Complete Summary

GUIDELINE TITLE

Neurophysiological tests and neuroimaging procedures in non-acute headache: guidelines and recommendations.

BIBLIOGRAPHIC SOURCE(S)

Sandrini G, Friberg L, Janig W, Jensen R, Russell D, Sanchez del Rio M, Sand T, Schoenen J, van Buchem M, van Dijk JG. Neurophysiological tests and neuroimaging procedures in non-acute headache: guidelines and recommendations. Eur J Neurol 2004 Apr;11(4):217-24. [43 references] PubMed

GUIDELINE STATUS

This is the current release of the guideline.

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

Non-acute headache

GUIDELINE CATEGORY

Diagnosis
Evaluation
Technology Assessment

CLINICAL SPECIALTY

Family Practice
Internal Medicine
Neurology
Pediatrics

INTENDED USERS

Physicians

GUIDELINE OBJECTIVE(S)

To help physicians make appropriate choices regarding the use of instrumental tests in non-acute headache patients

TARGET POPULATION

Patients presenting with non-acute headache

INTERVENTIONS AND PRACTICES CONSIDERED

Neurophysiological Tests and Neuroimaging Procedures*

1. Routine electroencephalogram (EEG) with standard visual interpretation
2. Quantitative EEG methods (frequency analysis with or without topographic mapping)
3. Analysis of photic driving
4. Evoked potentials
5. Reflex responses
6. Autonomic tests
7. Clinical tests, pain pressure thresholds, and electromyography (EMG) (with special reference to tension-type headache)
8. Neuroimaging (magnetic resonance imaging [MRI])
9. Single photon emission computerized tomography (SPECT) and photon emission tomography (PET)
10. Transcranial Doppler examination

*Note: See "Major Recommendations" field for context; some of these tests and procedures are considered but not recommended because of their limited utility in the clinical setting.

MAJOR OUTCOMES CONSIDERED

Usefulness, sensitivity, and specificity of tests and procedures for diagnosis and evaluation of non-acute headache

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

The task force collected and selected evidence according to the European Federation of Neurological Societies (EFNS) criteria (Hughes RAC, Barnes MP, Baron J, Brainin M [2001]. Guidance for the preparation of neurological management guidelines by EFNS scientific task forces. *Eur J Neurol* 8:549-550).

Reviews of published clinical evidence (from 1988 to 2002) were evaluated. Key literature references pre-dating the International Headache Society (IHS) Classification (1988) were particularly carefully examined as these studies applied different diagnostic criteria for headache.

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Evidence Classification Scheme for a Diagnostic Measure

Class I: A prospective study in a broad spectrum of persons with the suspected condition, using a "gold standard" for case definition, where the test is applied in a blinded evaluation, and enabling the assessment of appropriate tests of diagnostic accuracy

Class II: A prospective study of a narrow spectrum of persons with the suspected condition, or a well-designed retrospective study of a broad spectrum of persons with an established condition (by "gold standard") compared to a broad spectrum of controls, where test is applied in a blinded evaluation, and enabling the assessment of appropriate tests of diagnostic accuracy

Class III: Evidence provided by a retrospective study where either persons with the established condition or controls are of a narrow spectrum, and where test is applied in a blinded evaluation

Class IV: Any design where test is not applied in blinded evaluation OR evidence provided by expert opinion alone or in descriptive case series (without controls)

METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not stated

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

The expert task force appointed by the Scientific Committee of the European Federation of Neurological Societies (EFNS) prepared the guidelines according to EFNS criteria (Hughes RAC, Barnes MP, Baron J, Brainin M [2001]. Guidance for the preparation of neurological management guidelines by EFNS scientific task forces. *Eur J Neurol* 8:549-550).

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Rating of Recommendations

Level A rating (established as useful/predictive or not useful/predictive) requires at least one convincing class I study or at least two consistent, convincing class II studies.

Level B rating (established as probably useful/predictive or not useful/predictive) requires at least one convincing class II study or overwhelming class III evidence.

Level C rating (established as possibly useful/predictive or not useful/predictive) requires at least two convincing class III studies.

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

The guidelines were validated according to the European Federation of Neurological Societies (EFNS) criteria (Hughes RAC, Barnes MP, Baron J, Brainin M [2001]. Guidance for the preparation of neurological management guidelines by EFNS scientific task forces. *Eur J Neurol* 8:549-550).

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

The levels of evidence (class I-IV) supporting the recommendations and ratings of recommendations (A-C) are defined at the end of the "Major Recommendations" field.

