Migraine headaches triggered by palpation of chronic facial folliculitis: a peripheral and central interaction in migraine

Zi-Ru Deng

First Affiliated Hospital of Anhui Medical University

Han-Li Li

First Affiliated Hospital of Anhui Medical University

Juan Zhang

First Affiliated Hospital of Anhui Medical University

Qi-Bing Sun

First Affiliated Hospital of Anhui Medical University

Xin Chen

First Affiliated Hospital of Anhui Medical University

Yu Wang (✉ yw4d@hotmail.com)

The First Affiliated Hospital of Anhui Medical University <https://orcid.org/0000-0002-9454-9699>

Case report

Keywords: facial folliculitis, migraine, interaction, center, periphery, immunomodulation

Posted Date: September 22nd, 2020

DOI: <https://doi.org/10.21203/rs.3.rs-76217/v1>

License: © ⓘ This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Abstract

Objective

To report a case of severe migraine without aura (MwoA) headaches triggered by palpation of the folliculitis around a unilateral nosewing and the folliculitis was chronic before effective treatment for migraine, and to discuss its underlying mechanisms.

Background

Multiple studies have shown that peripheral mechanisms may be involved in migraine generation and there are few case reports supporting this speculation. But a clinical case demonstrating a reciprocal action between migraine headache and peripheral pathology has never been reported.

Methods

A case of new onset migraine headache triggered by palpation of the regional facial folliculitis which was chronic but responsive to an effective treatment for migraine was reported. We briefly reviewed the peripheral mechanisms of migraine and the reciprocal action between migraine headache and peripheral pathology.

Results

A 45-year-old man with chronic folliculitis around the left nosewing of which palpation, each time, would trigger an episode of headache fulfilling the criteria for MwoA by the International Classification of Headache Disorders 3rd edition (ICHD-3). And the episode of headache would be solely triggered by palpating the facial folliculitis. His chronic folliculitis around the left nosewing did not relieve after treatment with only antibiotics but resolved in the setting of no triggered migraine headache after treatment with sodium valproate.

Conclusions

In the setting of chronic facial folliculitis, palpating regional area can trigger migraine headache, and in particular, resolution of the chronic facial folliculitis was associated with effective therapy for migraine. This indicates that there is a peripheral and central interaction associated with neurogenic immunomodulation in migraine.

Introduction

High occurrence of tenderness of pericranial areas, such as shoulder, neck, sternocleidomastoid, anterior temporal and occipital insertions, in migraine patients has been recognized for long time. And many of these tenderness areas are trigger points for migraine attack. This implicates that peripheral mechanisms may be involved in the pathogenesis of migraine [1]. There have been several case reports showing that petrous apicitis can present with headache as one of the main presentations, some of which had a phenotype of migraine features [2–4]. Recently, Alyssa Mancini described a patient with petrous apicitis developed a new onset of migraine without aura (MwoA) headaches which resolved after treatment with mastoidectomy and long course of antibiotics [5]. This indicates that inflammatory alterations of trigeminal nerve fibers innervated on petrous apex can initiate and sustain the recurrence of migraine headaches. But an interactive association between migraine and chronic facial folliculitis has never been reported. Here, we describe a case of severe MwoA headaches triggered by palpation of the facial folliculitis around a unilateral nosewing in a man whose facial folliculitis resolved after effective treatment for migraine. We also discuss the probable peripheral mechanisms responsible for triggering migraine headaches under the condition of facial folliculitis around a unilateral nosewing, and how the central mechanisms affect the peripheral inflammatory pathology in migraine.

Case Presentation

A 45-year-old man came to our department with complaints of severe headache which was triggered by face washing or shaving contacting on the facial folliculitis around the left nosewing for the past 8 months. The headache was solely triggered by contacting on the folliculitis due to face washing and shaving or by hand palpation of the folliculitis, and the folliculitis contact or palpation each time could initiate a severe headache. Before the occurrence of severe headache, an abrupt and transient sharp stabbing pain radiated from the area of left nosewing to around area of the left face immediately after contacting or palpating the folliculitis. The headache was unilateral, left-sided, and located in the left frontal, temporal and parietal regions or sometimes the whole left hemisphere. The head pain was throbbing, pulsating and sometimes stabbing in feature and 8–10/10 in intensity on average. The headache was accompanied with nausea, vomiting sometimes, photophobia, phonophobia and irritability, and was aggravated by head movement, walking and physical activity but alleviated mildly by lying down and rest. The headache would last for half day or relieve after an overnight sleep. He had ever taken Ibuprofen 0.2 g and 0.4 g, indometacin 25 mg and 50 mg, and these analgetic agents only mildly decreased the pain severity but not the pain duration. On the other hand, he complained the incurable facial folliculitis around the left nosewing though he had used different antibiotic ointment prescribed by different dermatologists. Folliculitis with purulent heads disappeared in one small area and reoccurred in other small areas, but the chronic recurrence of folliculitis with purulent heads were restricted within the regional skin area surrounding the left nosewing. His pain presentation was treated as trigeminal neuralgia as there was an abrupt and transient sharp stabbing pain radiating from the area of the left nosewing to around area of the left face prior to the severe unilateral headache and there was triggering events of face washing and shaving or hand palpating which usually evoke the attacking of trigeminal

