

Practice parameter: The utility of neuroimaging in the evaluation of headache in patients with normal neurologic examinations

(Summary statement)

Report of the Quality Standards Subcommittee of the American Academy of Neurology

Mission statement. The Quality Standards Subcommittee of the American Academy of Neurology is charged with developing practice parameters for neurologists for diagnostic procedures, treatment modalities, and clinical disorders. The selection of topics is based on prevalence of disease, frequency of use of procedures, economic impact, membership needs, existence of controversy, external constraints, and resource availability. The subcommittee agreed that the issue of neuroimaging in patients with headache was an appropriate area to study and consequently undertook this project.

Justification. Headache is among the most common problems leading patients to see their physician. Up to 20% of women suffer from migraine. In one survey, 24% of persons questioned had had a headache severe enough to require an analgesic during the previous 2 weeks. With the proliferation of imaging centers, increasing patient demand for thorough and "high-tech" evaluation, and the increasing practice of "defensive medicine," neuroimaging—in the form of CT or MRI—is widely used to evaluate headache. Objective data to support this widespread practice are scarce. This paper reviews the pertinent literature in order to define the yield of pathology when neuroimaging is performed to evaluate headache in patients with normal neurologic examinations, and to see what effect neuroimaging has on patient health outcomes.

Description of the study process. A MEDLINE search of the literature from 1974 through 1991 was performed using the following key terms: "MRI—headache," "CT—headache," "MRI—migraine," "CT—migraine," and "headache—diagnosis." All bibliographies of the articles cited were re-

viewed for additional papers; pertinent textbooks and more recent journals were checked. Only those articles reporting studies with more than 17 patients were included. The other articles consisted mainly of single patient case reports of unusual pathologic findings that would have biased the analysis. Only patients with normal neurologic examinations were included in this study. The information was pooled and analyzed. The Quality Standards Subcommittee sent this summary document to several specialty societies (table) and headache specialists, and, when appropriate, their comments and recommendations were incorporated.

Conclusions. A total of 17 studies were found and analyzed. They could be divided into studies of neuroimaging in patients with migraine and those in patients with undefined headaches (ie, not defined in the paper). Some of the studies, including the two largest ones, were done in the early days of CT. All the studies were case series, and most were retrospective. The data are all classified as class III evidence.

A total of 897 CTs or MRIs were done in migraine patients. From these scans, three tumors were found and one arteriovenous malformation (AVM) was noted. One of the patients with a tumor and the patient with the AVM had an associated seizure disorder, greatly increasing the clinical likelihood of an intracranial lesion. One of the tumors was a malignant glioma (glioblastoma multiforme), the discovery of which did not likely affect patient outcome. The other tumor, a choroid plexus papilloma, was felt to be incidental because the patient's classic migraine headaches persisted after its removal. The total yield of pathology was 0.4%.

A total of 1,825 CTs and MRIs were performed in patients with headache and normal neurologic

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Table. Medical societies invited to comment on this practice parameter (asterisks indicate those who provided comment)

American Academy of Family Physicians*
 American College of Radiology*
 American College of Emergency Physicians*
 American Society of Internal Medicine*
 American Psychiatric Association
 American College of Physicians
 American Association of Neurological Surgeons

examinations for whom the authors did not supply clinical information. This sample included patients from several large studies from tertiary care facilities and included cases of acute headache, progressively worsening headache, and chronic headache. In this pooled sample, 21 tumors, six AVMs, three aneurysms, five subdural hematomas, and eight cases of hydrocephalus were diagnosed by neuroimaging. The total yield of pathology was 2.4%.

Recommendations. Based on a review of the evidence—which is class III—and expert opinion, the Quality Standards Subcommittee came to a consensus that there is *moderate clinical certainty to support the following practice guideline:*

In adult patients with recurrent headaches that have been defined as migraine—including those with visual aura—with no recent change in pattern, no history of seizures, and no other focal neurologic signs or symptoms, the routine use of neuroimaging is not warranted. In patients with atypical headache patterns, a history of seizures, or focal neurologic signs or symptoms, CT or MRI may be indicated.

At this time, there is insufficient evidence to define the role of CT and MRI in the evaluation of patients with headaches that are not consistent with migraine.

Recommendations for future research.

1. Large prospective studies to define the clinical characteristics of chronic headaches that would help identify those patients at higher risk for intracranial disease.

2. Evaluation of the role of repeated neuroimaging in patients with previously negative studies.

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DEFINITIONS

Classification of evidence

Class I. Evidence provided by one or more well-designed randomized controlled clinical trials.

Class II. Evidence provided by one or more well-designed clinical studies such as case-control studies, cohort studies, and so forth.

Class III. Evidence provided by expert opinion, nonrandomized historical controls, or one or more case reports.

Strength of recommendations

Standards. Generally accepted principles for patient management that reflect a high degree of clinical certainty (ie, based on class I evidence or, when circumstances preclude randomized clinical trials, overwhelming evidence from class II studies that directly addresses the question at hand or from decision analysis that directly addresses all the issues).

Guidelines. Recommendations for patient management that may identify a particular strategy or range of management strategies and that reflect moderate clinical certainty (ie, based on class II evidence that directly addresses the issue, decision analysis that directly addresses the issue, or strong consensus of class III evidence).

Practice options or advisories. Other strategies for patient management for which there is unclear clinical certainty (ie, based on inconclusive or conflicting evidence or opinion).

Practice parameters. Results, in the form of one or more specific recommendations, from a scientifically based analysis of a specific clinical problem.

This summary statement is provided as an educational service of the American Academy of Neurology. It is based on an assessment of current scientific and clinical information. It is not intended to include all possible proper methods of care for a particular neurologic problem or all legitimate criteria for choosing to use a specific procedure. Neither is it intended to exclude any reasonable alternative methodologies. The AAN recognizes that specific patient care decisions are the prerogative of the patient and the physician caring for the patient, based on all the circumstances involved.