Review of the literature on spinal ultrasound for the evaluation of back pain and radicular disorders

Report of the Therapeutics and Technology Assessment Subcommittee of the American Academy of Neurology

The American Academy of Neurology's Therapeutics and Technology Assessment (TTA) Subcommittee has developed this statement on spinal ultrasound in response to numerous inquiries from neurologists who have questioned the utility of this procedure. Due to the paucity of relevant literature, an evidence-based assessment on this procedure following the usual TTA process is not possible. However, because of current confusion on the utility of spinal ultrasound in the evaluation of back pain and radicular disorders, this necessarily brief assessment was produced.

Methods. A literature search was performed in MEDLINE back to 1985 using the search terms "all ultrasound" linked by *and* to "all spine" and the result of this search linked by *and* to "all pain." The search yielded eight articles,¹⁻⁸ none of which addressed the problem of back pain or radiculopathy.

In addition to the literature search, a Call for Comments request was placed in AAN's newsletter, *AANews*, asking members to provide feedback on their experiences with spinal ultrasound. The AAN received several articles that address the use of ultrasound for the following uses: general management of pain, such as in soft tissue injury; guiding placement of needles; measuring the diameters of the spinal canal and bone density; imaging spinal malformations in utero and in infants; and using it as an adjunctive intraoperative tool in spinal surgery. However, the AAN did not receive any published peer-reviewed studies on the use of diagnostic spinal ultrasound for back pain or inflammatory or compressive nerve root disorders.

The AAN received one article, published in a journal not indexed by the National Library of Medicine,⁹ in which the authors contend that spinal ultrasound can show inflammation in nerve roots or facets. However, the author did not clearly describe the ultrasound abnormalities charac-

teristic of inflammation of nerve roots or facets in the paraspinal areas. In two abstracts referenced by the author, the paraspinal areas were studied with spinal ultrasound in cadavers¹⁰ and in normal volunteers.¹¹ Although insonation was done from C₂ to S₁ in the volunteers, the lumbar region is not mentioned in the analysis. The authors note that the cervical nerve roots could be seen in only 12 of 39 patients. Inflammation is not addressed.

The article⁹ compares MRI with spinal ultrasound in 100 consecutive patients with back pain and 20 controls without back pain. Although the author relates that 95% of patients had positive ultrasound abnormalities compared to 89% with MRI abnormalities, the only definition of abnormality is "moderate" inflammation in facets or nerve root areas. "Mild" inflammation is considered normal and is found in 55% of controls. How "mild" and "moderate" are distinguished is not stated. The ultrasound studies were read without knowledge of the patient's history, but by only one person, presumably the author. There is no attempt to use either clinical examination or MRI as a "gold standard" for a more precise comparison of diagnostic sensitivity, specificity, and positive or negative predictive values.

The AAN also sought statements on spinal ultrasound from other national specialty societies. The American College of Radiology has adopted the following statement on spinal ultrasound (excerpted)¹²:

Over the past several years interest has developed in the use of ultrasound technology for the evaluation of the spine and paraspinal regions in adults. While diagnostic ultrasound is appropriately used 1) intra-operatively; 2) in the newborn and infants for the evaluation of the spinal cord and canal; and 3) for multiple musculoskeletal applications in adults, there is currently no documented scientific evidence of the efficacy of this modality in the evaluation of the paraspinal tissues and the spine in adults. Any claims or inferences that the use of spinal or paraspinal ultrasound is more advantageous or has a greater diagnostic accuracy than established procedures such as computed to-

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mography (CT) or magnetic resonance imaging (MRI) cannot be made today based on recognized medical research.

Conclusion. Currently, no published peer reviewed literature supports the use of diagnostic ultrasound in the evaluation of patients with back pain or radicular symptoms. The procedure cannot be recommended for use in the clinical evaluation of such patients.

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