Sub-Study in SORAMIC

Quality Assurance for MRI Scanners in Clinical Multicenter Studies

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Aims of the project

• Validation of MRI scanners used in SORAMIC in concordance to the MRI Accreditation Program of the American College of Radiology (ACR)[1–4]

• Characterization of the implementation of the local SORAMIC – pulse sequences and the achieved image quality by phantom measurements

• Identification of technical and methodical deviations

• Results regarding individual and over-all image quality of the MRI devices used in SORAMIC

[1–4] see Appendix
Motivation

• Current situation in clinical multicenter studies
  – Scanner pool is defined by the devices available at study sites
    (heterogeneity due to different manufacturers, magnetic field strengths, receiver coils, etc.)
  – Certain freedom of choice in pulse sequence parameters

→ General question: Is the image quality comparable?

• Literature Review
  – Limited number of sites\[^{5-7}\] and MRI scanners\[^{8}\] or few test parameters\[^{9-11}\]
  – QA in the context of fMRI or DTI\[^{12, 13}\]
  – Studies with variable phantom geometries\[^{14}\]

→ Comparable Setup: PhD thesis of A. Hellerbach\[^{15}\]
Methods

- Standard phantom geometry (ACR phantom) and standardized measurement conditions

- 3 ACR pulse sequences (sag, ax T1–SE; ax T2–SE)

- 2 SORAMIC pulse sequences (ax 3D T1–GRE; ax 2D T2–TSE)

- Test parameters
  SNR, geom. distortion, ghosting, etc.

- Total examination time: 1.5 h
  Scan time: 30 min

- Pulse sequences are implemented via examcard
Results (Interim Analysis)

- Measurements at 6 German SORAMIC sites (8 MRI scanners)
- Magnetic field strengths: 1.5 T (n=6), 3.0 T (n=2)
- 3 manufacturers (GE, Siemens, Philips)
- Interim analysis → minor variations within ranges defined by ACR

Slice Thickness Accuracy
Outlook / Vision

- Extension of the QA measurements to European SORAMIC-sites
- Measurement of newly included sites
- Feedback of image quality to every site
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Appendix


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