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## **Cutaneous allodynia during cluster headache attacks**

Franz Riederer<sup>1</sup>, H. Macit Selekler<sup>2</sup>, Peter S. Sándor<sup>3</sup>, Christian Wöber<sup>4</sup>

<sup>1</sup>Department of Neurology, Hietzing Hospital, Vienna, Austria

<sup>2</sup>Headache Section, Department of Neurology, Medical Faculty, Kocaeli University, Kocaeli, Turkey

<sup>3</sup>Headache and Pain Unit, Neurology Department, University Hospital Zurich, Switzerland

<sup>4</sup>Department of Neurology, Medical University of Vienna, Vienna, Austria

*Address for correspondence:*

Macit Selekler, MD

Headache Section, Department of Neurology,

Medical Faculty, Kocaeli University, Umuttepe

Izmit 41380, Kocaeli/TURKEY

Tel.: 0090 532 4748025

Fax.: 0090 262 3037003

E-mail: [macitselekler@hotmail.com](mailto:macitselekler@hotmail.com)

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## **Introduction**

Cutaneous allodynia occurs in more than 60 % of patients with episodic migraine, either solely within the referred pain area on the ipsilateral head or within and outside the ipsilateral head (1, 2). Burstein et al. (3) described a patient in whom one hour after migraine pain onset mechanical and cold allodynia started to develop in the ipsilateral head and after two hours, allodynia spread to the contralateral head and the ipsilateral forearm. The authors hypothesized that allodynia on the ipsilateral head reflects sensitization of second order neurons in trigeminal nucleus caudalis and allodynia outside this area is related to sensitization of third-order neurons in the thalamus (3). In cluster headache (CH), data are limited to two studies, one showing cutaneous allodynia in 4 of 10 patients and the other study reporting absence of allodynia in 16 patients (4, 5).

Apart from allodynia, primary headaches may be associated with spontaneous limb pain (6-9), both of which were considered to be the result of central sensitization. In the current literature, there is no report on spontaneous limb pain in CH patients.

We present two CH patients who rapidly developed allodynia in trigeminal areas and in ipsilateral limbs, in one of whom accompanied by ipsilateral limb pain.

## **Case 1**

A 42-year-old woman consulted the Headache Section of the Kocaeli University because of severe unilateral headaches. Headaches were strictly unilateral, side-locked to the right orbito-frontal area, associated with right-sided conjunctival injection and lacrimation, lasted 20 to 30 minutes, and fulfilled the International Headache Society

(IHS) criteria for episodic CH (10). For thirteen years she had been suffering from these headaches occurring in periods of 10-12 weeks each year.

Headaches typically reached maximum intensity after 5 to 15 minutes, when it became throbbing, and lasted a total of about 30 minutes. As soon as pain quality became throbbing, in most attacks the patient felt a tenderness of her scalp as well as in the ipsilateral arm and chest. In her most severe attacks she reported the tenderness to have spread to the ipsilateral thigh and even foot. When touching her tender scalp, chest, arm or leg, she reported the head-pain to aggravate, with the throbbing changing to “stabs of a knife”. Tenderness typically decreased and disappeared with the pain. After the age of 12 years she had headaches fulfilling IHS criteria of migraine without aura (10), 3-4 times per month, which discontinued with the onset of CH. Pain was right-sided, had throbbing quality and was accompanied by nausea, photophobia and phonophobia, and, when with high pain intensity, reddening of the right eye. Severity of pain was less compared to CH and the patient did not report any allodynia during migraine attacks.

Physical and neurological examination were unremarkable including sensory testing for cutaneous allodynia outside the attack. Cranial MRI and routine blood tests revealed normal results.

The patient did not want any pharmacotherapy, since she was scheduled for an operation (**Macit: can you specify the operation?**) in the following week. Oxygen could not be provided for logistic reasons. CH attacks stopped spontaneously after one week.

## **Case 2**

A 47-year-old man had a history of episodic CH for 20 years. He visited the neurological outpatient clinic of the Hietzing hospital because of a cluster episode lasting for 4 weeks. Severe pain attacks occurred regularly with a frequency of one to two per day, mostly during the night and waking him up. This pain was located in the right temporal and retroorbital region, and was reported to extend, within a few minutes, to the right upper and lower limb, which was associated with a feeling of swelling. During the attack the patient also reported pronounced allodynia in the right temporal region as well as in the right hand and foot so that he had difficulty in lying on a pillow on the right side, touching things with the right hand, or standing. The attacks were associated with right-sided lacrimation, conjunctival injection, rhinorrhoea and temporal flush. During the attacks the patient was agitated and mostly kept pacing around. Attacks lasted 60 to 90 minutes when untreated. All symptoms including limb pain and allodynia were relieved after subcutaneous injection of 6 mg sumatriptan. Inhalation of 100 % oxygen at high flow rates did not abort the attacks. The patient had been suffering from similar attacks occurring in clusters of two weeks for about 20 years.

The neurological examination including pin prick testing of sensitivity was normal in the pain free interval. Cranial MRI and MR-angiography, as well as routine blood tests including blood cell count and erythrocyte sedimentation rate were unremarkable.

The patient received 250 mg intravenous methylprednisolone for five days followed by 100 mg oral prednisolone gradually tapered over 12 days. Verapamil started elsewhere was increased from 120 mg to 200 mg per day. Attacks stopped completely after the first methylprednisolone dose. Verapamil was discontinued three weeks later.

