J Headache Pain (2005) 6:205–210
DOI 10.1007/s10194-005-0186-x

Paola Sarchielli
Mauro Pedini
Andrea Alberti
Cristiana Rossi
Antonio Baldi
Ilenia Corbelli
Paolo Calabresi

Application of ICHD 2nd edition criteria for primary headaches with the aid of a computerised, structured medical record for the specialist

Published online: 20 July 2005

P. Sarchielli (✉) • M. Pedini • A. Alberti
C. Rossi • A. Baldi • I. Corbelli • P. Calabresi
Neurologic Clinic,
Dept. of Medical and Surgical Specialties and Public Health,
University of Perugia, Silvestrini Hospital,
S. Andrea delle Fratte, I-06156 Perugia, Italy
e-mail: headache@unipg.it
Tel.: +39-075-5783609
Fax: +39-075-5783870

Abstract We tested the computerised, structured medical record by entering and analysing the consecutive clinical sheets of primary headaches in the episodic forms (200) and chronic headache (200) and the corresponding output diagnoses of patients attending our Headache Centre. A diagnosis of one of the primary headache forms was obtained in 67.9% of cases. A certain diagnosis of primary headache plus that of a probable form was obtained in 24.4% of cases (12.7% represented by chronic migraine (CM) or chronic tension-type headache (CTTH)+probable medication-overuse headache). Only probable forms were diagnosed in the remaining 7.3% (as single probable diagnosis in 5.8% of cases or multiple diagnoses of probable forms in the remaining ones). The percentage of certain diagnoses mainly in the chronic headache group (28.4%), and to a lesser extent tension-type headache (6.5%), were obtained in 34.9% of cases. A certain diagnosis of one chronic form plus that of a probable form was obtained in 50.8% of cases (26.9% represented by probable medication-overuse headache). Only probable forms were diagnosed in 13.46% (as single probable diagnosis in 8.73% of cases or multiple diagnoses of probable forms in the remaining ones). In the other cases, the ICHD-II classification does not allow the diagnoses of CM, CTTH or probable forms and medication-overuse headache because the mandatory criteria for the diagnoses are too stringent and do not reflect modifications of the headache pattern in relation to its chronicity. These preliminary results underscore the usefulness of a computerised device based on the ICHD 2nd edition for diagnostic purposes in tertiary centres dedicated to headaches in clinical practice as well as its relevance for research. This computerised device may help to validate the new diagnostic criteria and to answer some emerging questions from the application of the new classification version, the relevance of which should be verified in clinical practice.

Key words ICHD 2nd edition • Classification criteria • Primary headaches • Computerised clinical sheet

Introduction

With the purpose of investigating the application of the 1988 IHS criteria in tertiary care centres dedicated to headache, in 1998 we set up an easy-to-use computerised structured record based only on the mandatory IHS requirements for the diagnosis of primary headaches, that is, migraine with and without aura, episodic and chronic tension-type headache (CTTH), and episodic and chronic cluster headache.

With the help of an expert (MP), a programme called "IHS Diagnostic Criteria for Primary Headache", was developed strictly based on the 1988 IHS operational diagnostic criteria [1], in Italian and international versions. This programme was set up using CA dBFast for Windows International (Computer Associates International, Inc., New York), an extended version of Dbase language for Windows. The programme was tested under Microsoft Windows OS 3.11, 95, 98 and NT 4.0. The use of Dbase archives (DBF) allows the direct transfer to other major software (i.e., Microsoft Excel), making statistical analysis easy and versatile. The programme operates in a stand-alone or LAN environment and is compatible with the main network systems under Microsoft Windows.

The computerised structured record encompassed the 1988 IHS criteria up to the second digit for all the above primary headaches. Before its use, the clinician should exclude any secondary headache by means of general and neurological examinations and, if necessary, proceed with laboratory and instrumental investigations.

Immediately after publication in 2004 of the International Classification of Headache Disorders (ICHD) 2nd edition [2], we implemented our computerised, structured medical record based exclusively on the proposed new classification system for primary headaches (2.0 version). In particular, our aim was to verify, with the aid of our computerised device, the application of the new ICHD-2 criteria in the clinical practice, especially considering some aspects, such as the introduction of probable forms, the definition of aura, and the introduction of chronic migraine (CM) as well as drug abuse. In the continuing search for potential applications of the new ICHD 2nd edition 2004, we updated the software that manages the relational database in which to save the personal data of the patient and the clinical data required for the diagnosis of primary headache, reaching a coverage of about 85%–90% of all headaches and almost the totality of primary headache diagnoses [3].

