Motion Correction of Single-Voxel Spectroscopy by Independent Component Analysis Applied to Spectra From Nonanesthetized Pediatric Subjects

For single-voxel spectroscopy, the acquisition of the spectrum is typically repeated n times and then combined with a factor in order to improve the signal-to-noise ratio. In practice, the acquisitions are not only affected by random noise but also by physiologic motion and subject movements. Since the influence of physiologic motion such as cardiac and respiratory motion on the data is limited, it can be compensated for without data loss. Individual acquisitions hampered by subject movements, on the other hand, need to be rejected if no correction or compensation is possible. If the individual acquisitions are stored, it is possible to identify and reject the motion-disturbed acquisitions before averaging. Several automatic algorithms were investigated using a dataset of spectra from nonanesthetized infants with a gestational age of 40 weeks. Median filtering removed most subject movement artifacts, but at the cost of increased sensitivity to random noise. Neither independent component analysis nor outlier identification with multiple comparisons has this problem. These two algorithms are novel in this context. The peak height values of the metabolites were increased compared to the mean of all acquisitions for both methods, although primarily for the ICA method. Magn Reson Med, 2009. © 2009 Wiley-Liss, Inc.