



Clinical Study of Eleven Patients with Cervicogenic Headaches, Mixed Cervicogenic Headaches and Migraine and Associated Pathologies

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Abstract

Clinical study of eleven patients, ranging from 34 to 81 years-old, with cervicogenic headaches were studied with intense headaches and the neck as a source of pain irradiated to occipital and temporal regions and backwards, which exhibited NMR images of cervical and lumbar spine pathology, osteoporosis, gallstones and colecystitis. The following associated cardiovascular, neurological, neurobehavioral and metabolic diseases comorbidities were found such as blood hypertension, diabetes, obesity, hypothyroidism, partial epilepsy, tremor, familial stress, memory and sleep disorders, and dizziness. We found in addition mixed cervicogenic headache and migraine in 50% of cases studied. The headache and the associated images of cervical pathology have been clinically interpreted as cardinal signs of cervicogenic headache.

Keywords: Cervicogenic headache; Mixed cervicogenic headache; Migraine; Headache

Introduction

Hilton described the concept of headaches originating from the cervical spine in 1860. In 1983 Sjaastad introduced the term "cervicogenic headache" (CGH). Diagnostic criteria have been established by several expert groups, with agreement that these headaches start in the neck or occipital region and are associated with tenderness of cervical paraspinal tissues. Almost any pathology affecting the cervical spine has been implicated in the genesis of CGH as a result of convergence of sensory input from the cervical structures within the spinal nucleus of the trigeminal nerve. The main differential diagnoses are tension type headache and migraine headache. No specific pathology has been noted on imaging or diagnostic studies which correlates with CGH. Further research will help to clarify the theory, diagnosis, and treatment options for patients with CGH [1].

Hülse and Seifert [2] point out that it is discussed controversially whether cervicogenic pain in the head and/or neck is a pathogenic entity. The good results obtained with manual therapy in patients with head and neck pain contradict the refusal of the majority of the neurologists to accept the diagnosis "cervicogenic headache." Cervicogenic headache (CGH) is pain referred to the head from a source in the cervical spine or mediated by cervical nerves. Clinical features allow for no more than a diagnosis of probable cervicogenic headache. Definitive diagnosis requires evidence of a cervical source of pain [3-5]. On the contrary, Vincent considers that cervicogenic headache (CGH) is a well-recognized syndrome [6]. Proposed diagnostic criteria differentiate CGH from migraine and tension-type headache (TTH) in most of the cases. The best differentiating factors include side-locked unilateral pain irradiating from the back and evidence of neck involvement-

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attacks may be precipitated by digital pressure over trigger spots in the cervical/nuchal areas or sustained awkward neck positions. Migrainous traits may be present in some cases.

Frese and Evers conclude that CGH is not just a migraine variant triggered by neck dysfunction but a functional entity [7]. Becker postulate that it is clear that the cervical region contains many pain-sensitive structures, and that these are prone to injury [8]. The anatomical and physiological mechanisms are in place to allow referral of pain to the head including frontal head regions and even the orbit in patients with pain originating from many of these neck structures. The present study describes eleven patients with cervicogenic headaches (CGH) and mixed cervicogenic headaches and migraine (CGHM), and pathological diseases of cervical spine, and the associated neurological, neurobehavioral and metabolic diseases in an attempt to get deeper insight into the pathophysiology and pathogenesis of CGH.

Material and Methods

Eleven patients ranging from 34 to 81 years-old were studied at the Clinical Neuroscience Outpatient Clinic of Clinical Neuroscience Institute. Maracaibo. Venezuela. San Rafael Clinical Home and the Biological Research Institute. Faculty of Medicine, Zulia University. Cervicogenic headaches and associated pathologies were diagnosed according to the International Headache Society-IIIb criteria. The Helsinki declaration principles for research in human being were adopted.

Case Reports

Case 1: EO, 54 years old, F. Neck pain irradiated to occipital and temporal regions, shoulders and backwards. Blood hypertension, hypothyroidism, dizziness, Familial Stress, Degenerative disc disease of cervical and lumbar spine.

Diagnosis: Cervicogenic headache; Hypothyroidism and Blood hypertension.

Case 2: CB, 81 years old, F. Intense headache irradiated to neck and backwards. Blood hypertension, Diabetes, Obesity, Cervical osteophytes and osteoporosis, gallstones and cholecystitis.

Diagnosis: Cervicogenic headache; Blood hypertension; Diabetes; Obesity

Case 3: MO, 34 years old. F. Intense headache irradiated to the neck, partial seizures and crisis oculogiras, fine involuntary movements of right arm and limb, mood changes. NMR images showed discal protrusion of cervical spine cord at the level of C3 and C4. Patient received anticonceptive treatment.