The new 3.0 version of "ICHD 2nd edition Diagnostic Criteria for Primary Headache", allows the diagnosis of all migraine subtypes to the second digit and of 1.2 *Migraine without aura* to the third digit (from 1.2.1 to 1.2.6). This level of diagnosis for migraine without aura was not present in the 2.0 version, as well as the capability to discriminate between 1.3, 1.4 and 1.5 migraine subtypes. The diagnosis of migraine complications was also completed, and now the level of migraine diagnosis from 1.5.1 to 1.5.6 is possible, whereas in the 2.0 ITA version, this was limited to 1.5.1 *Chronic migraine*.

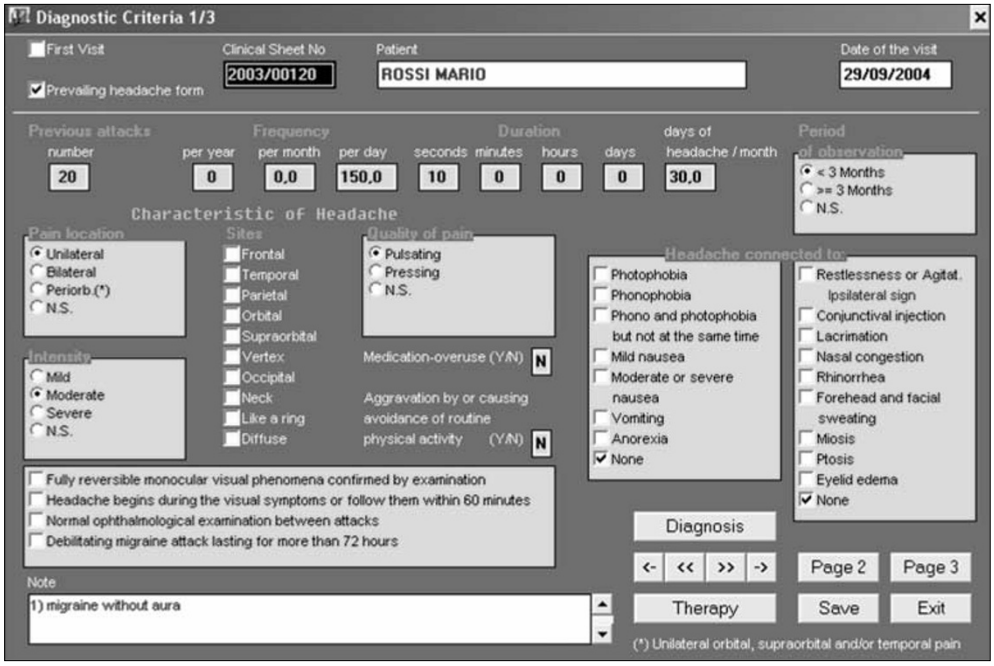

Fig. 1 First sheet of the computerised record in the latest version. It allows input of the mandatory variables for the diagnosis according to ICHD-II, such as number of attacks, duration of attacks, period of observation, pain characteristics (duration, location, intensity, quality), associated and accompanying symptoms