neuralgia. Thus, he was given, by physicians, carbamazepine (0.2–0.3 g twice a day), or oxcarbazepine (0.3–0.6 g twice a day) but the pain was not alleviated.

When the patient came to our department, neurological and physical examinations, and brain magnetic resonance imaging (MRI) revealed normal. Blood routine test and other investigations including erythrocyte sedimentation rate and venereal disease screen were all in normal range. On regional skin around the left nosewing, small purulent heads were found and some keloids with different degrees of pigmentation which as described by the patient as antecedent purulent heads (Fig. 1). Basing on the headache presentations and the normal examinations apart from regional skin findings, the patient was treated as migraine headaches, as it met the diagnostic criteria for MwoA by the International Classification of Headache Disorders 3rd edition (ICHD-3) except for the triggering event [6]. The patient accepted prophylactic treatment with sodium valproate (500 mg twice a day) without using antibiotic ointment for two months. During the first week of the migraine treatment, the migraine headaches could still be triggered by the purulent head palpation, but pain severity and duration was dramatically decreased. One week after the migraine treatment with sodium valproate, the purulent heads on the skin around nosewing faded away and no headache was triggered by palpation of the left nosewing skin or by other contact like face washing. In the next two-month migraine treatment and half-year follow-up, the patient had no headache attack and no regional skin purulent infection occurred around the left nosewing.

Discussion

Migraine headache attacks can be triggered by many factors through trigeminal nerve (TN) or non-TN pathways. Many factors including odor stimulation, stress, menstruation, weather change and sunlight have been identified as trigger factors for migraine attacks through non-TN pathway [7–9]. On the other hand, clinical observational studies have shown that some pericranial tenderness areas existing in migraine patients are trigger points for migraine attack through TN or spinal nerve pathways [1]. Case studies have shown that petrous apicitis can initiate and sustain the recurrence of migraine headaches through TN pathway [5]. Here, we report, for the first time, that migraine headaches were triggered exclusively by palpation of a purulent infection on a regional skin innervated by the second branch (V2) of TN. This case indicates that TN terminal stimulation provoked a migraine headache attacking under the condition of skin infection in the area innervated by TN terminals, while a TN terminal stimulation by palpating or pressing the symmetrical area without skin infection on the other side of the face did not evoke headache attacking. This is consistent with the report that noxious craniofacial stimulation to TN terminals has an amplifying effect on migraine headache induced by glyceryl trinitrate [10]. Currently, there is no literature report showing that TN stimulation can directly evoke migraine headache attacking though TN block is effective in the treatment of episodic and chronic migraine [11]. Thus, it might be proposed that TN stimulation itself is not enough to initiate a migraine or trigger a migraine headache attack, but, under certain condition causing increased sensitivity of TN or central system, TN stimulation can initiate a migraine or trigger a migraine headache attack.

On the other hand, migraine patients are found to be infrequently but not uncommonly accompanied with facial symptoms including facial pain associated with TN [12]. And trigeminal neuralgia development is at high risk in patients with migraine [13]. Recently, episodic migraine patients were detected with TN microstructural changes under magnetic resonance imaging study [14], and this microstructural changes were presented with disrupted myelin sheaths under electron microscopic study [15]. These literature reports indicate that migraine attacking may affect the TN with presentations on face, especially on the area innervated by the V2 of TN [12]. All these previous reports show migraine patients may have peripheral sensory presentations associated with TN or involvement of TN itself, a peripheral presentation of medication-resistant skin infection associated with migraine has never been reported. Here, we report, for the first time, that antibiotic medication-resistant chronic facial infection on the regional skin innervated by V2 of TN was ceased by an effective treatment of migraine, indicating that migraine processing in the central nervous system can influence skin immunomodulation through TN.

