



Review article

Cervicogenic headache: a critical review of the current diagnostic criteria

Massimo Leone, Domenico D'Amico, Licia Grazzi, Angelo Attanasio, Gennaro Bussone*

Headache Centre, Carlo Besta National Neurological Institute, via Celoria 11, 20133 Milan, Italy

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Abstract

Opinions are divided on the use of the term cervicogenic headache (CGH) in cases with no evidence of cervical damage. According to Sjaastad et al. (1990), CGH is diagnosed from three features: (1) unilateral headache triggered by head/neck movements or posture; (2) unilateral headache triggered by pressure on the neck; (3) unilateral headache spreading to the neck and the homolateral shoulder/arm. Other characteristics are not essential for CGH diagnosis, including pain improvement after greater occipital nerve (GON)/C2 block. However, other authors give different definitions of CGH, and this may explain why reported frequencies for this headache vary so widely. In this paper we critically review the major diagnostic criteria of Sjaastad et al. for CGH in the light of clinical studies conducted at our institute and other literature findings. In a study of 500 headaches we found only two patients with unilateral headache triggered by head/neck movements or posture, and no cases of neck pressure-induced headache. No clear-cut criteria are given in the literature for differentiating CGH trigger points from myofascial trigger points. In another study of 440 primary headache patients we found that in the unilateral long-lasting headache group (64 migraines and 10 tension-type headaches), a pain involving the occiput/neck was present in 30 migraine and seven tension headache patients; thus, according to the CGH major criteria, 10% (30/307) of 'migraines' and 7% (7/96) of 'tension headaches' could be diagnosed as CGH. However, one cannot exclude that the association of unilateral pain with posterior irradiation is due to the high prevalence of migraine, tension-type headache and chronic neck pain. The relation between CGH and whip-lash injury has been put in doubt by a recent study which found no difference in headache frequency between trauma and control groups and reported no specific headache pattern in the trauma group. Other reports suggest that, when it occurs, CGH usually disappears within a year of whip-lash, throwing doubt on the appropriateness of surgery for post-traumatic CGH. The lack of specificity of GON/C2 block as a treatment for CGH adds further difficulties to the diagnosis of this headache. We conclude that, although neck structures play a role in the pathophysiology of some headaches, clinical patterns indicating a neck-headache relationship have still not been adequately defined. We believe that further rigorous studies are needed to definitively confirm the validity of CGH as a nosological entity. © 1998 International Association for the Study of Pain. Published by Elsevier Science B.V.

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1. Introduction

It is well known that headaches can originate from disorders of the neck, and for such conditions the term cervicogenic headache (CGH) would seem appropriate. However the use of this term for headaches whose origin from a neck condition can only be surmised or inferred (since direct evidence of cervical pathology is lacking) has generated considerable controversy (Edmeads, 1988). The problem is not merely academic, since recent analyses indicate that

back and neck pain costs society a considerable fraction of total health spending and are a major cause of morbidity and disability (Haldeman, 1996). This emphasizes the need for precise and reliable criteria for the diagnosis and treatment of painful conditions involving the neck.

The two major international organizations concerned with head pain, take differing positions with regard to the status of CGH. The current position of the International Headache Society (IHS, 1988) is to use the category 'headache associated with disorder of the neck' to accommodate forms associated with demonstrable neck pathology, but considers the concept of CGH in the absence of such pathol-

* Corresponding author. Tel.: +39 2 2394264; fax +39 2 70638067.

ogy 'not sufficiently validated'. See Appendix A for details. In contrast the International Association for the Study of Pain (IASP, 1994) gives general descriptions of the various possible manifestations of CGH, but does not specify whether the presence of clear-cut neck pathology is necessary to make the diagnosis (Appendix B).

Sjaastad has long been concerned with relations between headache and cervical spine conditions; following careful clinical observations the term CGH was proposed for a headache form thought to originate from unspecified neck structures (Sjaastad et al., 1983). This conception of CGH is widely accepted in Europe. The description of Sjaastad et al. (1990) of the clinical characteristics of CGH is extensive and includes numerous items; their major diagnostic criteria are reproduced in Appendix C. According to Sjaastad et al. (1990), '...points I and II are obligatory for the diagnosis. As for the subgroups a–b in point II, the presence of at least one of them is considered to be obligatory for the diagnosis. It suffices that a1 or a2 is present for subgroup IIa. The presence of IIc will further corroborate the diagnosis'.

Based on these criteria (Sjaastad et al., 1990) it is possible to pose a diagnosis of CGH in the presence of at least three distinct sets of symptoms.

1. Unilateral headache triggered by movements of head or neck or certain head posture (major criteria I plus IIa1);
2. Unilateral headache triggered by pressure on the neck (major criteria I plus IIa2);
3. Unilateral headache spreading to the neck or possibly the homolateral shoulder or arm (major criteria I plus IIb).

The association of past craniocervical trauma with temporary disappearance of the pain after greater occipital nerve (GON) or C2 nerve block on the pain side make the diagnosis more likely, but this is not considered necessary for the diagnosis (Sjaastad et al., 1990). Other pain characteristics and associated phenomena have also been given but again are not necessary for the diagnosis.

It is noteworthy that this definition is very similar to the description of CGH given by IASP (1994) (see Appendix B) the main difference being that IASP considers response to GON/C2 block a characteristic of CGH.

Other definitions and descriptions of CGH are to be found in the literature, but there are many, often irreconcilable, differences between them. For example, not all agree that fixed unilaterality is necessary for the diagnosis (Berger and Gerstenbrandt, 1986). Use of the same term for different clinical syndromes of poorly defined etiology, in addition to the lack of satisfactory epidemiological and concordance studies on CGH, result in confusion when one seeks to formulate a clinical diagnosis of this condition. In particular the main problem in clinical practice is to reliably differentiate CGH from migraine and tension-type headache. It is not surprising, therefore that the reported frequencies of CGH vary so widely (0.4%–15%) (Manzoni et al., 1990; Pfaffenrath and Kaube, 1990; D'Amico et al., 1994).

2. Aim of the study

Having set the scene by reviewing some of the problems associated with the nosology of CGH, we shall now critically review the major diagnostic criteria of Sjaastad et al. for CGH in the light of clinical studies conducted at our Headache Center over the last few years and other literature findings.

3. Fixed unilaterality

Fixed unilaterality (without side-shift) is a cardinal symptom for the diagnosis of CGH according to Sjaastad et al. (1990) even though bilateral forms are admitted. Among 1169 long-lasting (>4 h) primary headaches registered by our Center between 1988 and 1990, the frequency of unilaterality was 17% among migraines (127/767), 4% among tension-type headaches (10/244) and 27% (32/120) among non-classifiable headaches (Leone et al., 1993). Predictive power calculation showed that the most likely diagnosis when sidelocked unilaterality was present was migraine. This was in fact as expected since migraine is the most frequent headache in the group studied and because unilaterality is one of the characteristics of migraine pain. The high frequency of unilateral headache in the non-classifiable headache group could in part be due to the presence of migraine or CGH cases, since the data were abstracted from clinical records compiled at a time when neither the IHS diagnostic criteria of 1988 nor the CGH criteria of 1990 were used routinely at our Center. Subsequently we validated and used a computerized clinical record form containing all the elements required to diagnose primary headaches according to the IHS and Sjaastad et al. (Leone et al., 1994).

4. Symptoms and signs of neck involvement: attacks triggered by neck movement or sustained awkward head positioning

According to the major criteria, unilateral headache triggered by head or neck movements or a certain head posture is one of the important indicative signs of CGH. To the best of our knowledge the literature is silent on the frequency of headaches triggered by such conditions. We therefore analyzed the frequency and distribution of these clinical characteristics in a series of headaches assessed at our Center. Among 500 primary headaches observed in 410 consecutive patients seen from 1993 to 1995, there were six patients in whom the pain was triggered by head/neck movements or head posture; however only two of these were in the group of 112 long-lasting unilateral headaches (Leone et al., 1995a; Leone et al., 1995b). Thus the frequency of CGH was 0.4% (2/500) in this population. This finding suggests the conclusion that headache triggered by head movement

or fixed posture is not a very sensitive or specific diagnostic criterion.

5. Symptoms and signs of neck involvement: attacks elicited by external pressure over ipsilateral upper or posterior neck region or occiput

Another indicative characteristic of CGH according to the major criteria of Sjaastad et al. (1990) is unilateral headache triggered by pressure on the neck. Once again we note that the literature has little to say about the frequency of induction of specific forms of headache as a result of pressure on particular areas of the head or neck. In our series of 500 headaches (Leone et al., 1995b), not one was triggered by such pressure. In a study of 11 cases (Jaeger, 1989) diagnosed with CGH according to Sjaastad et al., 34 'very tender myofascial trigger points' were identified on the pain side; 70% ($N = 24$) of these points were over masseter, temporal or sternocleidomastoid muscles (venter muscoli, sternal and clavicular insertions of the latter but not its mastoid insertion); only 30% ($N = 10$) were located posteriorly (homolateral splenius, semispinalis and trapezium) in conformity with the criteria of Sjaastad et al. Clearly further studies are required to better document headache triggered by pressure on the head/neck. It would be particularly important to differentiate the so-called myofascial trigger points considered characteristic of myofascial syndromes from craniocervical triggers of CGH (Bogduk, 1993).

6. Symptoms and signs of neck involvement: ipsilateral neck, shoulder and arm pain of vague, non-radicular nature

The third indication of CGH is unilateral headache spreading to the neck, homolateral shoulder or arm. Among 440 consecutive primary headache patients seen at our Center from November 1992 to April 1993, 74 had unilateral long-lasting (>4 h) headaches, 37 (50%) of whom complained that the pain spread to the occiput and could therefore have been diagnosed as CGH (D'Amico et al., 1994). In this study 307 migraines and 96 tension-type headaches were diagnosed. Among the unilateral long-lasting headaches (64 migraines and 10 tension-type headaches), a pain involving the occipital region was present in 30 migraines and seven tension-type headaches. One might conclude, therefore, that 10% (30/307) of all forms of migraine and 7% (7/96) of all tension-type forms were CGH. However, one cannot exclude the possibility that the association of unilateral pain with posterior irradiation is, at least in part, attributable to the high frequencies of migraine, tension-type headache and chronic neck pain in the general population (around 12%, 70% (Rasmussen et al., 1991) and 10%, respectively (Makela et al., 1991)). We conclude that this set of clinical symptoms seems to be too broad to be of

practical clinical use and other characteristics need to be added to render the diagnosis more secure.

7. GON/C2 block and CGH

A characteristic that might seem to be important for identifying and diagnosing CGH is the response to GON or C2 block (IASP, 1994). However this is not considered a major criterion by Sjaastad et al. (1990), and in fact reduction or disappearance of pain after this kind of anesthesia does not seem to be specific for CGH. Thus, Gawel and Rothbarth (1992) reported that GON block was efficacious in 54% (52/97) of migraines and 71% (62/87) of post-traumatic headaches. Caputi and Firetto (1997) reported significant improvement in 85% of 23 migraines treated with GON block, sometimes in association with supraorbital nerve block. Jansen et al. (1989) found that in all their 14 patients with various headaches (probably CGH, cluster headaches and chronic paroxysmal hemicrania, from the descriptions) the pain disappeared after C2-C3-C4 block. Magnusson et al. (1996) noted the disappearance of pain after C2 block in 15 patients with persistent unilateral occipital pain appearing after whip-lash injury. Bovim and Sand (1992) investigated the efficacy of GON block in 24 patients with CGH, 14 with migraine and 14 with tension-type headache and found a significant reduction in pain 30 min after administration of the block in 54% of CGH, 14% of tension-type and 6% of migraine patients. It is known that GON block is more effective when pain is confined to the distribution of the nerve (Hakkinen et al., 1995). In their study Bovim and Sand did not specify the site of the pain; the greater efficacy of GON block in the CGH compared to migraine patients, might be because in patients with CGH the pain is more prominent posteriorly (occipito-nucal region), while in migraine the pain tends to be perceived in the anterior regions of the head. Recall that according to the IHS (1988), the site of the pain has no diagnostic significance for migraine or tension-type headache. That GON block has rather limited significance in the diagnosis of CGH also emerged from our examination of five CGH patients (among 440 patients with primary headaches), only two of whom (40%) obtained benefit from the procedure (D'Amico et al., 1994).

8. Whip-lash injury and cervicogenic headache

Another characteristic considered suggestive of, but not a major criterion for, CGH is whip-lash injury prior to headache onset. Schrader et al. (1996) conducted a study on 202 patients with persistent headache after whip-lash injury outside the medicolegal context. They found that the frequency of headache was no different from that in a control group; furthermore they did not describe a consistent headache pattern among the whip-lash group. Similarly in a study

by Lord et al. (1994) on patients with post-traumatic headache whose pain improved after C3 block, no specific clinical pattern emerged. We found only one patient (3%), among 33 with headache after whip-lash injury, whose headache conformed to one of the CGH criteria of Sjaastad et al. (unilateral headache with pain triggered by neck movements) (unpublished observation).

9. Surgical procedures and cervicogenic headache

A recent study reported that the majority of CGH cases arising after whip-lash disappear within a year of the trauma (Drottning et al., 1997). This finding leads one to wonder whether surgery is an appropriate treatment for patients diagnosed with post-traumatic CGH. Many different surgical approaches, on disparate parts of the neck, are claimed as highly effective treatments for CGH (for review see Pollmann et al., 1997). However, the absence of clearly demonstrable involvement of specific neck structures in CGH, and because most studies were not conducted on uniform series of patients selected by pre-established criteria, it is difficult, if not impossible, to say which CGH patients (diagnosed according to which CGH definition?) are likely to benefit from surgery, and what anatomical structure should be the target of the operation. When patients were selected and evaluated in a rigorous fashion, the results of surgery for CGH were rather modest. Thus in the study of Bovim et al. (1992) of 50 CGH patients selected according to uniform criteria, and undergoing GON liberation, 70% of the patients had re-occurrence of their headache after 3 months, and after 16 months the headache had recurred in 90%.

10. Conclusions

Although it seems abundantly clear that neck structures play a primary role in the pathophysiology of some headaches, either as a main causal factor or as a cofactor, the clinical patterns indicating a neck-headache relationship have still not been adequately defined. Furthermore, the relations between whip-lash injury and CGH require further clarification, and the use of surgery as a treatment for CGH appears in pressing need of critical revision. We believe that rigorous studies are urgently needed to definitively confirm or refute the validity of CGH as a nosological entity.

Appendix A Criteria for headaches associated with disorder of the neck (IHS, 1988)

The IHS currently uses the category 'headache associated with disorder of the neck' to accommodate headaches which manifest as

- '(A) Pain localized to neck and occipital region. May project to forehead, orbital region, temples, vertex or ears;
- (B) Pain is precipitated or aggravated by special neck movements or sustained neck posture;
- (C) At least one of the following:

1. Resistance to or limitation of passive neck movements.
2. Changes in neck muscles contour, texture, tone or response to active and passive stretching and contraction.
3. Abnormal tenderness of neck muscles;

(D) Radiological examination reveals at least one of the following:

1. Movement abnormalities in flexion/extension.
2. Abnormal posture.
3. Fractures, congenital abnormalities, bone tumours, rheumatoid arthritis or other distinct pathology (not spondylosis or osteochondrosis).'

Appendix B Description of cervicogenic headache (IASP, 1994)

'Attacks of moderately severe unilateral head pain without change in side, ordinarily involving the whole hemicranium, usually starting in the neck or occipital area, and eventually involving the forehead and temporal areas, where the maximal pain is frequently located. The headache usually appears in episodes of varying duration in the early phase, but with time the headache frequently becomes more continuous, with exacerbation and remissions. Symptoms and signs such as mechanical precipitation of attacks imply involvement of the neck. A blockade of the greater occipital nerve, the minor occipital nerve, the so-called third occipital nerve, or the cervical roots on the symptomatic side... represents a diagnostic test.'

Appendix C Major criteria for the diagnosis of cervicogenic headache (Sjaastad et al., 1990)

- I. Unilaterality of head pain, without sideshift.
- II. Symptoms and signs of neck involvement:
 - a. Provocation of attacks:
 1. Pain, seemingly of a similar nature, triggered by neck movement and/or sustained awkward head positioning.
 2. Pain similar in distribution and character to the spontaneously occurring pain elicited by external pressure over ipsilateral upper, posterior neck region or occipital region.
 - b. Ipsilateral neck, shoulder and arm pain of a rather vague, non-radicular nature.
 - c. Reduced range of motion in the cervical spine.

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