

## Unusual headaches

P.K. Maheshwari and Anjana Pandey

Department of Medicine, S.N. Medical College & hospital, Agra, Uttar Pradesh, INDIA

### ABSTRACT

Headaches presented with unusual manner like cough, exertion, and sex, poses a diagnostic challenge in the emergency room or primary care provider's office. The majority of these patients have no underlying intracranial pathologic condition and have a good prognosis. Since the pathophysiology is poorly understood, treatment choices are limited. Further research is needed to elucidate the pathophysiologic mechanisms of these uncommon headaches and to assess the cost-effectiveness of various diagnostic and follow-up strategies. This article focuses on eleven unusual headache syndromes, all of which are associated with significant morbidity and mortality.

KEYWORDS: Headache, unusual, diagnostic challenge

Corresponding Author: P.K. Maheshwari, D.M. (Neurology), P.G. Department of Medicine, S.N. Medical College & hospital, Agra, Uttar Pradesh, INDIA, Phone: +915622525352, E-mail: nee\_tu2002@yahoo.co.in

doi : 10.5214/ans.0972.7531.190409

### Introduction

Headache represents one of the most common somatic complaints seen in the emergency department, accounting for 1% to 3% of all emergency department visits. Although most headaches seen in the emergency department are benign, as many as 10% of all headaches are secondary to an underlying pathologic condition. The emergency physician is well-trained to exclude stroke, subarachnoid hemorrhage, and meningitis as potential causes of headache but some headaches are relatively uncommon. They may be primary or secondary and their recognition is dependent on the characterization of symptoms as well as identification of certain specific situation in which they need to be considered in the differential diagnosis. This article focuses on eleven unusual headache syndromes, all of which are associated with significant morbidity and mortality.

### Types of unusual headache

1. Nocturnal headaches
2. Hypnic headache
3. Neck-tongue syndrome
4. Alice in wonderland syndrome
5. Nummular headache
6. Auriculo-autonomic cephalgia/red ear syndrome
7. Burning mouth syndrome
8. Primary cough headache
9. Primary (benign) exertional headache
10. Primary headache associated with sexual activity
11. Thunderclap headache (TCH)

### Nocturnal headaches

Also known as exploding head syndrome,<sup>1</sup> a disorder named by Pearce in 1988.<sup>2</sup>

### Clinical features

Episodes of exploding head syndrome, which occur on falling asleep or, less often, on awakening, awaken people from sleep with a sensation of a loud bang in the head, like an explosion. Ten percent of cases are associated with the perception of a flash of light. Five percent of patients report a curious sensation as if they had stopped breathing and had to make a deliberate effort to breathe again. The episodes have a variable frequency and onset at any age, although the most common is middle age and older. The episodes take place in healthy individuals during any stage of sleep without evidence of epileptogenic discharges. Symptoms typically resolve with time and with reassurance that the disorder is benign. Secondary causes of nocturnal headaches include drug withdrawal, temporal arteritis, sleep apnea, nocturnal hypertension-headache syndrome, oxygen desaturation, pheochromocytomas, primary and secondary neoplasm, communicating hydrocephalus, subdural hematomas, sub acute angle-closure glaucoma, and vascular lesions.<sup>3</sup>

### Pathophysiology

The basis of this syndrome may be a delay in the reduction of activity in selected areas of the brainstem reticular formation as the patient passes from wakefulness to sleep.

### Differential diagnosis:

- Migraine - typically has associated symptoms and occurs only during sleep
- Cluster headaches, have autonomic symptoms and may occur during the day and during sleep.

- Hypnic headache (described in detail below).
- Chronic paroxysmal hemicranias, occurs during the day and at night, lasts for less than 30 minutes, and occurs 10 to 30 times a day.

### Hypnic headache

Rare disorder, first reported by Raskin in 1988<sup>5</sup>

### Clinical features

Occurs more often in the elderly (range of 36 to 83 years of age and a single case of a 9 year old<sup>6</sup>) with a female predominance.<sup>7</sup> The headaches occur only during sleep and awaken the sufferer at a consistent time. Nausea is infrequent, and autonomic symptoms are rare. The headaches can be unilateral or bilateral, throbbing or non throbbing, and mild to severe in intensity. During the headaches, patients typically prefer to sit up or stand, as lying supine may intensify the pain. The headaches can last 15 minutes to 3 hours and can occur frequently, as often as nightly, for many years. Spontaneous resolution is uncommon.

