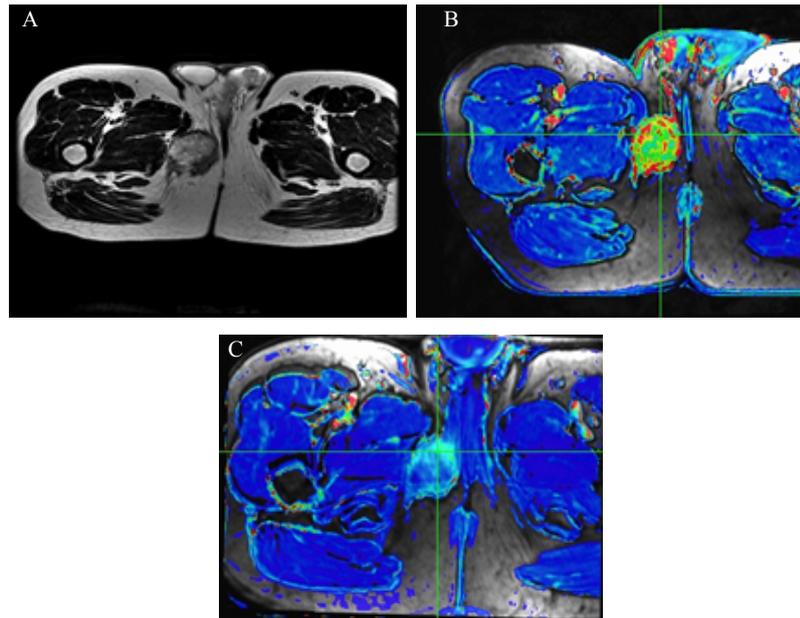


## Clinical case blog

### Title: Advanced Magnetic Resonance Imaging in Soft Tissue Sarcomas

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Dynamic Contrast-Enhanced Magnetic Resonance Imaging (DCE-MRI) is a promising imaging technique that permits indirect probing of the tumor microenvironment. We demonstrate the use of DCE-MRI in one patient with a stage III Soft Tissue Sarcoma (STS) of the right proximal medial thigh treated with preoperative radiation therapy (RT). The corresponding DCE-MRI parameter maps were used to assess the radiographic response following treatment.

As opposed to conventional, contrast-enhanced, morphological MRI, DCE-MRI allows for assessment of functional information and physiology of the entity examined through pharmacokinetic (PK) modeling of signals obtained from fast MRI sequences acquired prior to and throughout the course of intravenous gadolinium injection. PK parameters such as  $K^{trans}$ , which quantifies the rate of transendothelial movement of contrast from the blood plasma to the extracellular extravascular space, can provide useful information related to tumor perfusion and vascular permeability before and after therapy. DCE-MRI and its associated PK parameters have already been shown to be valuable in other sites and disease settings, such as breast cancer [1,2].

The present case demonstrates changes in tumor  $K^{trans}$  when compared before and one month after a course of RT. Figure 1A exhibits a T2-weighted image of the patient's STS. Figure 1B demonstrates high  $K^{trans}$  in the region of tumor, indicating high perfusion or vascular permeability. Figure 1C demonstrates a reduced post-treatment  $K^{trans}$  relative to the pre-treatment  $K^{trans}$  (similar window widths and levels were used for both Figure 1B-C).

Advanced imaging can play a critical role in assessment of tumor response to various therapies. In the present case, DCE-MRI demonstrates a measurable STS response when treated with preoperative RT. This MRI technique may be used to guide treatment decisions in other patients with this disease and may be a useful, minimally-invasive method to assess response to various therapies.

Figure 1A: T2-weighted image of a high grade STS of the right proximal medial thigh Figure 1B: Pre-treatment  $K^{trans}$  Figure 1C: Post-treatment  $K^{trans}$

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