Diagnosis: Cervicogenic headache; Partial epilepsy and involuntary movements

Case 4: YP, 47 years old, F. Neck pain referred to head since five years ago. Photophobia and scintillating scotoma, blurred vision, subcutaneous hematomas in arms and legs. Dyslipidemia, polyuria, polydipsia. Normal blood pressure.

Diagnosis: Mixed Cervicogenic headache and migraine and dyslipidemia

Case 5: EB, 37 years old, F. Neck pain irradiated to head and shoulders inducing holocraneal headache, left eye pain, blood hypertension, dizziness, sleep apnoea, memory disorders, and vision disturbances,

Diagnosis: Mixed Cervicogenic headache and migraine; Blood hypertension; Diabetes; Obesity

Case 6: VL, 51 years-old, F. Intense neck pain and temporo-occipital headache and transitory loss of consciousness irradiated to right arm, dizziness, vertigo, sonophobia. NMR images showed multisegmentary cervical osteopathy and arthropathy with non-compressive posterior disc displacement.

Diagnosis: Mixed Cervicogenic headache; Dizziness; Vertigo; Sonophobia; Cervical osteopathic and arthropathy

Case 7: JL, 54 years-old, F. Holocraneal headache and neck pain irradiated to head and shoulders after motor vehicle accident (Whiplas injury). Hyperthyroidism, tachycardia, depression by familial stress and conjugal separation, insomnia. NMR images showed posterior protrusion of intervertebral disc at C5 and C6 with compression of spinal cord.

Diagnosis: Cervicogenic headache and Posttraumatic headache; Tension headache; hyperthyroidism and depression

Case 8: MM, 44 years-old, F. Chronic cervicogenic headache since eight years, blood hypertension and hypertensive crisis, memory disorders, depression, dyslipidemia. Cervical RMN images showed cervical degenerative discopathy without disc protrusions. Lumbar RNM images depicted chronic radicular motor lesions

Diagnosis: Chronic cervicogenic headache; High blood pressure; Memory disorders; depression; dyslipidemia.

Case 9: MO, 34 years-old. Intense daily headache and cervical pain, partial epilepsy, depression, tremor in right hand and leg, cold sweat, mood changes, sleep disorders. NMR images showed prominent disc protrusion at C3-C4 levels. Prominent magna cistern and right rotation of dorsal vertebral column.

Diagnosis: Cervicogenic headaches; Partial epilepsy; Depression, Tremor in right hand and leg interpreted as parkinsonism

Case 10: EO, 54 years-old, F. Holocraneal headache irradiated to the facial region and shoulders, neck pain, dizziness, hypothyroidism, high blood pressure, tachycardia. NMR images showed degenerative discopathy of cervical, dorsal and lumbar vertebral column.

Diagnosis: Mixed cervicogenic headache; hypothyroidism; dizziness and high blood pressure.

Case 11: MN, 56 years old, F. Intense headache and neck pain, high blood pressure, diabetes, Fat liver, Gall lithiasis and colecistitis. NMR images showed curvature of cervical spine, osteophytes and osteoporosis.

Diagnosis: Cervicogenic headache; Diabetes; Liver and gall bladder pathology and curvature of cervical spine; osteophytes and osteoporosis

Interpretation of Results

The above clinical study showed patients, ranging from 34 to 81 years old, with intense headaches and the neck as a source of intense pain irradiated to occipital and temporal regions and backwards and NMR images of cervical and lumbar pathology, osteoporosis, gallstones and cholecystitis. The following associated comorbidities were found including neurological, neurobehavioral and metabolic diseases such as blood hypertension, diabetes, obesity, hypothyroidism, partial epilepsy, tremor, familial stress, memory and sleep disorders, dizziness. We found in addition mixed cervicogenic headache and migraine. The associated images of cervical pathology have been clinically interpreted as cardinal signs of cervicogenic headache.

Discussion

In the present paper we have studied eleven adult and aging patients, ranging from 34 to 81 years old with cervicogenic headache. There is an opinion that with increasing cervical degenerative joint disease with ageing, cervicogenic headaches become more frequent. In addition to cervicogenic headache, musculoskeletal dysfunction was also found in headaches classifiable as migraine or tension-type headache [9].

