Artifacts to Artefacts: Causes and Cures from a Clinical Perspective

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Target Audience: Clinicians (Residents, Fellows, and Attending Level) whose practice includes MRI. Graduate students studying MR for their research will also benefit from this talk. Advanced MR researchers may enjoy the talk but are not specifically targeted.

Purpose:

- Understand what is an MR artifact
- Learn to identify key artifacts and to understand their origins
- Learn how to eliminate the artifacts, if this is desired
- Learn how to utilize artifacts for diagnostic purposes, whenever possible

In MR clinical practice, we routinely encounter imaging artifacts – that is, features of the MR image that are not present in the object being imaged. Some artifacts are encountered routinely, while others are seen under special conditions. We will try to understand the origin of these artifacts, relating it to the MR signal acquisition and image reconstruction process, but the approach will be as non-mathematical as possible, relying instead on figures, cartoons, and actual images from phantoms and clinical practice. After understanding the artifacts, we will discuss the next clinical steps after identifying the artifact, namely: Can the artifact be eliminated or minimized (if this is even desirable) and how, or can the artifact be utilized for clinical benefit?

It is not possible to comprehensively discuss every artifact that can be clinically encountered. We will focus instead on representative artifacts that are either particularly common clinically, or are instructive such that understanding them provides insight into the MRI itself. Representative artifacts that are likely to be covered include aliasing and parallel imaging artifacts, motion and pulsation, chemical shift, Gibbs ringing, magnetic susceptibility, and high field B_1 inhomogeneities. The explanations will draw from review articles and books and online sources, which have covered this material in the literature.

References:

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