

Magnetic resonance imaging (MRI) offers exceptional soft tissue contrast with good spatial resolution, but is increasingly being used to elicit insights on physiological and bio-molecular processes. Because of these features, MRI is being adopted as a tool, not only in the diagnosis of cancer, but also as an accessory for treatment planning and as a method for monitoring the efficacy of various cancer therapies.

This presentation will consider the use of MRI and focus on its expanding role with regard to cancer diagnosis and treatment. First, basic principles of how MRI contrast is manipulated will be reviewed. Then, specific examples showing MRI images of brain, breast, prostate and GI cancers will be presented. The utility of advanced methods including magnetic resonance spectroscopy (MRS), contrast-enhanced perfusion MRI and diffusion MR imaging for evaluating treatment efficacy will be discussed.

The utility of MRI as a tool for cancer treatment will then be presented. This will include a discussion of image registration methods, both rigid and deformable. Also the challenges of MRI artifacts that can hamper the use of MRI for treatment planning will be discussed and suggestions shall be made on how to alleviate these issues. Finally, the use of MRI for a variety of clinical presentations of cancer will be demonstrated through specific examples.

By the end of this session the attendee should:

1. be familiar with the basic concepts of MR imaging and how it can be used to facilitate the diagnosis of cancer.
2. understand the role of advanced MRI methods for following the efficacy of cancer therapy.
3. be aware of the utility of MRI as an aid to treatment planning and the pitfalls associated with its use.

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