Cervicogenic headache (CEH) originates from disorders of the neck but is recognized as a referred pain in the head. Primary sensory afferents from the cervical roots C1-C3 converge with afferents from the occiput and trigeminal afferents on the same second-order neuron in the upper cervical spine. Consequently, the anatomical structures innervated by the cervical roots C1-C3 are potential sources of CGH. CGH can originate from different muscles and ligaments of the neck, from intervertebral discs, and, particularly, from the atlanto-occipital, atlantoaxial, and C2/C3 zygapophyseal joints. In addition, the vertebral and internal carotid arteries, and the dura mater of the upper spinal cord and posterior cranial fossa might participate. Cervicogenic headache is defined as headaches originating from cervical spine structures including cervical facet joints, cervical intervertebral discs, skeletal muscles, connective tissues, and neurovascular structures. According to this hypothesis, functional convergence of the upper cervical and trigeminal sensory pathways allows the bidirectional (afferent and efferent) referral of pain to the occipital, frontal, temporal, and/or orbital regions [3-5, 7,10-13]. According to Gasik, [14] the pain may spread to the neck, occipital area of skull, area of jaw and eyeballs, and arms. There are many theories trying to explain spreading of the pain outside the area innervated by C1, C2 and C3 cervical roots. Their common denominator is communication between fibres running in those roots and neurons

of trigeminal nerve. Many authors describe a possibility of such connection through the jelly-like nucleus of the trigeminal nerve located in the back funiculi of spinal cord. In this mechanism, the pain conducted via occipital nerves may affect activity of neurons of the trigeminal nerve and influence areas innervated by the trigeminal nerve. According to some authors, the necessary condition to make a diagnosis of cervicogenic headache is finding the changes of spondylosis nature of the cervical spine section in additional examinations

According to Baron et al. [15], cervicogenic headache frequently coexists with complaints of dizziness, tinnitus, nausea, imbalance, hearing complaints, and ear/eye pain. Controversy exists as to whether this constellation of symptoms may be cervically mediated. A wider spectrum of cervically mediated symptoms may exist by influence of trigeminocervical and vestibular circuitry through cervical afferent neuromodulation.

Iskra et al. [16] postulate a manual differential diagnosis between cervicogenic headaches and migraine. According to these Authors the analysis of literature suggests that manipulative effects on neck structures in cases of migraine can reduce the intensity and the duration of pain, and the frequency of attacks by no more than 20%, and the therapeutic effectiveness of manual therapy for CGH is much higher.

The patients with cervicogenic headache often had bilateral pain. The regions mainly concentrated in the temporal region, with occipital, head or orbit pains [17].

A notable portion of patients with cervicogenic headache can have an atypical presentation mimicking a primary type headache. However, cervicogenic headaches with atypical presentation can be difficult to diagnose and manage at the initial visit of the patients. Etiopathophysiology of this type of headache could be explained by the theories including discogenic, convergence and sensitization-desensitization theories [12].

Avigan et al. [18] made a systematic review evidencing the heterogeneity in the clinical characteristics used to diagnose CGH in participants recruited in randomized controlled trials and how well the diagnostic criteria used align with the most recent edition (3rd) of the International Classification of Headache Disorders

According to Jull et al. [19], restricted movement, in association with palpable upper cervical joint dysfunction and impairment in the cranio-cervical flexion test (CCFT), had 100% sensitivity and 94% specificity to identify cervicogenic headache. Musculoskeletal disorders are considered the underlying cause of cervicogenic headache, but neck pain is commonly associated with migraine and tension-type headaches.

The cervical region contains many pain-sensitive structures, and that these are prone to injury. The anatomical and physiological mechanisms are in place to allow referral of pain to the head including frontal head regions and even the orbit in patients with pain originating from many of these neck structures. Clinical

studies have shown that pain from cervical spine structures can in fact be referred to the head. Finally, clinical treatment trials involving patients with proven painful disorders of upper cervical zygapophysial joints have shown significant headache relief with treatment directed at cervical pain generators. In conclusion, painful disorders of the neck can give rise to headache, and the challenge is to identify these patients and treat them successfully [8].

Postmortem studies show that a spectrum of injuries can befall the zygapophysial joints in motor vehicle accidents. Biomechanics studies of normal volunteers and of cadavers reveal the mechanisms by which such injuries can be sustained. Studies in cadavers and in laboratory animals have produced these injuries. Clinical studies have shown that zygapophysial joint pain is very common among patients with chronic neck pain after whiplash, and that this pain can be successfully eliminated by radiofrequency neurotomy [20].

