

AbstractID: 4671 Title: A New Gel Phantom for MRI

Purpose:

To develop a gel-based quality control phantom for MRI that does not suffer from flow artifacts seen in liquid-based phantoms.

Method and Materials:

We have developed a gel based phantom incorporating NiCl and NaCl that does not suffer from flow artifacts. The phantom was evaluated for accuracy of the stated T1 and T2 values, uniformity and dehydration properties. The T1 relaxation time was measured using a spin echo sequence with TR = 1000 mS and TE varied between 10 mS and 350 mS. The T2 relaxation time was measured through a fast spin echo inversion recovery sequence with TR = 1000 mS, TE = 50 mS and TI varied between 50 and 983 mS. All measurements and images were made on a GE Signa 1.5T MRI scanner.

Results:

Measured T1 and T2 values were within 1.3% of the nominal values of 260.3 mS for T1 and 234.1 mS for T2. Uniformity was measured using the ACR T1 sequence of TR = 500 mS, TE = 20 mS. The gel phantom demonstrated a uniformity of 86.5% over its volume in a dedicated head coil, compared to 87.2% for a still liquid phantom in an identical container. The measured mass of 4691 grams did not change over a 6 month period.

Conclusion:

This new gel phantom shows promise as a replacement for liquid MRI phantoms. Future efforts will focus on adapting the gel to other container geometries and modifying the formulation for more tissue equivalent relaxation times and to match the ACR MRI accreditation program phantom.

Conflict of Interest (only if applicable):

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