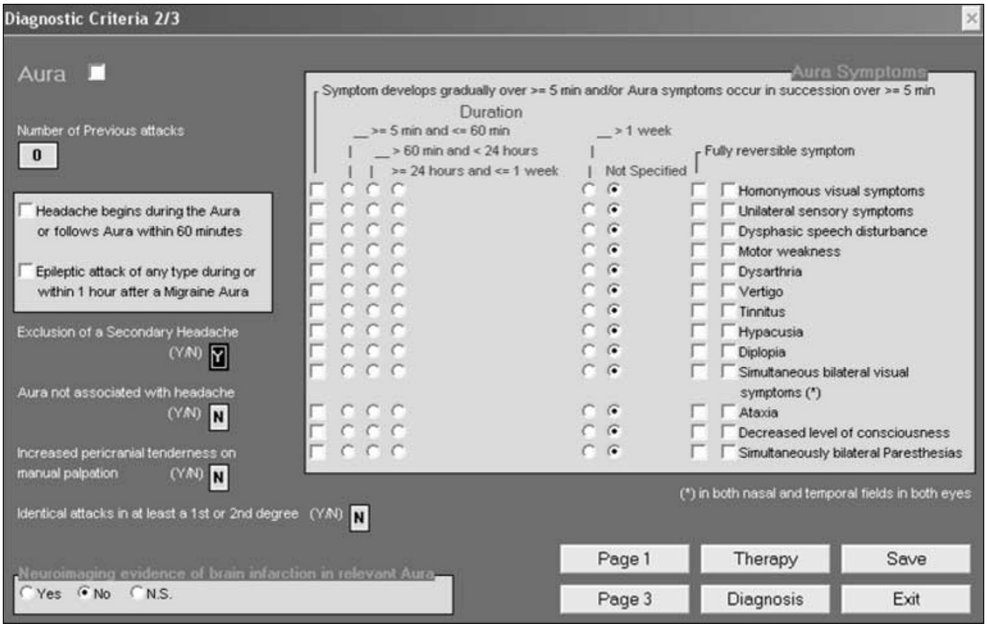

Fig. 2 Second sheet of the computerised record in the latest version. It allows input of the variables relevant to aura, exclusion of a secondary headache, presence of pericranial tenderness (tension-type headache), cluster period duration and attack-free periods

Fig. 3 Third sheet of the computerised record in the latest version. This third screen allows the user to return to screens 1 and 2, to access the output diagnosis, and also to save the data. There is also a button for access to an additional sheet dedicated to symptomatic and prophylactic treatment and for additional annotations

The module is now in beta 1 testing for the diagnostic category, 1.3 *Childhood periodic syndromes*, which are common precursors of migraine, and in time the software will also include this important migraine subtype, for which an additional screen will be dedicated.

As in the previous 2.0 version, the actual 3.0 version allows the diagnosis of tension-type headache to the third digit. The diagnoses of cluster headache allowed to the third digit were all covered as in version 2.0, but the other trigeminal autonomic cephalgias, 3.2, 3.3 and 3.4, which were lacking in the previous version, are now introduced to the second digit in the 3.0 version. The screens of the actual version of the computerised record are shown in Figures 1–3.

Moreover, our intention is to develop all subtypes included in the diagnostic group of headaches attributed to substances or their withdrawal, which is strictly bound to the diagnoses of CM and CTTH. At the moment, verification for the occurrence of drug abuse is entrusted exclusively to the clinician.

Application of "IHS Diagnostic Criteria for Primary Headache" in the two versions, 1988 and 2004

First version (1988 IHS Classification)

We tested the computerised structured record based on 1988 IHS Criteria by entering and analysing data reported on the case sheets of 500 consecutive patients attending nine headache centres in Italy [4].

The rate of concordance between the diagnosis provided by the computerised structured record and that reported by clinicians on the case sheets was calculated, and reasons for any discrepancies between the two diagnoses were analysed. Concordance between the two diagnoses was found in 345 of 500 cases examined (69%). In the remaining 155 cases, diagnoses reached with the computerised structured record and the case sheets were impossible or discordant with respect to the diagnoses made by the clinician. In 144 of these cases

(28.8%), this was due to missing information or errors in the diagnosis recorded by the clinicians on the patients' case sheets.

In particular, the diagnosis could not be reached using the computerised structured record in 105 cases (20.6%), because of a lack of one or more pieces of data needed in formulating a correct diagnosis according to IHS operational criteria for one of the primary headache disorders. In the remaining 41 cases, some data were missing, but the data available were sufficient to reach a diagnosis according to IHS criteria. Moreover, the diagnoses reached using the computerised structured record were not in agreement with those made by the clinicians in another 39 cases (7.8%), due to an incorrect interpretation by the clinicians of the data reported on the patients' case sheets. In only 2.2% of cases (n=11), misdiagnoses were due to programme errors that were promptly corrected. This study therefore suggests that incorrect application of IHS criteria for the diagnosis of primary headaches may occur in as many as one-third of patients attending headache Centres, and that use of a computerised structured record based exclusively on current IHS criteria may overcome this deficiency.

