

Evidence-based Medicine: What's Wrong with Spectroscopy Papers?

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Introduction:

In 1991, Bottomley wrote an editorial under the title given to this abstract¹. Fourteen years later, a new understanding of MRS demands we address what went wrong and how to fix it. Evidence-based medicine (EBM) finds MRS ineffective in all of its endeavors²⁻⁴. For most active researchers in proton MRS, the “discovery” phase is over and automation has rendered this method robust. Areas of primary diagnostic utility have been defined, which although not universally agreed, have a wide acceptance among specialist spectroscopists. Not so among two important constituents: the referring clinician and the payers. After a glorious five years during which MRS (CPT code 76390) was reimbursed, a negative technology assessment commissioned by the American College of Radiology (ACR) rescinded permission to charge for MRS. We have examined the reasons for this change and conclude it is correct but reversible.

Methods:

Using the methods of Fryback and Thornberg (six criteria: technical feasibility, diagnostic accuracy, diagnostic impact, therapeutic impact, outcome impact, societal impact), we surveyed 22,000 full papers and published abstracts identified in Medline by the keywords “MRS, proton, clinical, diagnosis.”

Results:

- 1) 10-12 brain diseases or syndromes reached credibility on the basis of criteria revealed in >3 independent published MRS studies.
- 2) Methodology (single versus multi-voxel; STEAM vs. PRESS vs. ISIS vs. CSI; TE; field strength) had no impact on the Technology Assessment criteria 1 and 2 but does impose strong barriers for the non-specialist resulting in unjustified exclusion from further analysis.
- 3) Efficacy of MRS? Fryback criteria 3 through 6 were address in 0.01 % of published papers and abstracts.

Discussion:

MRS is an efficacious diagnostic tool, which based on thousands of anecdotal reports, really provides benefit to patients and their doctors. EBM is a valuable discipline intending to reduce health-care costs and improve medical practice. The analysis applying EBM criteria confirms efficacy of MRS in 10-12 diagnostic settings. The contrary opinions of professional EBM studies published or reported to date appear to result from inadequate analysis of the published literature.

Conclusion:

- 1) Inadequate EBM has unfairly targeted MRS.
- 2) The fault may lie in inadequate reporting by MRS professionals. In addition to answering Fryback and Thornberg's six criteria, authors are recommended to include efficacy in the title and to illustrate a minimum of two primary MR spectra in the text.
- 3) Recommended guidelines for authors, study design, editors and reviewers could reverse this decision rapidly and speed the evaluation of new MRS techniques for clinical use.

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