There are two case reports of secondary hypnic headache: one patient who had obstructive sleep apnea with resolution of headaches with use of continuous positive airway pressure<sup>8</sup> and a second who had a posterior fossa meningioma with resolution of headaches after removal.<sup>9</sup>

### Treatment

Medications reported as effective include caffeine (one or two cups of caffeinated coffee or a 40- to 60-mg caffeine tablet before bedtime), lithium carbonate (300 mg at bedtime), indomethacin, atenolol, mel-

atonin, cyclobenzaprine, verapamil, pizotifen, gabapentin, clonidine, acetylsalicylic acid, acetaminophen, ergotamine derivatives, acetazolamide, prednisone, and flunarizine.

### Neck-tongue syndrome

First described by Lance and Anthony in 1980.

#### Clinical features

Neck-tongue syndrome is an uncommon disorder seen in childhood, characterized by acute unilateral occipital pain and numbness of the ipsilateral tongue lasting seconds to 1 minute and precipitated by sudden movement, usually rotation, of the head.<sup>10,11</sup> Although neck-tongue syndrome can occur without obvious abnormalities, associated disorders include degenerative spondylosis, ankylosing spondylitis, psoriatic arthritis, and genetically determined laxity of ligaments of joint capsules. A benign, familial form of neck-tongue syndrome is described without anatomic abnormality, which resolves spontaneously during adolescence.<sup>12</sup>

#### Pathophysiology

The symptoms are the result of transient subluxation of the atlantoaxial joint that stretches the joint capsule and the c2 ventral ramus, which contains proprioceptive fibers from the tongue originating from the lingual nerve to the hypoglossal nerve to the c2 root.

### Alice in wonderland syndrome

#### Historical perspective

In 1955, Todd gave the syndrome its name<sup>13</sup> from the book, *Alice's adventures in wonderland*, published in England in 1864 by Charles Lutwidge Dodgson under the pseudonym of Lewis Carroll (the Latinization of Lutwidge Charles). Dodgson was a professor of mathematics at Oxford University and a migraineur. There is speculation that he might have had the syndrome.<sup>14,15</sup>

#### Pathophysiology

The cause proposed is migrainous ischemia of the nondominant posterior parietal lobule.

#### Clinical features

Rare migraine aura where patients experience distortion in body image characterized by enlargement, diminution, or distortion of part of or the whole body, which they know is not real. The syndrome can occur at any age but is more common in

children. Although most common with migraine, it also is reported after viral encephalitis (especially after Epstein-Barr virus) and as an epileptic phenomenon. Association seen with topiramate use.<sup>16,17</sup> Lippmann describes seven migraineurs who had unusual distortions of body image in 1952.<sup>18</sup> The descriptions of four patients are illustrative.

"Occasionally the patient has an attack where she feels small, about 1 ft high." another patient had the sensation of "her left ear ballooning out Six inches or more." a third patient described his sensations: "the body is as if someone had drawn a vertical line separating the two halves. The right half seems to be twice the size of the left half." and a fourth noted, "I feel that my body is growing larger and larger until it seems to occupy the whole room."

Other rare visual hallucinations, distortions, and illusions that are reported in migraine include the following: zoopsia (visual hallucinations containing complex objects, such as people and animals); achromatopsia (no perception of color); prosopagnosia (inability to recognize faces); visual agnosia (inability to recognize objects); akinetopsia (loss of ability to perceive visual motion); metamorphopsia (distortion of the shapes of objects); micropsia (objects appear too small); macropsia (objects appear too large); teleopsia (objects seem too far away); Lilliputians (people appear too small); multiple images; persistent positive visual phenomena (diffuse small particles, such as TV static or dots, in the entire visual field lasting months to years); palinopsia (the persistence or recurrence of visual images after the exciting stimulus object is removed); cerebral polyopia (the perception of multiple images); and tilted and upside-down vision.<sup>19</sup>

Neuroimaging studies in migraineurs with the syndrome are normal.

#### Treatment

Patients who have frequent Alice in wonderland auras may benefit from Migraine preventive medications.