Electroencephalogram (EEG)

Routine EEG with Standard Visual Interpretation

Interictal EEG is not routinely indicated in the diagnostic evaluation of headache patients. Interictal EEG is only indicated if the clinical history suggests a possible diagnosis of epilepsy, e.g., in the case of (i) unusually brief headache episodes; (ii) unusual aura symptoms (e.g., gastric/olfactory sensations, circular visual symptoms); (iii) headache associated with unusually brief auras or aura-like phenomena; (iv) headache associated with severe neurological deficits; and (v) other risk factors for epilepsy. Ictal EEG is indicated during episodes suggesting complicated aura and during auras associated with decreased consciousness or confusion.

Quantitative EEG Methods (Frequency Analysis with or without Topographic Mapping)

Current quantitative EEG methods are not routinely indicated in the diagnostic evaluation of headache patients.

Quantitative frequency analysis of EEG must always be recorded with raw EEG data and interpreted by a skilled physician in order to avoid misinterpretation of technical artifacts, normal state fluctuations and various physiological rhythms.

Analysis of Photic Driving

Photic driving may be increased in migraine and tension-type headache (TTH) patient groups as compared with headache-free subjects. The specificity of the method is not yet sufficiently documented.

There is not enough evidence to suggest that the photic driving methods that are currently in use can reliably discriminate either between migraine and nonmigraine primary headache patients or between primary headache patients and headache-free subjects.

This is a class II level of evidence and the grade of recommendation is B.

Evoked Potentials (EPs)

The literature data, often conflicting, failed to demonstrate the usefulness of EPs as a diagnostic tool in migraine. Findings should therefore be replicated before visually evoked potentials (VEPs) can be recommended in the diagnosis of migraine (not enough data are available for other types of headache). In conclusion, the Task Force does not recommend the use of EPs in the diagnosis of headache disorders.

This is a class II level of evidence, but the literature contains contrasting data and the clinical significance of abnormalities is poorly understood. The grade of recommendation is B.

Reflex Responses

Most of the neurophysiological investigation techniques have only limited usefulness in the diagnosis of headache. Further research in large populations is needed in order to establish which electrophysiological markers could be relevant in clinical practice.

This is a class IV level of evidence for nociceptive flexion reflex (not blinded studies), and class III for corneal reflex and blink reflex. The grade of recommendation is C and B respectively. As for exteroceptive suppression of masticatory muscle activity, only few blinded studies (class III) fail to confirm previous investigations: the grade of recommendation is C.

Autonomic Tests

Studies of autonomic functions in migraine and cluster headache were mostly focused on autonomic systems innervating specific target organs which, anatomically and functionally, are not necessarily related to the supposed autonomic origin of the pain. Autonomic parameters are confounded by effector organ response characteristics. Therefore, there is no clear evidence justifying the recommendation of autonomic tests for the routine clinical examination of headache patients.

This is a class IV level of evidence and the grade of recommendation is C.

Clinical Tests, Pressure Pain Thresholds (PPTs), and Electromyography (EMG) (with Special Reference to TTH)

Tenderness recorded by manual palpation is the most specific and sensitive test in patients with TTH, and can therefore be recommended as a routine clinical test in contrast to EMG and pressure pain thresholds. However, this manual palpation is non-specific and cannot be used to discriminate between different coexisting primary or secondary headaches.

This is a class IV level of evidence and the grade of recommendation is C (few blinded studies mainly concerning methodology in healthy volunteers).

Neuroimaging

When neuroimaging is warranted, the most sensitive method should be used, and magnetic resonance imaging (MRI) and not computed tomography (CT) is recommended in these cases.

The grade of recommendation is C, as most studies are non-analytical and although there exist a few randomized clinical trials, some of them are not directly relevant to these recommendations (class IV).

Specific recommendations are:

1. In adult and paediatric patients with migraine, with no recent change in pattern, no history of seizures, and no other focal neurological signs or symptoms, the routine use of neuroimaging is not warranted.

2. In patients with atypical headache patterns, a history of seizures, and/or neurological signs or symptoms, or symptomatic illness such as tumours, acquired immunodeficiency syndrome (AIDS), and neurofibromatosis, MRI may be indicated (to be carefully evaluated in each case).

Single-Photon Emission Computed Tomography (SPECT) and Positron Emission Tomography (PET)

If attacks can be fully accounted for by the standard headache classification (International Headache Society), a PET or SPECT scan will generally be of no further diagnostic value. Nuclear medicine examinations of cerebral circulation and metabolism can be carried out in subgroups of headache patients for diagnosis and evaluation of complications. Regional cerebral blood flow (rCBF) recordings can be of particular value in patients in whom the standard classification (International Headache Society) cannot be fully applied, when patients experience unusually severe attacks, or the quality or severity of attacks has changed. rCBF recordings should then be carried out both during an attack (if possible several repeated scans) and interictally (at a time interval of >5 days after an attack). Quantifiable rCBF measurements are preferable to distribution images.

