



MSK

SY18-2

Advanced MRI of musculoskeletal tumors

In Sook Lee

Radiology, Pusan National University Hospital, Korea

MR imaging plays a major role in the workup and treatment of MSK tumors. It represents the imaging modality of choice in detection and characterization of MSK tumors, provides evaluation of tumor extent, guidance to treatment planning and is crucial in post-treatment assessment and surveillance. Anatomical imaging are used routinely in clinical practice in the MRI evaluation of MSK tumors, but are not able to accurately characterize many MSK lesions. Advanced MR imaging techniques interrogate tissues at a cellular level and include diffusion-weighted imaging (DWI), chemical shift imaging, dynamic contrast enhancement (DCE), and MR spectroscopy. Functional MR imaging can add to the specificity of interpretations, however, these sequences must always be interpreted in conjunction with routine anatomical imaging sequences.

It is important to understand which functional MR imaging techniques would be helpful in different situations, and to recognize limitations and technical considerations when employing these techniques. This lecture reviews each of these advanced MR imaging techniques with regard to detection and characterization of tumors, differentiation of benign from malignant lesions and tumor tissue from nontumor tissue, and assessment of response to treatment.

Important advantages of DCE imaging

- ; Tissue characterization, staging of local extent, identification of areas of viable tumor to guide biopsy, monitoring of preoperative chemotherapy, detection of residual or recurrent tumor, and distinguishing tumor from fibrosis

DWI

- ; quantitative and qualitative analysis of tissue cellularity and cell membrane integrity,
- ; highly cellular areas with restricted diffusion have lower ADCs than less cellular areas with higher ADCs.

Chemical shift MR imaging

- ; assess the relationship between the amounts of fat and water, differentiating malignant from benign processes
- ; infiltrative processes in the BM, lack of suppression of signal intensity on opposed-phase image

MR spectroscopy

- ; providing a means of molecular characterization of bone and soft tissue malignancies
- ; increased levels of choline compounds, a feature of malignancy

Keywords: Magnetic resonance imaging, tumors, dynamic contrast-enhanced perfusion imaging, magnetic resonance spectroscopy imaging, diffusion-weighted imaging, In-phase and opposed-phase imaging