### Nummular headache

Nummular headache (a coin shaped cephalalgia) is a rare, chronic, mild to moderate, pressure-like pain in a rounded or elliptic scalp area (most often the parietal region, in particular its most convex portion, although any region of the head may be affected) of approximately 1 to 6 cm in diameter first described by Pareja and colleagues in 2002.<sup>21-23</sup>

#### Clinical features

The location usually is single and unilateral, not changing in size or shape with time, but it can be midline and bilateral.<sup>24</sup> Typically, the pain is continuous and persists for days to months with exacerbations described as lancinating pains lasting for several seconds or minutes up to a few hours. The affected area may show a variable combination of hypoaesthesia, dysesthesia, paresthesia, or tenderness. Spontaneous remissions may occur but the pain usually recurs.

The cause is not known; the disorder is benign and might be the result of a localized terminal branch neuralgia of a pericranial nerve.

Diagnostic testing, including CT, MRI of the brain, and blood, is normal.

#### Treatment

Mild cases typically require no treatment. Patients who have more intense pain might benefit from naproxen or gabapentin.

### Red ear syndrome/ Auriculo-autonomic cephalgia

Lance first described this syndrome in 1995.<sup>25</sup>

#### Clinical feature

The disorder is characterized by episodic burning pain, usually in one ear lobe, associated with flushing or reddening of the ear with duration of 5 minutes to 3 hours in children and adults.<sup>26</sup> In individuals, one ear, alternating ears, or occasionally both ears can be involved in attacks that can occur rarely or up to 4 per day. The redness can occur without pain. The syndrome can be idiopathic or occur in association with migraine,<sup>27,28</sup> thalamic syndrome, atypical glossopharyngeal and trigeminal neuralgia, upper cervical spine pathology (cervical arachnoiditis, cervical spondylosis, traction injury, Chiari malformation, or herpes zoster of the upper cervical roots), and dysfunction of the temporomandibular joint.<sup>29-31</sup>

#### Pathophysiology

Lance postulates that the cause might be an antidromic discharge of nerve impulses in the third cervical root and greater auricular nerve in response to some local pain-producing lesion in the upper neck or trigeminal areas of innervations.

#### Treatment

Frequent episodes might be reduced with preventive use of gabapentin.

## Burning mouth syndrome

### *Clinical features*

Characterized by a burning, tingling, hot, scalded, or numb sensation in the oral cavity in patients who have a clinically normal oral mucosal examination.<sup>33</sup> Synonyms include glossodynia, glossopyrosis, glos-salgia, stomatodynia, stomatopyrosis, sore tongue and mouth, burning tongue, oral or lingual paresthesia, and oral dysesthesia. This pain occurs most commonly on the anterior two thirds and tip of the tongue but also may occur on the upper alveolar region, palate, lips, and lower alveolar region. Less commonly, the buccal mucosa, floor of the mouth, and the throat are affected. The pain may be constant or absent in the morning and progress during the day or be intermittent with symptom-free intervals.

The prevalence in the general population is 3.7% with a 7:1 female-to-male ratio, usually in a middle-aged and elderly population, with a mean age of 60 years. Burning mouth syndrome, thus, is not an uncommon disorder but is one that may be uncommonly seen and recognized by neurologists.

The diagnosis is one of exclusion. Although approximately one third may have a psychiatric disorder, often depression, anxiety, or other causes should be considered. The following are causes: xerostomia or dry mouth, which can be the result of medications, such as tricyclic antidepressants, or systemic disease, such as Sjogren's; nutritional deficiency, such as iron, vitamin B12, zinc, or B-complex vitamins; a trigeminal small fiber neuropathy;<sup>34</sup> allergic contact dermatitis resulting from food and oral preparation, which may be detected by patch testing; denture-related etiology; parafunctional behavior, such as clenching or grind the teeth, thrusting the tongue, or running the tongue along the teeth. Candidiasis may be a cause in up to 30% of cases and can be present with a normal examination; diabetes mellitus may be present in 5% of cases; and angiotensin converting enzyme inhibitors (e.g., enalapril, captopril, and lisinopril) can be a cause.

