

“Klinton headache” - a case report of mimic new daily persistent headache associated to primary essential *cutis verticis gyrata*

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Abstract

Background. Primary essential cutis verticis gyrata is a condition that usually affects healthy subjects associated to convoluted folds and furrows formed from thickened skin of the scalp resembling cerebriform pattern.

Case. we describe a case of association between primary essential cutis verticis gyrata and new daily persistent headache.

Discussion/Conclusion. In our knowledge this is the first description of new daily persistent headache associated with primary essential cutis verticis gyrata. We think that primary essential cutis verticis gyrata could be considered as a possible trigger factor, never described before, for the development of new daily persistent headache. *Clin Ter* 2019; 170(2):e77-80. doi: 10.7417/CT.2019.2112

Key words: new daily persistent headache, cutis verticis gyrata, trigeminal nucleus caudalis

Abbreviations

CVG: cutis verticis gyrata
PE-CVG: primary essential cutis verticis gyrata
PNE-CVG: primary non-essential cutis verticis gyrata
NDPH: new daily persistent headache
NSAIDs: nonsteroidal anti-inflammatory drugs
EBV: Epstein-Barr virus
HHV-6: human herpesvirus 6
VDRL: Venereal Disease Research Laboratory
MRV: magnetic resonance venography
MRA: magnetic resonance angiography
MRI 3D: three-dimensional magnetic resonance imaging
mml-NDPH: mimic migraine-like new daily persistent headache
onaBoNT-A: onabotulinum toxin type A
TNF- α : tumor necrosis factor- α
TNC: trigeminal nucleus caudalis

Cutis verticis gyrata (CVG) is a descriptive term proposed by Unna in 1907 (1) for a condition of the scalp manifesting as convoluted folds and furrows formed from thickened skin of the scalp resembling cerebriform pattern. CVG was originally described in 1837 by Jean-Louis-Marc Alibert as “bulldog” scalp syndrome and has also been known as *paquidermia verticis gyrata* and *cutis verticis plicata*. In 1953 Polan e Butterworth classified CVG into two forms: primary and secondary (2). The primary form can be divided in essential and non-essential, where the essential form does not present other abnormalities (rare) while primary non-essential is associated with one or more other conditions. In the primary essential form (PE-CVG), the etiology is not known, and, though most of the cases seem sporadic, autosomal recessive and autosomal dominant inheritance with variable expression have been described. In the primary non-essential form (PNE-CVG), the pathogenesis (beside the genetic determination) may be endocrine (3,4). This may be due to increased peripheral use of testosterone, which was further supported by the results of a study in which free testosterone levels were reduced in patients with PNE-CVG compared with controls (5). In the first cited paper (2) authors reported about also an association with the fragile X syndrome or other fragile sites on chromosomes 9, 10, and 12, and, in a single case, breaks at bands 3p14 and 16q23, have been reported (2,6,7). In the secondary form, the etiology depends on the underlying process (eg, inflammatory, neoplastic).

New daily persistent headache (NDPH) is a primary persistent headache, daily from its onset. Patients invariably recall and can accurately describe such an onset. The pain lacks characteristic features, and may be migraine-like or tension-type like symptoms, sometimes both. This disorder has two subforms: a self-limiting subform that typically resolves within several months without therapy, and a refractory form that is resistant to aggressive treatment regimens (8). NDPH is a primary headache disorder, and secondary causes have been excluded when we establish this diagnosis. Secondary NDPH include venous sinus thrombosis, intracranial hypertension or hypotension, carotid or vertebral artery

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dissection, meningitis, sphenoid sinusitis, posttraumatic headache, cervical facet syndrome, and intranasal contact point headache (caused by contact of intranasal structures such as nasal septum and turbinates) (9,10).

Patient presentation

A 22-year-old caucasian healthy male presented with chronic daily headache. He referred a continuous fronto-temporal headache, bilateral but mainly left-sided, spreading to the neck and to the trigeminal maxillary and mandibular areas. The pain was described as continuous, dull, tightening, associated with allodynia, unresponsive to NSAIDs, triptans and opiates. The patient reported scarce accompanying symptoms such as photophobia and, rarely, nausea. The headache, that appeared about a year before, was persistent, daily from its onset that was clearly remembered and coincided with the recognition of a skin malformation. The general and neurological examination was normal except for the head examination that showed scalp skin redundancy, deep cerebriform folds and wrinkles, located in fronto-parietal-occipital region. The mood was mildly depressed. He denied comorbidities, similar family history, consanguinity, head trauma and usage of anabolic steroid drugs, as well as skin and scalp inflammatory disease history. The erythrocyte sedimentation rate, Lupus antibody, and viral titers (IgG and IGM for EBV, HH6, and cytomegalovirus), VDRL, thyroid function, complete blood count, and serum chemistries were normal. Hormonal assays performed in order to exclude endocrinological diseases, such as acromegaly and insulin-resistance syndrome, showed no alterations. MRI of the brain with and without contrast, MRV and MRA of the head and neck were obtained using a 3T scanner (Verio, SIEMENS,