Second version (based on ICHD-2)

We tested the computerised structured record by entering and analysing different cases of primary headaches and the corresponding output diagnoses, with particular regard to the new entities introduced: diagnoses of probable migraine with and without aura, probable frequent and infrequent tension-type headache, CM and probable CM, and finally, probable tension-type headache.

First, we assessed the clinical chart and headache diaries of the first 200 consecutive patients who attended our Headache Centre in 2004, using the ICHD-II computerised system.

Diagnosis of one of the primary headache forms was obtained in 67.9% of cases. A certain diagnosis of primary headache plus that of a probable form was obtained in 24.4% of cases (12.7% represented by CM or CTTH+probable medication-overuse headache). Only probable forms were diagnosed in the remaining 7.3% (as single probable diagnoses in 5.8% of cases or multiple diagnoses of probable forms in the remaining ones).

Some cases, which were analysed using the 2.0 version of our record, prompted us to propose some modifications to the new diagnostic criteria for probable frequent and infrequent tension-type headache [5]. These proposals were published as a Letter to the Editor in one of the first issues of *Cephalalgia*, 2005 [6].

One example is the case with an output diagnosis of frequent episodic tension-type headache, which, based on the ICHD 2nd edition classification system, also fulfils criteria A and B for probable infrequent headache. This is because the diagnostic criterion A for probable infrequent episodic tension-type headache is misleading, stating: "Episodes fulfilling all but one of criteria A–D for 2.1 *Infrequent episodic tension-type headache*". To avoid this drawback, we propose to change criteria A and B for infrequent tension-type headache as follows: A. Headache episode occurring on <1 day per month on average (<12 days per year) for a period of >3 months and lasting from 30 minutes to 7 days. B. At least 10 episodes fulfilling criterion A. Criteria C–E remain unchanged. Consequently, we suggest the following definition for Criterion A of "2.4.1 *Probable infrequent episodic tension-type headache*": Episodes fulfilling criterion A and all but one of criteria B–D for 2.1 *Infrequent episodic tension-type headache*. Criteria C and D remain unchanged.

Another case is that for which we have 3 probable diagnoses: probable frequent headache, probable infrequent headache and probable migraine. Based on the modifications proposed above, one of the probable diagnoses can be excluded, and the differential diagnosis between two probable forms (i.e., probable frequent headache and probable migraine) remains. The clinical judgement in this case is pivotal.

3.0 version (based on ICHD-II, implementation of 2.0 version)

After further implementation of our computerised record, we focused our attention on the first 200 consecutive patients with primary chronic headaches who attended our clinic in 2004. Certain diagnoses, mainly CM (28.4%), and to a lesser extent tension-type headache (6.5%), were obtained in 34.9% of cases. A certain diagnosis of a chronic form plus a probable form was obtained in 50.8% of cases (26.9% represented by probable medication-overuse headache). Only probable forms were diagnosed in 13.46% (as single probable diagnoses in 8.73% of cases or multiple diagnoses of probable forms in the remaining ones).

A small group of patients (n=7) was identified who have 15 or more headaches per month, fulfilling the diagnostic criteria for both 1.5.1 *Chronic migraine* and 2.3 *Chronic tension-type headache*. This is considered in the classification in the comments to CTTH. The classification states, in fact, that it is possible to have the two diagnoses when two (and only two) of the four pain characteristics are present and headaches are associated with mild nausea. In these rare cases, other clinical evidence that is

not part of the explicit diagnostic criteria should be taken into account and the clinician should make the best possible choice of diagnosis based on this.

