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Technologist presentation

Non contrast vascular imaging techniques from the perspective of the MR technologist

Sara Powers

Address: Brigham and Womens Hospital, Boston, MA, USA

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Introduction

From the perspective of the MR technologist, non-contrast vascular imaging presents the opportunity to eliminate the cost and nephrotoxicity of gadolinium based contrast agents. At the same time, these new techniques have unique features that are important to master for successful integration to a vascular imaging program. This Case Report format describes various imaging techniques used for most patients. Patient considerations that require special attention will be highlighted.

Purpose

To provide teaching points for the MR technologist for non-contrast imaging. Several protocols will be described. The first is renal artery imaging based on ECG-gated 3D steady-state free precession imaging of un-inverted blood inflow, relying on a spatially selective saturation pulse to null signal from static tissue. Methods such as a navigator pulse are needed to freeze breathing motion. The second is peripheral arterial imaging based on subtraction of two ECG-gated 3D fast spin echo images, acquired during the periods of slow and fast arterial flow respectively (blood bright during former, dark during latter), heavily relying on limiting patient motion so that static tissues can be successfully canceled in subtraction.

Methods

Case reports will be shown using both 1.5T and 3T systems. The novel aspect of these vascular sequences is the absence of gadolinium based contrast media. The differences between the strategies for imaging the renal and peripheral vascular systems will be highlighted from the perspective of the MR technologist.

Results

When available, example cases will include comparisons with other imaging modalities for the renal and peripheral arterial imaging systems.

Conclusions

Understanding novel non-contrast vascular sequences and attention to protocol detail will enable the technologist to perform routine high quality imaging.