Erlangen, Germany). Results showed hypertrophy of the scalp due to thickening of the skin and subcutaneous tissues with multiple cerebriform folds mainly located at the vertex and in the fronto-parietal regions (Fig. 1).

MRI 3D reconstruction showed multiple scalp foldings resembling the surface of the brain with anteroposterior disposition in fronto-parietal-occipital regions (Fig. 2).

The brain parenchyma was unremarkable, showing asymmetry of the lateral ventricles but no signal abnormalities (figure 1). By performing brain MRI we excluded that changes characteristic of CVG were associated with local inflammatory or neoplastic processes such as pachydermoperiostosis, pituitary tumors, intracerebral aneurysm, tuberous sclerosis, amyloidosis, myxedema, dermatofibroma. Having been diagnosed with PE-CVG, the patient was followed-up for chronic daily headache and mood depression. We considered patient affected by mimic migraine-like new daily persistent headache (mml-NDPH). Several attempts at pharmacological (topiramate, pregabalin, amitriptyline, valproate, benzodiazepines, indomethacin, corticosteroids) and non-pharmacological (acupuncture, relaxation techniques) prophylactic treatments were tried, without achieving an acceptable control of pain. Occipital nerve blockades and neural-therapy were also ineffective. Finally we treated the patient with ultrasound guided pericranial injections of about 150 UI of onabotulinum toxin type A (onaBoNT-A). In this procedure, ultrasound guidance provided clear advantages in visualizing the CVG anatomy and the spread of onaBoNT-A from the needle (11). However, treatment with onaBoNT-A was ineffective, having obtained a minimal reduction in the frequency and intensity of a headache just for a few days.

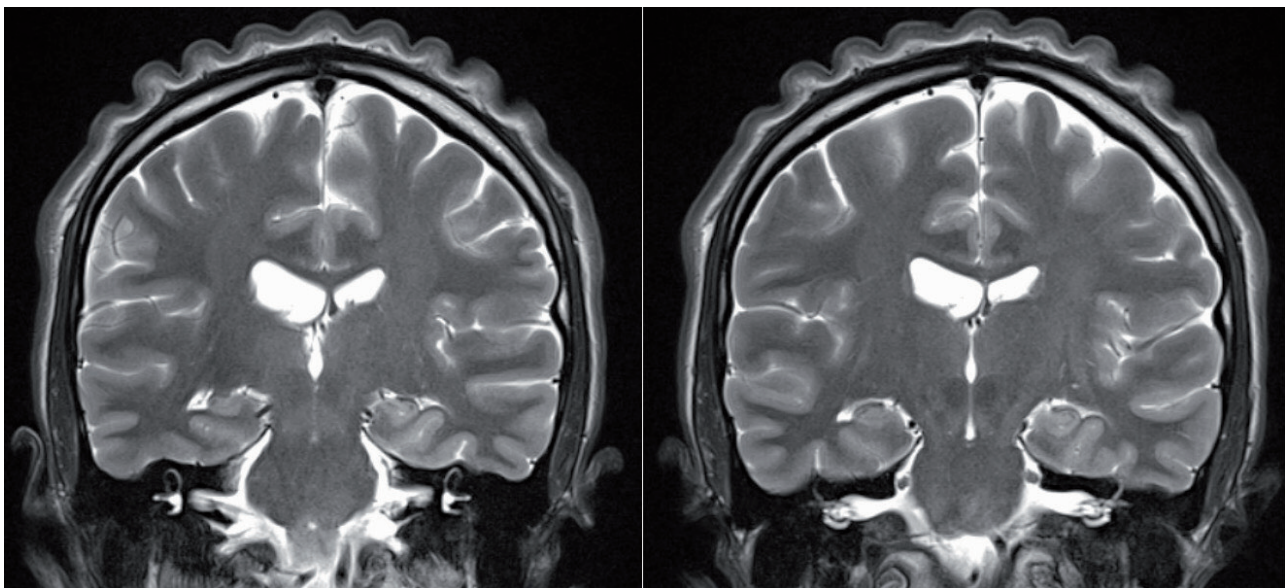


Fig. 1. Coronal T2 weighted image demonstrates thickening of the skin and subcutaneous tissues with multiple folds in the surface with no signal abnormalities of the brain parenchyma.

