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## Evidence-Based Imaging of the Nervous System

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## Evidence-Based Imaging of the Nervous System

Those of us who have chosen a profession entrusted with the health and welfare of human beings, spending almost a sixth of the wealth of the wealthiest society in human history, have an obligation to attempt to do so effectively and efficiently within the limits of current knowledge. It is not enough for us to collect knowledge about the best diagnostic techniques, though this is important in its own right. We must also collate, synthesize, and disseminate this knowledge among our colleagues and the interested public.

The American College of Radiology (ACR) Appropriateness Criteria for neurologic imaging attempt to achieve these aims. Each of them addresses a clinical problem or neurologic system and seeks, through a narrative summary of the clinical problem, a systematic literature review and a modified Delphi consensus development process to present a coherent framework on which to base rational neuroradiologic evaluation of our patients.

Ideally, each of the clinical scenarios discussed would have been the subject of several mutually concordant large-scale randomized clinical trials with clearly defined unambiguous end points directly investigating which, if any, of the competing imaging approaches resulted in more favorable patient outcomes. Furthermore, these studies and their authors should have been free of commercial sponsorship, should have registered the trial publicly before initiation, reported the results regardless of outcome, and selected methods that permitted appropriate analysis of patient preferences and economic impacts. Additionally, each of the technologies evaluated should have represented the current state of the art, so no concern for obsolescence is present. Alas, we found no such studies upon which to base our recommendations.

These astringent concepts of evidence-based medicine need not prevent us from attempting to systematize the current state of knowledge of appropriate imaging utilization. In the absence of the best possible evidence, we must use the best available evidence. The authors of each of the appropriateness criteria chose from the available literature those studies whose methodologic quality, scale, reproducibility, and impact led to the strongest, most durable conclusions and presented these

conclusions in a narrative format. A panel of experts chosen to represent a variety of geographic regions, practice settings and styles, and medical specialties then developed consensus as to the relative appropriateness of imaging studies in each clinical scenario.

The product of this process is not above criticism, nor is it eternal or universal in its applicability. It does represent an application of evidence-based medicine techniques, that is, the rationalist project of employing the best available scientific evidence applied in a manner consistent with society's values, tailored to individual patient preferences and physician experience to guide patient care.

These appropriateness criteria are intended to guide the appropriate utilization of radiologic procedures whenever rational standards are required. One can imagine salutary applications of these criteria where self-referral results in excessively aggressive imaging or, conversely, where uninformed attempts to restrict medically necessary imaging evaluation prevail. Under these and other circumstances, appropriateness criteria may bolster those seeking the best care for the patient.

It was said during the 19th Century that "An American army wastes enough to supply a French army of the same size." It may be the case that our 21st century health care system can fairly be described in the same terms, though it is reasonable to point out the relative results of the 2 approaches. We spend more on healthcare than many other countries with superior health outcomes, though we offer greater patient autonomy and access to advanced technologic options. It is to be hoped that the creation and publication of the ACR Neurologic Imaging Appropriateness Criteria are small steps toward eliminating inefficiency and promoting excellence in the provision of imaging services by defining rational care in an easily accessible format.

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