### *Treatment*

If an underlying cause cannot be found and treated, treatments that might be tried include empiric antifungal agents, B-complex vitamins, tricyclic antidepressants, gabapentin, oral clonazepam, and topical clonazepam (sucking a 1-mg tab-

let for 3 minutes and then spitting it out 3 times a day).<sup>35,36</sup> Women who are postmenopausal might benefit from estrogen-progesterone replacement therapy.<sup>37</sup>

### **Primary cough headache**

The history could be compatible with primary cough headache as defined by the international headache society's second edition criteria: sudden onset, lasting from 1 second to 30 minutes, and brought on by and occurring only in association with coughing, straining, or Valsalva's maneuver.<sup>38</sup>

Primary cough headache, however, is a diagnosis of exclusion, where the symptoms cannot be attributed to another disorder. Primary cough headache usually is bilateral and affects predominantly patients older than 40. In some cases, the onset may be after a respiratory infection with cough. The term, cough headache, also is used by many to include headaches brought on by sneezing, weightlifting, bending, stooping, or straining with a bowel movement. Weightlifting also can cause an acute bilateral nuchal-occipital or nuchaloccipital- parietal headache that can persist as a residual ache for days or weeks, which may be the result of stretching of cervical ligaments and tendons. Other secondary causes should be excluded as appropriate, such as subarachnoid hemorrhage. Although primary cough headache is associated with an increase in intracranial pressure, the exact cause of the pain is not certain.

Posterior cranial fossa overcrowding may be a contributing factor.<sup>8</sup> Primary cough headache may be diagnosed only after structural lesions are excluded, such as posterior fossa tumor, chiari malformation, platybasia, basilar impression, spontaneous intracranial hypotension pneumocephalus, middle cranial fossa or posterior fossa meningioma, medulloblastoma, pinealoma, chromophobe adenoma, midbrain cyst, and subdural hematoma (excluded by neuroimaging). Internal carotid artery stenosis and unruptured intracranial saccular aneurysms are questionable associations with unilateral cough headache.

### *Investigation*

MRI of the brain is the preferred imaging study to exclude secondary causes.

### *Treatment*

Benign cough headaches (and less often secondary cases) may respond to Indo-

methacin (25–50 mg 3 times a day),<sup>9</sup> lumbar puncture,<sup>10</sup> Methysergide,<sup>11</sup> Acetazolamide (500–2000 mg per day in divided doses),<sup>12</sup> and perhaps topiramate (because of its weak carbonic anhydrase inhibition).

### **Primary exertional headache**

Primary (benign) exertional headache, which has a lifetime prevalence of 1%, is brought on by and occurs only during or after physical exercise and lasts from 5 minutes to 48 hours.<sup>39-41</sup>

### *Pathophysiology*

Cardiac ischemia rarely may cause a unilateral or bilateral headache in any part of the head brought on by exercise and relieved by rest, cardiac cephalalgia, or anginal headache.<sup>42,43</sup> Headaches rarely may occur alone or be accompanied by chest pain. In cases of unstable angina, headaches may occur at rest.<sup>44</sup> Although the cause is not known, a potential pathway for referral of cardiac pain to the head would be convergence with craniovascular afferents.<sup>45</sup> Two other possible mechanisms of headache are suggested.<sup>42</sup> A reduction of cardiac output and an increase in right atrial pressure occur in myocardial ischemia. The associated reduction in venous return may increase intracranial pressure, which could produce headache. Second, release of chemical mediators resulting from myocardial ischemia (serotonin, bradykinin, histamine, and Substance p) may stimulate nociceptive intracranial receptors and produce headache.

### *Clinical feature*

It is typically a throbbing bilateral headache and not attributed to another cause. Reported activities include running, rowing, tennis, and swimming. One particular activity may precipitate the headaches in some individuals but not others. This headache type is prevented by avoiding excessive exertion, particularly in hot weather or at high altitude. Exercise can be a trigger for a typical migraine for some migraineurs.

Secondary causes to be excluded include subarachnoid hemorrhage, pheochromocytomas, cardiac ischemia, middle cerebral artery dissection, paranasal sinusitis, intracranial neoplasms, colloid cysts of the third ventricle, and hypoplasia of the aortic arch after successful coarctation repair.

An MRI of the brain with magnetic resonance angiography assists in ruling out structural or vascular lesions.

