AbstractID: 8305 Title: Accelerating Breast Dynamic Contrast Enhanced MRI with Efficient Multiple Acquisitions by SPEED Using Shared Information

Purpose: The efficient multiple acquisition method using Skipped Phase Encoding and Edge Deghosting (SPEED) has been successfully demonstrated with a dynamic contrast enhanced (CE) mice tumor study; however, it has not been tested with any human subjects. In this work, this technique is further developed to accelerate breast dynamic CE MRI.

Method and Materials: In dynamic CE-MRI, a series of images are acquired within different time frames, which contain highly similar spatial information. The strong structural similarity is used to accelerate imaging by SPEED with factors greater than that achievable with a single acquisition. It was tested in this work with an *in vivo* breast dynamic CE MRI study. The dynamic CE scan was performed on a GE 1.5T system using a T1-weighted gradient echo sequence (matrix 256x256, FOV 20cm x 20cm, TR = 5.5 ms, TE = 1.5 ms, flip angle = 30°, slice thickness = 4 mm, the number of frames = 7).

Results: Reference images are first reconstructed from full k-space data. The corresponding deghosted images are then reconstructed from partial data, with undersampling factors of 3/5 for one frame and 2/5 for all other frames, resulting in an acceleration factor of 2. In other words, the total scan time is 3.5 times that of a single acquisition. The images reconstructed from partial data by the proposed method show comparable quality as those reference images.

Conclusion: In this work, the technique of efficient multiple acquisitions by SPEED is further developed to accelerate breast dynamic CE MRI. By using shared spatial information, a breast dynamic CE MRI study is accelerated by SPEED with a factor of 2, which is greater than that achievable with a single acquisition. This saving can be used to double the image resolution, or to increase the frame rates of dynamic sequence.