advantages associated with various anatomic, functional and metabolic MR imaging techniques used for the evaluation of musculoskeletal tumors for treatment planning. Although MR imaging plays a role in characterizing musculoskeletal lesions pre-treatment, its main role is in determining the extent of disease.

OUTLINE OF CONTENT

A. MR Imaging Pulse Sequences

A1. Anatomic sequences: T1, Fluid-sensitive, chemical shift imaging and static post-contrast imaging

A2. Functional sequences: Diffusion weighted and perfusion imaging

A3. Metabolic sequences: MR Spectroscopy

A4. Whole Body MR Imaging

B. Roles of MR imaging for treatment planning

B1. Detection

B2. Characterization

B3. Determination of extent of disease

SUMMARY

The role of MR imaging in the evaluation of musculoskeletal tumors continues to evolve as new techniques emerge. While conventional T1 and fluid-sensitive sequences are entirely sufficient to determine the location and extent of a lesion, quantitative methodologies (chemical shift imaging, perfusion imaging, DWI, MR spectroscopy) have become available and provide metrics that may advance the role of MR imaging for characterization. Tumor extent is well-evaluated on anatomic pulse sequences, but with the advent of whole body imaging, the roles of MR imaging now include detection.