#### Treatment

Exertional headaches may be prevented by a warm-up period. Some patients choose to avoid the particular activity. Indomethacin (25–150 mg per day) may work as a preventive, taken minutes to 1 hour before exertion. Prophylactic drugs used for migraine, such as beta-blockers, may be effective for some patients.

#### Primary headache associated with sexual activity

Headache associated with sexual activity (also referred to as sexual headache, benign vascular sexual headache, and coital cephalgia) is of two types, pre-orgasmic and orgasmic, that have distinct clinical features. Sexual headaches are unpredictable and are not necessarily precipitated with every sexual encounter.<sup>46,47</sup>

#### Pre-orgasmic headache

Headache is a dull, usually bioccipital pressure-like or aching pain that appears during sexual activity and increases with mounting sexual excitement. There is often an awareness of increased contraction in neck and jaw muscles. Pre-orgasmic headache accounts for less than a third of the benign sexual headaches reported in the literature. In one series of 21 patients, the sexual headaches persisted about 30 minutes on average with a range from 1 to 180 minutes, and the frequency of the headaches was related to that of orgasm. In another series of 51 patients with sexual headache, 11 patients had symptoms consistent with pre-orgasmic headache (i.e. pain started mildly and intensified slowly and gradually with increasing sexual excitement). In these patients, the median duration of severe pain was 30 min (range 10 min to 6 hours), while the median duration of mild pain was one hour.

#### Orgasmic headache

Orgasmic headache has a sudden explosive onset followed by severe throbbing head pain that occurs just prior to or at the moment of orgasm. Orgasmic headache may rapidly generalize to involve the entire head.

#### Treatment

The anti-inflammatory indomethacin, or more recently, naproxen sodium. The usual dose of indomethacin is 50 mg. or 75 mg,

given one to two hours prior to the activity. Propranolol has also been used, both on a daily basis and on an as-needed basis. Propranolol, 40 mg. one or two hours prior to the activity may be used. Ergotamine, aspirin, or ibuprofen used prophylactically have been helpful.

It may also be helpful to look at other aspects, such as the level of anxiety of the person during the sexual activity. Occasionally, in addition to medication, counseling has been useful in patients with sexually induced headaches, particularly when there is a high level of anxiety or other psychological factors that are involved. Position is occasionally important, as the "active partner" seems to be more likely to experience sexual headache than the "passive partner".

#### Thunderclap headache (TCH)

Thunderclap headache (TCH) refers to a severe headache of sudden onset. It is explosive and unexpected nature is likened to a "clap of thunder." although TCH initially referred to pain associated with an unruptured intracranial aneurysm; multiple etiologies have since been described.<sup>48,49</sup> These include cerebral venous thrombosis, cervical artery dissection, spontaneous intracranial hypotension, pituitary apoplexy, retroclival hematoma, ischemic stroke, acute hypertensive crisis with reversible posterior leukoencephalopathy syndrome, third ventricular colloid cysts, bacterial and viral meningitis, complicated sinusitis, and reversible cerebral vasoconstriction syndromes.

In addition, the term primary TCH is often used to refer to a benign, idiopathic, and potentially recurrent headache of sudden and severe intensity with a lack of underlying pathology.

#### Treatment

There is no single treatment for thunderclap headaches. Treatment is aimed at the underlying problem causing the headaches — if one is found. If no identifiable cause can be found and there is recurring thunderclap headaches, preventive (indomethacin, naprosyn) medicine to be taken on a daily basis. With or without treatment, thunderclap headaches usually stop happening within a few days or weeks. Nimodipine for treatment of primary thunderclap headache.

Eleven patients with primary thunderclap headache (TCH) were treated with oral

nimodipine 30 to 60 mg every 4 hours or IV nimodipine 0.5 to 2 mg/h if the oral regimen failed or images showed cerebral vasospasm. With oral nimodipine, headache did not recur in the nine patients without vasospasm. IV nimodipine was given in two patients with vasospasm, including one who developed ischemic stroke. Nimodipine may be effective for TCH. Vasospasm may warrant IV nimodipine.<sup>50</sup>

The article complies with International Committee of Medical Journal Editor's uniform requirements for the manuscripts.

Competing interests: None, Source of funding: None

Received Date : 05 July 2012

Revised Date : 23 September 2012

Accepted Date : 09 October 2012

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