AbstractID: 7603 Title: A fast and high spatial resolution 1H magnetic resonance spectroscopic imaging technique for breast cancer

Purpose:
We present our initial experience with in vivo high spatial resolution 1H MRSI of human breast lesions at a short echo time, by using recently developed echo-filter suppression technique and the elliptical sampling scheme

Method and Materials:
The technique consists of three parts: optional inversion recovery, optional outer volume pre-saturation (OVP), and an echo-filter MRSI with a weighted k-space sampling scheme. The simplest echo-filter pulse sequence consists of a 900 RF pulse (or a series of pulses) to define the volume of interest (VOI), a delay TE/2, a frequency-selective (FS) 1800 pulse, and another delay TE/2 with equally strong crusher gradients (G) on each side of the FS pulse. To improve sampling efficiency, a weighted k-space sampling scheme is used to acquire the MRSI data set.
Siemens whole-body 1.5T Sonata is used, TR=1600 ms, TE=60 ms, Ave=8, acquisition time= 12.1 min, and a 60 Hz Gaussian FS pulse setting at Cho resonance (3.2 ppm).

Results:
To date, six studies from five patients with DCE-MRI, 5 succeed, the spectra are well differentiated between biopsy proven tumor and control voxels. The spatial resolution here is only 0.59 cm3, the highest spatial resolution for in vivo 1H breast MRS at 1.5T to date. Excellent lipid and water suppression for in vivo 1H MRS was achieved. Aside from 8 Hz filter in the time domain and fast Fourier transform (FFT), no other processing was used to generate the spectra.

Conclusion:
As demonstrated, the proposed technique has the potential to overcome the difficulties for routine breast 1H MRS. It is robust (suppression technique is insensitive to magnetic field inhomogeneity), high spatial resolution (0.59 cc at 1.5T with a TE of only 60 ms), fast (acquisition time of 12 minutes), and even better at 3T (higher resolution and/or shorter TE).