This is a class IV level of evidence, i.e., most studies are case reports or case series, and therefore the grade of recommendation is C. There is insufficient evidence to make specific recommendations.

Transcranial Doppler

Transcranial Doppler examination is not helpful in headache diagnosis. It is, however, a non-invasive examination with excellent temporal resolution which is useful for studying the vascular aspects of the headache pathophysiology and the vascular effects of anti-headache medication. The information obtained using this method is easier to interpret if side-to-side comparisons are made or if it is combined with rCBF measurements.

This is a class IV level of evidence and the grade of recommendation is C.

Definitions:

Evidence Classification Scheme for a Diagnostic Measure

Class I: A prospective study in a broad spectrum of persons with the suspected condition, using a 'gold standard' for case definition, where the test is applied in a blinded evaluation, and enabling the assessment of appropriate tests of diagnostic accuracy

Class II: A prospective study of a narrow spectrum of persons with the suspected condition, or a well-designed retrospective study of a broad spectrum of persons with an established condition (by 'gold standard') compared to a broad spectrum of controls, where test is applied in a blinded evaluation, and enabling the assessment of appropriate tests of diagnostic accuracy

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Class IV: Any design where test is not applied in blinded evaluation OR evidence provided by expert opinion alone or in descriptive case series (without controls)

Rating of Recommendations

Level A rating: (established as useful/predictive or not useful/predictive) requires at least one convincing class I study or at least two consistent, convincing class II studies

Level B rating: (established as probably useful/predictive or not useful/predictive) requires at least one convincing class II study or overwhelming class III evidence

Level C rating: (established as possibly useful/predictive or not useful/predictive) requires at least two convincing class III studies

CLINICAL ALGORITHM(S)

None provided

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is identified and graded for selected recommendations (see "Major Recommendations").

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Accurate diagnosis of non-acute headache

POTENTIAL HARMS

Not stated

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

- As this paper was going to press, the new International Headache Society Classification of Headache Disorders was published (Cephalalgia 2004, vol. 24, Suppl. 1). This key reference includes clinical and instrumental diagnostic

criteria for differentiating between primary and secondary headaches and its consultation is strongly recommended.
- The present guidelines and recommendations are intended to furnish the reader with information, based on the evidence in the literature, concerning the usefulness of instrumental investigations in non-acute headache; clearly, however, each clinical judgment is the responsibility of the physician(s) concerned

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

The European Federation of Neurological Societies has a mailing list and all guideline papers go to national societies, national ministries of health, World Health Organisation, European Union, and a number of other destinations. Corporate support is recruited to buy large numbers of reprints of the guideline papers and permission is given to sponsoring companies to distribute the guideline papers from their commercial channels, provided there is no advertising attached.

IMPLEMENTATION TOOLS

Staff Training/Competency Material

For information about availability, see the "Availability of Companion Documents" and "Patient Resources" fields below.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Living with Illness

IOM DOMAIN

Effectiveness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Sandrini G, Friberg L, Janig W, Jensen R, Russell D, Sanchez del Rio M, Sand T, Schoenen J, van Buchem M, van Dijk JG. Neurophysiological tests and neuroimaging procedures in non-acute headache: guidelines and recommendations. Eur J Neurol 2004 Apr;11(4):217-24. [43 references] PubMed

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

2004 Apr

GUIDELINE DEVELOPER(S)

European Federation of Neurological Societies - Medical Specialty Society

SOURCE(S) OF FUNDING

European Federation of Neurological Societies

GUIDELINE COMMITTEE

European Federation of Neurological Societies Task Force

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

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FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

This is the current release of the guideline.

GUIDELINE AVAILABILITY

Electronic copies: Available to registered users from the European Federation of Neurological Societies Web site.

Print copies: Available from Giorgio Sandrini MD, University Centre for Adaptive Disorders and Headache, IRCCS C. Mondino Foundation, Via Palestro 3 – 27100 Pavia, Italy; E-mail: gsandrin@unipv.it

AVAILABILITY OF COMPANION DOCUMENTS

The following are available:

- Brainin M, Barnes M, Baron JC, Gilhus NE, Hughes R, Selmaj K, Waldemar G; Guideline Standards Subcommittee of the EFNS Scientific Committee. Guidance for the preparation of neurological management guidelines by EFNS scientific task forces – revised recommendations 2004. Eur J Neurol. 2004 Sep;11(9):577-81. Electronic copies: Available in Portable Document Format (PDF) from the European Federation of Neurological Societies Web site.
- Guideline papers. European Federation of Neurological Societies. Electronic copies: Available from the European Federation of Neurological Societies Web site.
- Continuing Medical Education questions available from the European Journal of Neurology Web site.

PATIENT RESOURCES

None available

NGC STATUS

This NGC summary was completed by ECRI on August 24, 2006. The information was verified by the guideline developer on October 25, 2006.

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