## Discussion

We report two patients with episodic CH according to IHS criteria (10) who suffered from allodynia in trigeminal regions and ipsilateral limbs. Case 2 also had ipsilateral limb pain. These symptoms occurred exclusively in relation to CH attacks and developed rapidly after headache onset. All symptoms responded well to standard acute and prophylactic treatment in case 2, and remitted spontaneously in case 1. Since the patients were completely free of limb symptoms between the attacks and the neurological examination as well as cranial MRI were normal further diagnostic workup was considered dispensable.

Upper and lower limb pain associated with CH has been mentioned in historical descriptions (7) but reports in recent literature are scarce. The prevalence of limb pain among headache patients is probably as low as 1-4 % (6, 8). Guilloff and Fruns (6) studied limb and body pain in CH patients and migraine not applying IHS criteria, postulating a central origin of pain involving the thalamus and sensory cortical regions. Allodynia in trigeminal and cervical dermatomes has been described in CH patients during as well as outside attacks, especially in those with longer disease duration (4, 11) but not in the lower limbs. The lack of quantitative evaluation of allodynia during the attack is a shortcoming of the present case reports, but spontaneous descriptions (e.g. difficulty in lying on a pillow on the right side, touching things with the right hand, or standing) were compelling. Resolution of cutaneous allodynia and headache following inhalation of 100% oxygen was reported in a male patient with a first cluster period (11). In contrast to these clinical observations Ladda et al. (5) did not find any evidence of cutaneous allodynia during a nitroglycerine-induced CH attack in three patients. Using

quantitative sensory testing they detected increased sensory thresholds in CH patients compared to healthy controls and the findings did not differ outside and during an attack.

Limb pain associated with allodynia was recently reported in migraine patients (1) and attributed to central sensitization. In another case series (8) two migraineurs had limb pain in every attack and 8 experienced limb pain only in their most severe episodes.

In contrast to the model of Burstein et al. (3) that related extra-trigeminal allodynia to sensitization of third-order neurons in the thalamus developing after two hours, limb symptoms developed rapidly after headache onset in our patients. Similarly, limb sensations were also early phenomena in some migraine patients (6, 8) and rapid onset of cutaneous allodynia has been described in SUNCT (12). Alternatively, allodynia in cluster headache and migraine could be attributed to temporary dysfunction of descending pain modulating systems involving the hypothalamus, periaqueductal grey and dorsal horns (13).

In conclusion, cutaneous allodynia and spontaneous limb pain in CH patients reflect central sensitization or could be seen as a temporary dysfunction of descending pain modulating pathways. The extracranial manifestations of CH deserve more attention in clinical practice. Neuroimaging studies using voxel-based morphometry and fMRI should be carried out.

## References

1. Bigal ME, Ashina S, Burstein R, Reed ML, Buse D, Serrano D, Lipton RB; AMPP Group. Prevalence and characteristics of allodynia in headache sufferers: a population study. *Neurology* 2008; 70:1525-33
2. Burstein R, Yarnitsky D, Goor-Aryeh I, Ransil BJ, Bajwa ZH. An association between migraine and cutaneous allodynia. *Ann Neurol* 2000; 47:614-24.
3. Burstein R, Cutrer MF, Yarnitsky D. The development of cutaneous allodynia during a migraine attack clinical evidence for the sequential recruitment of spinal and supraspinal nociceptive neurons in migraine. *Brain* 2000; 123:1703-9.
4. Ashkenazi A, Young WB. Dynamic mechanical (brush) allodynia in cluster headache. *Headache* 2004; 44:1010-2.
5. Ladda J, Straube A, Förderreuther S, Krause P, Eggert T. Quantitative sensory testing in cluster headache: increased sensory thresholds. *Cephalalgia* 2006; 26:1043-50.
6. Guilloff RJ, Fruns M. Limb pain in migraine and cluster headache. *J Neurol Neurosurg Psychiatry* 1988; 51:1022-1031.
7. Guilloff RJ, Fruns M. Migrainous limb pain. A historical note. *Headache* 1990;30:138-141
8. Raudino F. Limb pain and headache. *Headache* 1994; 34:169-171.
9. Cuadrado ML, Young WB, Fernandez-de-las-Penas C, Arias JA, Pareja JA. Migrainous corpalgia: body pain and allodynia associated with migraine attacks. *Cephalalgia* 2008; 28:87-91.
10. Headache Classification Subcommittee. The International Classification of Headache Disorders: 2nd edition. *Cephalalgia* 2004;24 Suppl 1:9-160.

11. Huber G, Lampl C. Oxygen Therapy Influences Episodic Cluster Headache and Related Cutaneous Brush and Cold Allodynia. *Headache*.2008 [Epub ahead of print]
12. Rozen TD, Haynes GV, Saper JR, Sheftell FD. Abrupt onset and termination of cutaneous allodynia (central sensitization) during attacks of SUNCT. *Headache* 2005; 45:153-155.
13. Purves D, Augustine GJ, Fitzpatrick D, Katz LC, LaMantia AS, McNamara JO, Williams SM. The Physiological Basis of Pain Modulation. In: Purves D, editor. *Neuroscience*. Second Ed. Sunderland: Sinauer, 2001