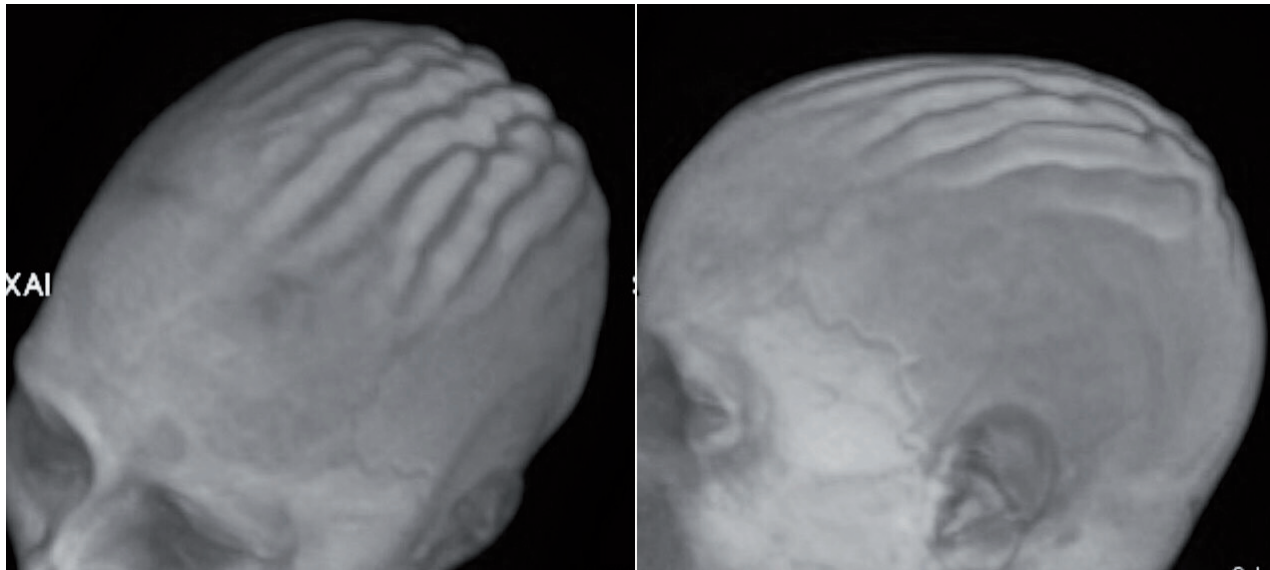


Fig. 2. T13D MPRAGE VR reconstruction shows multiple scalp foldings resembling the surface of the brain with anteroposterior disposition in fronto-parietal-occipital regions.

Discussion and conclusions

In our patient, the PE-CVG was associated with mml-NDPH resistant to pharmacological and non-pharmacological treatments, including botulinum toxin. Due to the rarity of the condition, only few cases of PE-CVG have been reported (12,13), but the possible association between PE-CVG and chronic daily headache has been reported before just in a case report (14). Considering the extremely close onset of PE-CVG and mml-NDPH, we hypothesize that a single pathophysiologic process causes the two phenomena. The histopathology of the cases previously reported ranges from normal to thickened connective tissue and/or hypertrophy or hyperplasia of the hair follicles and sebaceous glands and showed hyaluronic acid deposition in the dermis (15). These elements do not allow for a coherent and plausible explanation of the association between mml-NDPH and PE-CVG and the alternative explanation of a chance association cannot be ruled out. We feel that the chronification of headache in this patient was also affected by the mood depression, at least in part rooted in the aesthetic alteration caused by PE-CVG.

The pathogenetic mechanism of the NDPH is unknown but there are many proposed etiologies: inflammatory/autonomic etiologies (TNF α levels) (16), stressful life event, viral illness (9) and more recently cervical spine joint hypermobility and hereditary connective tissue disorders (9,17). The recent theory is that joint hypermobility eroded the facet joints precipitating persistent headache due to the convergence of trigeminal and cervical nerve afferents in the trigeminal nucleus caudalis (TNC) (18). Similar processes could explain the present case. PE-CVG can plausibly be associated to peripheral neural stimulation leading to secondary cortical sensitization. In this patient's case topographically, there was a major PE-CVG involvement of the

distribution area of the cervical roots of the major occipital nerve and of the first branch of the trigeminal nerve (Fig. 3A). The nociceptive symptoms additionally involved the second and third trigeminal branches, possibly owing to trigemino-cervical convergence mechanisms in the TNC (Fig. 3B).