Cervicogenic headache (CEH) affects 22-25% of the adult population with females being four times more affected than men. CEHs are thought to arise from musculoskeletal impairments in the neck with symptoms most commonly consisting of suboccipital neck pain, dizziness, and lightheadedness [21].

Cervicogenic headache and dizziness

We have reported dizziness in five patients (50%). Cervicogenic dizziness (CGD) is hard to diagnose as there is no objective test [22]. Cervicogenic cephalic syndrome (CCS) comprises a group of diseases, consists of cervicogenic headache and dizziness [23].

Cervicogenic headache and blood hypertension

In the present study we have found blood hypertension in five patients with CGH (50%). According to Vincent [6], CGH may depend in addition on a central predisposition counterpart, leading to the activation of the trigeminovascular system and pain generation

Cervicogenic diseases and metabolic diseases

Metabolic diseases such hypothyroidism, diabetes and obesity were found in the patients examined, which can be considered precipitating risk factors in the elderly population. We have not found previous reported on cervicogenic headaches and interactions with these metabolic entities.

According to La Grew et al. [24], those diagnosed with cervicogenic headache were more likely to be female ($P = 0.041$), report a higher maximum pain level on presentation ($P = 0.015$), have a diagnosis of diabetes prior to presentation ($P = 0.011$). The lack of data on some of the patients who presented with headache may have led to underdiagnosis of the true incidence of cervicogenic headache. Future work should look to re-examine

the incidence of CGH in a larger cohort to validate the findings here and further define risk factors for post-procedural CGH.

Cervicogenic diseases and vertigo

We have found vertigo in one patient with cervicogenic headache. Thompson-Harvey and Hain [25] identify patient features distinguishing cervical vertigo from vestibular causes of vertigo and vestibular migraine. Cervical vertigo subjects may resemble migraine subjects who also have evidence of neck injury. These observations indicates that cervicogenic headache with vertigo should be differentiated from vestibular vertigo and vestibular migraine.

Pollak and Pollak, [26] postulate that headache is also frequent in benign paroxysmal positional vertigo (BPPV). The most common is tension-type headache, followed by migraine and cervicogenic headache. Head pain seems to be an independently associated epiphenomenon of BPPV that can worsen patients' distress.

Mixed cervicogenic headache and migraine

The presence of photophobia, sonophobia, scintillating scotoma, blurred vision, dizziness, vomits were interpreted as symptoms related to migrainous traits [6] present in the patients examined of mixed cervicogenic headache and migraine.

Cervicogenic headache and neurobehavioral disorders

We have reported depression in three cases with CGH and in one case with stress-related disorder (27%). Presumably one consequence of these associations is the hypothesis that estrogens have a role in the pathophysiology of both disorders, as have been postulated by Peterlin et al. [27] between migraine and depression. Until now, the studies into the possible mechanisms underlying these associations remains limited as concluded in previous several studies, which means that the cervicogenic headache has migrainous trait. Prospective epidemiological studies suggest a common genetic, biochemical or environmental background behind primary headaches and depression. This theory is supported by the role of the same neurotransmitter systems (mostly serotonin and dopamine) in headaches as well as in depression [28]. Pain, anxiety and depression also are comorbidities in migraine [29-31]. Furthermore, it is a common belief that in migraine without aura, neck symptoms frequently occur and that dizziness and CGH may pathogenetically be intimately related [32].

Cervicogenic headache affects a significant portion of the entire population. This type of headache especially with atypical presentation is often hard to diagnose and manage since its etiopathophysiology is not been yet well understood. Bir et al., [12] have investigated the prevalence of cervicogenic headache with atypical presentation and discussed the etiology of it, and the

outcome of surgical intervention on this type of headache in patients with cervical degenerative disease

Cervicogenic headache and Whiplash injury

We have observed a patient with whiplash injury after a car accident. This variety of cervicogenic headache has been earlier studied by Drottning et al. [33], who clarify the long-term natural course of cervicogenic headache (CGH) after whiplash injury.

Conclusion

We have observed patients with intense headaches and the neck as a source of pain irradiated to occipital and temporal regions and backwards correlated with NMR images of cervical spine pathology. The following associated cardiovascular, neurological, neurobehavioral and metabolic diseases comorbidities were found such as blood hypertension, diabetes, obesity, hypothyroidism, partial epilepsy, tremor, familial stress, memory and sleep disorders, and dizziness. We found in addition mixed cervicogenic headache and migraine in 36% of cases studied. The headache and the associated images of cervical pathology has been clinically interpreted as cardinal signs of cervicogenic headache.

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SUNTEXT REVIEWS

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