CASE REPORT

Symptomatic Trigeminal Autonomic Cephalalgia Associated with Allodynia in a Patient with Multiple Sclerosis

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A patient with symptomatic trigeminal autonomic cephalalgia (TAC) provides a chance to understand the pathophysiology and anatomic correlates of TAC. A 28-year-old woman experienced intermittent sharp and excruciating pain over her right temporal, ear and neck regions for 3 days. The headaches lasted 10–20 minutes each, occurred 1–2 times a day, and were accompanied by prominent ipsilateral lacrimation and conjunctival injection. The patient had hiccups, 4-limb numbness and impaired visual acuity in both eyes. She had also had 3 episodes of left-side optic neuritis in the past half year. Neurologic examination showed brushing allodynia over the right face and scalp during the headache attacks. The visual acuity of her right eye was 6/60 and that of the left eye was 1/60. Brain magnetic resonance imaging showed non-enhancing lesions on the right lateral tegmentum of the lower pons where the spinal trigeminal nucleus is located and the floor of the 4th ventricle. The patient was diagnosed as having multiple sclerosis with symptomatic TAC. Her headaches, autonomic signs and allodynia subsided 3 days after pulse therapy and gabapentin treatment were given. We suggest that the spinal trigeminal nucleus lesion was responsible for the symptomatology of TAC and cutaneous allodynia in our patient. [J Chin Med Assoc 2008;71(11):583–586]

Key Words: allodynia, multiple sclerosis, trigeminal autonomic cephalalgia

Introduction

Trigeminal autonomic cephalalgia (TAC) is a primary headache syndrome that is characterized by severe short-lasting unilateral headaches with ipsilateral cranial autonomic symptoms. Based on the International Classification of Headache Disorders, 2nd edition (ICHD-2), this group includes cluster headache, paroxysmal hemicrania, and short-lasting unilateral neuralgiform headache with conjunctival injection and tearing. The pathophysiology is still poorly understood. The hypothalamus and trigeminovascular system have been implicated.

Several reports have described the association of TAC-like headache with intracranial lesions. Pituitary adenomas were the most common lesions. Other lesions, such as arteriovenous malformation of temporal and frontal lobes, brain tumor in posterior fossa, vertebral artery aneurysm, and orbitosphenoidal aspergillosis, were also reported. Most of the lesions were located around the sella region or posterior cranial fossa. Rarely, parenchymal lesions and sphenoid sinus infection were also noted.

Cutaneous allodynia is common during migraine attacks. It is related to sensitization of neurons in the trigeminal nucleus caudalis and/or thalamus. The association between allodynia and TAC such as cluster headache is disputed, and the location responsible for allodynia in TAC is not clear.

In this report, we present a patient with multiple sclerosis, whose clinical features resembled TAC with allodynia. To the best of our knowledge, this is the first case report of spinal trigeminal nucleus as the underlying anatomic correlation.
Case Report

A 28-year-old woman presented with an excruciating pain that was initially localized to the right ear and then spread to her right temporal and neck regions. The pain began 3 days before admission. The headaches lasted for approximately 10–20 minutes each and occurred 1–2 times a day. It was accompanied by marked ipsilateral lacrimation, conjunctival injection, nausea and vomiting, but not rhinorrhea, nasal stuffiness or ptosis. In addition, the patient found that touching the right side of her face and scalp would induce severe pain during the headache attacks, which did not happen when the headache subsided. TAC was tentatively diagnosed. In addition to the headaches, she also complained of persistent hiccup, 4-limb numbness and impaired visual acuity.

The patient had had 3 recurrent episodes of optic neuritis of her left eye in the past half year. The visual acuity of the left eye during the last attack was only counting fingers but recovered to 6/20 2 weeks later. The magnetic resonance imaging (MRI) finding of the left optic nerve at that time (Figure 1) was compatible with optic neuritis, but no brain parenchymal abnormalities were noted. Cerebrospinal fluid studies including IgG index were normal.

