

MAGNETIC RESONANCE IMAGING

Magnetic resonance imaging is a highly advanced non-invasive medical imaging technique, with a very high spatial resolution. It is commonly used in preclinical and clinical studies as a non-invasive tool to investigate the structural, biochemical and functional changes in the brain. MRI's advance technology allows diversity in terms of acquisition and reconstructions parameters. Software and hardware upgrades along with diversity of these tools may cause discrepancies in main imaging parameters within same laboratory and across different across centers. We aimed to provide an insight about multicentre variability of main imaging parameters (T1 & T2 relaxation times, and temporal stability during EPI image acquisition for fMRI). Additionally, we aimed to initiate a multicentre quality assurance programme which can be performed automatically using the image a quality assurance software (a matlab script). This script has originally developed for human multicentre collaborative fMRI research project [1].

We hope that this study can initiate a uniform and a regular quality assurance program. We proposed a simple phantom (consist of agarose, NaCl and NiCl₂) experiment using a stability phantom. The receipt of the phantom, imaging parameters and Matlab script were distributed to 16 European MRI research centers. Our initial results depicted that there is a diversity between T1 and T2 relaxation parameters acquired at same magnetic field, using similar imaging parameters between different centers when the identical phantoms were used. These results indicate that multicentre studies should take into account any software and hardware differences. Since they may have an effect on tissue relaxation time parameters. Our future goal is to increase awareness about the importance of quality assurance programs. Additionally, we would like to set guidelines how to report information about magnetic resonance imaging experiments in papers in order to ensure reproducibility.

References

1: Friedman L. and Glover G.H Report on a Multicenter fMRI quality assurance protocol J Magn Reson Imaging 2006; 23:827-839.