Chemical shift-based water/fat separation methods have been emerging due to the growing clinical need for fat quantification in different body organs. Accurate quantification of proton-density fat fraction requires the assessment of many confounding factors, including the need of modeling the presence of multiple peaks in the fat spectrum. Most recent quantitative chemical shift-based water/fat separation approaches rely on a multipake fat spectrum with precalibrated peak locations and precalibrated or self-calibrated peak relative amplitudes. However, water/fat susceptibility differences can induce fat spectrum resonance shifts depending on the shape and orientation of the fatty inclusions. The effect is of particular interest in the skeletal muscle due to the anisotropic arrangement of extracellular lipids. In this work, the effect of susceptibility-induced fat resonance shift on the fat fraction is characterized in a conventional complex-based chemical shift-based water/fat separation approach that does not model the susceptibility-induced fat resonance shift. A novel algorithm is then proposed to quantify the resonance shift in a complex-based chemical shift-based water/fat separation approach that considers the fat resonance shift in the signal model, aiming to extract information about the orientation/geometry of lipids. The technique is validated in a phantom and preliminary in vivo
results are shown in the calf musculature of healthy and diabetic subjects.

Zeitschriftentitel / Abkürzung:
Magn Reson Med

Jahr: 2012
Band: 68
Heft / Issue: 5
Seiten: 1495-505
Sprache: eng
Print-ISSN: 0740-3194
TUM Einrichtung:
r Radiologie

Occurrences:
- Einrichtungen > Fakultäten > Fakultät für Medizin > Kliniken und Institute > Institut für Radiologie > 2012

entries: