



Headache secondary to cervical artery dissections: practice pointers

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Abstract

Cervical artery dissections may present with mild and misleading symptoms such as a headache or cervical pain. In the absence of early diagnosis and therapy, such patients may have a high risk of cerebrovascular events. In order to refine evaluation of cervical artery dissections, we report the experience of a single center, focusing on clinical findings (e.g., headache and pain-related features at onset). From 2012 to 2017, 49 patients with cervical arteries dissections were admitted to our institution; 28 out of 49 patients (57%) presented with a headache or cervical pain, which were evaluated according to the International Classification of Headache Disorders (ICHD-III beta). Item C3a of ICHD-III beta (“pain is severe and continuous for days or longer”) was present in all patients symptomatic for a headache. Another common characteristic was the recent onset, with an average (\pm SD) timing from the onset of a headache to the first neurologic evaluation of 3 (\pm 2) days (range 1–5). A refined clinical evaluation of patients presenting with a headache at the Emergency Department could improve the early detection and management of patients with cervical artery dissections, in particular when presenting without other associated neurological symptoms.

Keywords Secondary headache · Cervical artery dissection · Carotid artery dissection · Vertebral artery dissection

Introduction

Cervical artery dissection (CeAD), namely carotid and vertebral artery dissection, represents a relevant cause of stroke, predominantly in young patients, but it is frequently underdiagnosed [1, 2]. This is probably due to the subtle and unspecific symptoms CeAD may present with [1, 3, 4]. In fact, patients with carotid artery dissection (CAD) may show predominantly pain and other local ipsilateral neurological symptoms, whether vertebral artery dissection (VAD) is mainly characterized by local posterior neck pain and occipital cephalalgia. Following this mild and misleading presentation, a high risk of early cerebrovascular complications is reported [5–7], probably due to embolism from a thrombus originating at the dissection site [8]. In particular, it has been recently

shown that the risk of stroke after CeAD unaccompanied by ischemia at presentation is limited to the first 2 weeks [9]. Given that, a prompt diagnosis of CeAD is essential to correctly address the therapeutic strategies and to prevent complications [10]. This early diagnostic phase based on rapid recognition of symptoms is crucial if we assume CeAD as a series of linked events beginning with the dissection, followed by a headache (\pm local symptoms), and concluding with cerebrovascular complications (embolic/hemodynamic). This hypothesis deals with the possibility that CeAD may be asymptomatic at first, becoming symptomatic afterward [1]. However, it is difficult to identify a pattern of pain-related features specific for CeAD, especially in the absence of other neurological signs. In the third edition of the International Classification of Headache Disorders (ICHD-III beta), diagnostic criteria for a headache attributed to CeAD have been significantly modified [11], improving its reliability in CeADs’ detection at first clinical evaluation [12]. Selected headache-related features have been powerfully emphasized: the acute onset, the continuous lasting, and its time-persistence [11]. Nevertheless, the systematic application of these criteria in clinical practice is still largely limited. Here, we confirm the importance of ICHD-III beta in the early detection of a headache secondary to CeAD, and we apply this classification to identify possible “red flags” for CeAD in the clinical-diagnostic workout.

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Case series

We retrospectively evaluated consecutive cases admitted to our institution in Grosseto, with the diagnosis of CeAD (ICD-9-CM codes: 443.21, 443.24) from January 2012 to December 2017. All patients underwent cervical artery Doppler ultrasounds (DU) followed by angiography CT scan or magnetic resonance angiography for the diagnostic confirmation. Main patients' clinical features are reported in Table 1. In total, we found 49 patients diagnosed with CeAD, 26 of whom were females (mean age \pm SD; 56 ± 11 years; range 30–85). CADs were 27 (48%), five of whom (18% of CAD) bilateral; VADs were 29 (52%), two of whom (7% of VADs) were bilateral, and two others (8% of VAD) had an intracranial extension.

Twenty-eight patients (57%) were symptomatic for a headache or cervical pain (of those, 6 had headache only, 10 had isolated cervical pain, and 12 had both headache and cervical pain), and they have been evaluated according to the new ICHD-III beta criteria (Fig. 1). Seventeen out of 28 patients (61%) showed other clinical findings (Horner's syndrome, cranial nerves deficit, dizziness, postural instability, syncope, transient ischemic attacks, stroke); while the remaining 11 patients (39%) reported no other symptoms (4/11 had CAD and 7/11 had VAD). Headache/cervical pain had an acute onset in most cases (26/28 patients, 93%), while two cases (7%) had a previous personal history of a chronic headache, but referred a modification of their "usual" headache. Interestingly, we observed that item C3a of ICHD-III beta ("pain is severe and continuous for days or longer") was the most recurrent in our group of patients with a headache (100%). The other common characteristic was the recent onset, with an average (\pm SD) timing from the onset of a headache to the first neurologic evaluation of $3 (\pm 2)$ days (range 1–5). The intensity of pain was minimal-

Diagnostic Criteria for Headache Attributed to Cervical Arteries Dissection

A. Features of headache should follow criterion C
B. Diagnosis of cervical arteries dissection is essential
C. At least two among: <ol style="list-style-type: none"> 1. Evolution of pain in close temporal relation to other signs of cervical artery dissection; or pain leads <i>per se</i> to the diagnosis of cervical artery dissection 2. One or both among: <ol style="list-style-type: none"> a) Worsening of pain contemporarily with other signs of cervical arteries lesion b) Pain improves or resolves within 1 month after the onset 3. One or both among: <ol style="list-style-type: none"> a) Pain is severe and continuous for days or longer b) Pain precedes signs of acute retinal and/or cerebral ischemia 4. Pain is unilateral and ipsilateral to the dissected cervical artery
D. Headache is not justified by another ICHD-3 diagnosis

Fig. 1 Diagnostic criteria for headache attributed to cervical arteries dissection (modified from: Headache Classification Committee of the International Headache Society (IHS), 2013) [11]

moderate (2–5/10 on a VAS scale) in 10 out of 28 patients (35%) and moderate-severe (6–9/10 on a VAS scale) in 18/28 patients (65%). Patients with minimal-moderate pain intensity were mostly those with isolated cervical pain (9 out of 10); differently, patients with moderate-severe pain were mainly those with headache associated or not with cervical pain (17 out of 18). Localization of pain, as expected, was prevalent in lateral cervical regions and facial region in CAD, whether in VAD, it was prevalent in posterior bilateral neck regions.

Discussion

Since a headache or cervical pain was the unique symptom leading to the diagnosis in almost 60% of our patients, a

Table 1 Main clinical features of the patients examined in the present study. SD, standard deviation; TIA, transient ischemic attack; DUS, Doppler ultrasounds; CTA, angiography CT scan; MRA, magnetic resonance angiography

Clinical features	
Carotid artery dissection (CAD) (<i>n</i> , %)	27, 48% (5 bilateral)
Vertebral artery dissections (VAD) (<i>n</i> , %)	29, 52% (2 bilateral)
Males, females (<i>n</i>)	26, 23
Mean age \pm SD, (age range)	56 ± 11 , (30–85)
Asymptomatic for headache (<i>n</i>)	21
Headache as unique symptom (<i>n</i>)	11
Headache associated to other neurological symptoms (<i>n</i>)	Horner, 5 Cranial nerves deficit, 5 Dizziness, 2 Postural instability, 1 Syncope, 1 TIA/stroke, 3
Diagnostic procedures (DUS, CT, MRI) (<i>n</i>)	DUS, 49 CTA, 33 MRA, 16

detailed analysis of features associated with these symptoms is essential. It is noteworthy that a new type of headache with a recent onset is the first important step in the differential diagnosis of secondary headaches [11]. Hence, two different scenarios are possible: the first one is characterized by a headache associated to other neurological symptoms, and items C1 and C2a (temporal relationship of a headache with other neurological symptoms) are of valuable help in the diagnostic process [11]. The second scenario consists of an isolated headache. In that insidious context, clinicians should investigate the anamnesis and the headache-related clinical features, to address the diagnostic workout. In that scenario, item C3a of ICHD-III beta represents a “red-flag” of a secondary headache. In our experience, the time-persistency associated with a recent onset headache constitutes the two most predictive clinical features for a headache secondary to CeAD. Hereafter, the diagnosis may be supported by the typical distribution of pain with an anterior localization of pain in CAD, and a more posterior localization in VAD [5]. Interestingly, the intensity of pain was minimal-moderate mainly in patients with isolated cervical pain, and moderate-severe in those with a headache associated or not with cervical pain, as previously reported [13].

Conclusions

A recent-onset headache with a continuous and time-persistent pain might be considered the most important “red-flags” of paucisymptomatic CeAD, which should not be overlooked as a potential diagnosis in the Emergency Department. When these “red-flags” are present, the diagnostic workout should consider CeAD, after the exclusion of other etiologies (infections, venous thrombosis, etc.) [14]. In conclusion, we suggest that the management of patients with a recent-onset headache should be based on a three-step practical approach based on: (a) evaluation of critical clinical features, (b) standard neuroimaging (cranial CT scan, for instance), and (c) flow-imaging exams (DU or angiography CT scan).

Nevertheless, the present study has relevant limitations, as it retrospectively evaluated clinical and vascular features of patients with a definite diagnosis of CeAD. Identification and validation of predictors of CeAD in the Emergency Department, as well as their clinical impact, warrant prospective studies on larger samples.

Compliance with ethical standards

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Conflict of interest The authors declare that they have no conflict of interest.

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