Neurologic examination showed impaired pinprick sensation over distal limbs. Other sensory modalities, such as light touch, position and vibration were normal. The visual acuity of the right eye deteriorated from 6/6 to 6/60, and that of the left from 6/60 to 1/60. Fundoscopy showed temporal pale on the left optic disc. No focal weakness or impairment of other cranial nerves was detected. Tendon reflexes were normal and bilaterally symmetrical. Brush-evoked allodynia, tested by repetitively applying a 4 × 4-inch gauze pad, was found on the patient’s right face (trigeminal nerve 1st and 2nd branches’ distribution) and scalp during the headache attacks.

Brain MRI showed non-enhancing T1 isointense and T2 high signal lesions on the right lateral tegmentum of the lower pons, bilateral optic nerves and the floor of the 4th ventricle (Figure 2A). These lesions had not been seen on the brain MRI done 2 months previously. There were no hemisphere white matter lesions. Cerebrospinal fluid studies including oligoclonal band and IgG index were normal. Autoimmune markers such as ANA, ds-DNA, SS-A and SS-B were negative. Based on the clinical, neuroimaging and laboratory findings, the diagnosis of definite multiple sclerosis was made.

The headaches, autonomic symptoms and allodynia subsided gradually within 3 days after steroid pulse therapy (1,000 mg/day methylprednisolone) and gabapentin were given. Of note, her hiccups were also controlled when the dosage of gabapentin reached 800 mg/day. Gabapentin was tapered 1 month later. However, the hiccups and nausea recurred 1 week after gabapentin withdrawal. Therefore, gabapentin was re instituted, which relieved the hiccups immediately. As of the last visit 9 months after this attack, no further symptoms had occurred. Follow-up brain MRI 4 months later disclosed that the lesion had markedly resolved (Figure 2B).

Discussion

Our patient presented with paroxysmal unilateral headaches and ipsilateral autonomic symptoms, which were compatible with TAC. Brain MRI showed a lesion...
involving the right spinal trigeminal nucleus. Since this lesion was only shown during this attack but not 2 months previously, we considered it to be responsible for both her TAC and cutaneous allodynia.

Only 3 patients with multiple sclerosis presenting with TAC have been reported before. The first case was a 42-year-old man with headache lasting for 2–3 hours, which was initially localized to the right orbit, and then spread to the homolateral maxillary and temporal regions. Ipsilateral tearing, rhinorrhea and eye reddening were found. His lesions were around the lateral ventricles and root entry zone of the right trigeminal nerve. The second case was a 53-year-old man with stabbing pain, shooting from his left upper lip to above and medial to his left eye for 15 seconds, followed by a piercing pain over the left cheek for 20 seconds. Profuse tearing and eye congestion were also noted. No abnormality was found on imaging studies. The third case was a 42-year-old man with right temporal stabbing pain that lasted 5–30 seconds. Ipsilateral tearing and conjunctival injection were found. The lesions were on the anterior pons, right cerebral peduncle and medulla. The lesions of our patient and the first and probably the third cases described above all involved the trigeminal system. In contrast to previous cases, only our patient presented with cutaneous allodynia.

Functional imaging has confirmed an activation of the hypothalamic grey matter in induced or spontaneous cluster headaches. Sympathetic nerves surrounding carotid arteries and the trigeminal system might also be possible locations for autonomic symptoms. In our and other multiple sclerosis cases, the involvement of the trigeminal system but not the hypothalamus on brain MRI suggested that a trigeminal nerve system lesion itself could present as TAC. Furthermore, allodynia has been linked to the sensitization of the 2nd- and 3rd-order neurons in the spinal trigeminal nucleus and/or the thalamus in migraine patients. It is not known whether this is also true in TAC patients. Nevertheless, the ipsilateral spinal trigeminal nucleus lesion in our patient supports this speculation.

Gabapentin has been reported to be effective in the treatment of trigeminal neuralgia in patients with multiple sclerosis. Both headaches and allodynia subsided after pulse therapy and gabapentin treatment in our patient. In addition to pulse therapy, we could not exclude the possibility that gabapentin might play a role in relieving both TAC and allodynia in our patient.

In conclusion, our patient is the first reported case presenting with both symptomatic TAC and allodynia. This case demonstrated that the spinal trigeminal...
nucleus itself could activate both the trigemino-autonomic reflex and allodynia pathway.

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References