Since the onset of the headache coincided with the discovery by the patient of the cutaneous malformation, we reason that the latter preceded the former. The time between the development of the cutaneous lesion and the manifestation of headache may be due to the stimulation of the TNC reaching a critical activation threshold. As noted by Rozen (18), treatment refractoriness may be the result of crossing this threshold. In our knowledge this is the first description of NDPH associated with PE-CVG. We think that PE-CVG could be considered as a possible trigger factor, never described before, for the development of NDPH.

In the past, the condition of CVG has also been described as "Klingon head" (19) due to the similarity between the patient's scalp affected by CVG and that of the *Klingons*, the fictional extraterrestrial humanoid warrior species in the science fiction franchise *Star Trek*. For this reason we decided to call the association between PE-CVG and NDPH as "Klingon headache". In order to clarify regarding the possible association between NDPH and PE-CVG further studies will be needed. On this or on other planets.

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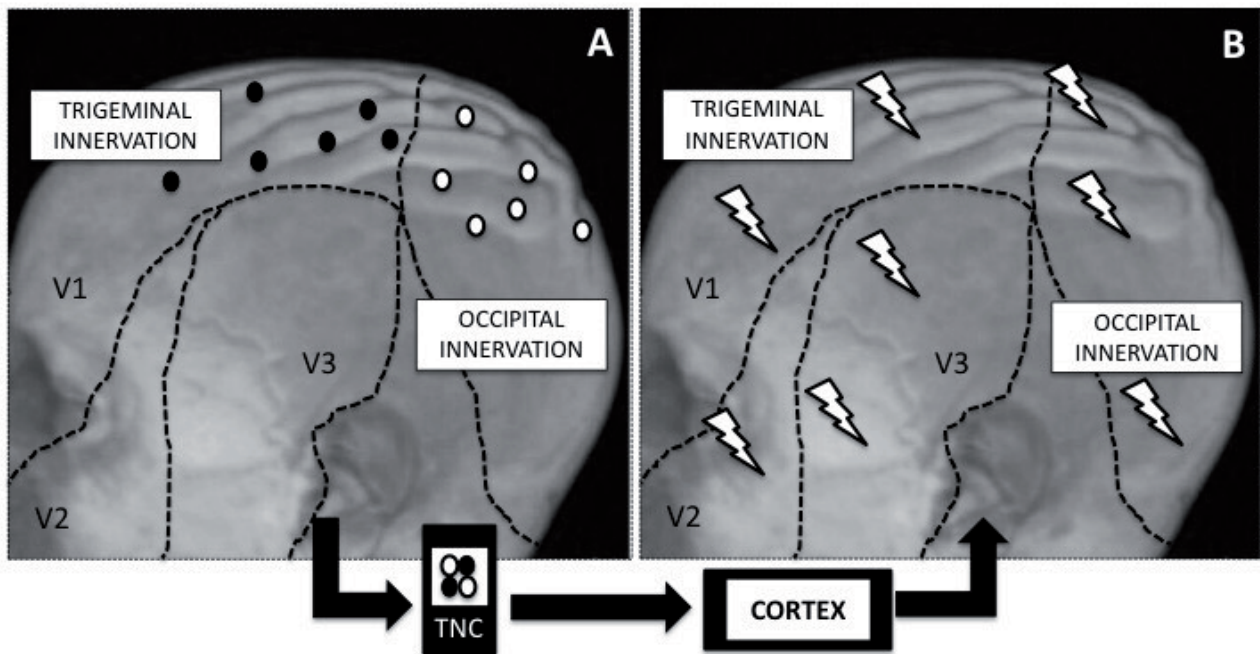


Fig. 3. A. Somatosensory distribution of pericranial innervation and putative origin of nociceptive inputs generated by cutis verticis gyrata from first division (V1) of the trigeminal nerve (black spots) and from occipital region (white spots); B. Trigemino-cervical convergence mechanisms in the trigeminal nucleus caudalis (TNC) could explain the spread of pain to second division (V2) and third division (V3) of the trigeminal nerve.

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