For 5 other patients, we obtained with our computerised record the diagnosis of both probable migraine and CM. These are the cases of patients who have migraine attacks for 15 days or more per month for more than 3 months but with a duration of attacks less than 4 hours, as stated in the diagnostic criteria for migraine without aura in patients >18 years of age. This was a minor imprecision of the software, which was immediately corrected on the basis of the comment to 1.6.1. *Probable migraine without aura*, where it is stated: "Do not code 1.6.1 *Probable migraine without aura* if the patient fulfils the criteria for 1.5.1 *Chronic migraine* or 1.5.2 *Status migrainosus*. In particular, we would like to point out that the diagnostic criterion A for CM states that headache should fulfil criteria C and D for 1.1 *Migraine without aura* on ≥15 days/month for >3 months, but not criterion B, which implies duration of headache attacks lasting 4–72 hours. In 11 cases the diagnosis of CM could not be obtained, despite the presence of migraine features and the occurrence for >15 days. This is because the observation period was <3 months in 1 case, criterion C for 1.1 was not fulfilled in 5 cases, or criterion D for 1.1 was not fulfilled in another five cases. A single interesting case with features of tension-type headache attacks had 6 probable diagnoses. The 2 diagnoses of probable infrequent and probable frequent headache were discarded according to modifications proposed by our group, whereas that of probable CTTH and probable medication-overuse headache remained, together with the additional diagnosis of probable migraine without aura. In 6 other cases we obtained the diagnosis of headache not classified. In one case it concerned a patient fulfilling all but one of the diagnostic criteria for "2.3 *Chronic tension-type headache*". We would like, however, to mention in this regard that the diagnosis of probable CTTH only refers to a headache that fulfils all criteria of CTTH and is not attributed to another disorder, but is associated, within the last 2 months, with medication overuse, fulfilling criterion B for any subforms of 8.2 *Medication-overuse headache*. Therefore, it can be attributed to patients fulfilling all but one criteria of CTTH when drug abuse does not occur. For 2 patients, the output diagnosis was headache not classifiable, because a chronic headache with migraine features and without medication abuse was present, which fulfilled all but one of criteria CD for Ò1.1 *Migraine without aura*" on ≥15 days/month for >3 months, given that in this as in the previous case, the term probable is exclusively limited to the presence of a medication overuse fulfilling criterion B for any of the subforms of "8.2 *Medication overuse headache*". The situation is also more complicated in 3 additional cases and led to the diagnosis of headache non-classifiable when CTTH (1 patient) and CM (2 patients) fulfil all but one of criteria CE for tension-type headache occurring on ≥15 days/month on average for >3 months, or criteria CD for "1.1 *Migraine without aura*" on ≥15 days/month for >3 months, respectively, when medication overuse is present.

Conclusions

The examples reported underscore the usefulness of a computerised device based on the ICHD 2nd edition for diagnostic purposes in tertiary centres dedicated to headaches in clinical practice as well as its relevance for research. This computerised device may help to validate the new diagnostic criteria and to answer some emerging questions, such as those presented above, arising from the application of the new classification version, the relevance of which should be verified in clinical practice.

This could surely help to clarify unsolved questions, and in this regard debate is needed among all the authors of the classification and among all those trying to apply the new diagnostic criteria, both in the clinical setting and in the research field. This should be the objective of the new group of IHS, which is dedicated to setting up a computerised system for headache diagnosis according to the ICHD 2nd edition classification, and our invitation to its members is to urgently commence work in this direction.

References

1. Headache Classification Committee of the International Headache Society (1988) Classification and diagnostic criteria for headache disorders, cranial neuralgias and facial pain. Cephalalgia 8[Suppl 7]:1–96
2. Headache Classification Subcommittee of the International Headache Society (2004) The International Classification of Headache Disorders, 2nd edn. Cephalalgia 24[Suppl 1]:9–162
3. Pedini M, Alberti A, Mazzotta G, Sarchielli P (2005) Diagnostic criteria for primary headaches of ICHD 2nd edition 2004: electronic sheet Vers Int. W 2.0. In: Olesen J (ed) Classification and diagnosis of headache disorders. Oxford University Press, Oxford, pp 33–39

4. Gallai V, Sarchielli P, Alberti A, Pedini M, Gallai B, Rossi C, Cittadini E; Collaborative group for the application of IHS criteria of the Italian society for the study of headache (2002) Application of the 1988 International Headache Society diagnostic criteria in nine Italian headache centers using a computerized structured record. Headache 42:1016–1024

5 Sarchielli P, Pedini M, Alberti A, Capocchi G (2005) Application of ICHD 2nd edition criteria for primary headaches with the aid of a computerized, structured medical record: some considerations. In: Olesen J (ed) Classification and diagnosis of headache disorders. Oxford University Press, Oxford, pp 279–286

6 Sarchielli P, Alberti A, Pedini M, Gallai V (2005) ICHD 2nd Edition: some considerations on the application of criteria for primary headache. Cephalalgia 25:157–160