Folliculitis is a type of uncomplicated skin and skin structure infection (uSSSI) which includes cellulitis, simple abscesses, impetigo, erysipelas and folliculitis. The common pathogenic bacteria of uSSSI are staphylococcus aureus and streptococcus pyogenes [16]. Recently, a study of necrotizing fasciitis demonstrated that streptococcus pyogenes secretes streptolysin to directly activate nociceptor neurons inducing pain during infection. The activated neurons in spinal ganglion, in turn, release the calcitonin gene-related peptide (CGRP) from the neuronal fiber terminals into the infected tissues, which inhibits the neutrophil recruiting and phagocytic killing of streptococcus pyogenes [17]. On the other hand, multiple studies have indicated that abundant CGRP secreted by trigeminal ganglion (TG) neurons interacts with adjacent neurons and satellite glial cells within TG to perpetuate both peripheral and central sensitization [18], and it is supposed with multiple evidences that central sensitization increase the propensity of either an external or an internal stimulus to trigger a migraine headache attack [18]. Thus, in our patient, it might be proposed that purulent infection around the nosewing may cause an activation of TG nociceptor neurons, the activated TG neurons secretes CGRP to sensitize the TN and brain and a migraine headache attack can be triggered by an external stimulus, a palpation of the skin, which may not be enough to generate a migraine attack in normal condition. Meanwhile, the activated TG neurons release CGRP from the TN terminals into the infected facial skin tissues causing a chronic infection as CGRP inhibits the phagocytic killing of pathogenic bacteria.

In conclusion, a bidirectional relationship between migraine headaches and chronic infection of regional skin innervated by TN terminals can be determined by the triggering role of TN stimulation under a condition of chronic regional skin infection, and by the maintaining role of migraine headaches in the chronic regional skin infection. This peripheral and central interaction in migraine might be associated with neuropeptide CGRP released from TG neurons.

Abbreviations

MwoA: migraine without aura; MRI:Magnetic resonance imaging; TN:Trigeminal nerve;
uSSSI:Uncomplicated skin and skin structure infection; CGRP:Calcitonin gene-related peptide;

TG:Trigeminal ganglion.

Declarations

Ethics Approval and consent to participate

The case study was approved by the Research Ethics Committee of the Anhui Medical University prior to study initiation. The patient provided written informed consent before the study procedure.

Consent for Publication

The patient provided written informed consent for publication of this article.

Availability of supporting data

Not applicable

Funding

This work was supported by Natural Science grants to Yu Wang (Grant No. 81671290) from the National Natural Science Foundation of China. This funding had roles in data collection and manuscript writing.

Authors' contributions

Conception YW, ZD. Acquisition of data ZD, HL, JZ, QS. Data interpretation ZD, HL, JZ, XC. Manuscript draft ZD. Revision for intellectual content YW. Final approval of the completed manuscript ZD, HL, JZ, QS, XC, YW.

Competing interests

The authors declare that they have no competing interests.

Acknowledgements

We acknowledge the patient for his patience in the following up.

References

1. Do TP, Heldarskard GF, Kolding LT, Hvedstrup J, Schytz HW (2018) Myofascial trigger points in migraine and tension-type headache. *J Headache Pain* 19(1):84
2. Rho Y (2015) Headache attributed to petrous apicitis without symptoms of acute otitis media. *Austin J Clin Neurol* 2:1055–1057
3. Plodpai Y, Hirunpat S, Kiddee W (2014) Gradenigo's syndrome secondary to chronic otitis media on a background of previous radical mastoidectomy: a case report. *Journal of medical case reports* 8:217

4. Tornabene S, Vilke GM (2010) Gradenigo's syndrome. *J Emerg Med* 38(4):449–451
5. Mancini AJ, Glassman RD, Chang YM, Burstein R, Ashina S (2019) Headache in Petrous Apicitis: A Case Report of Chronic Migraine-like Headache Due to Peripheral Pathology. *Headache* 59(10):1821–1826
6. (IHS) HCCotIHS: The International Classification of Headache Disorders, 3rd edition (beta version). *Cephalalgia* 2013, 33(9):629–808
7. Tai MS, Yet SXE, Lim TC, Pow ZY, Goh CB (2019) Geographical Differences in Trigger Factors of Tension-Type Headaches and Migraines. *Curr Pain Headache Rep* 23(2):12
8. Silva-Neto RP, Peres MF, Valenca MM (2014) Odorant substances that trigger headaches in migraine patients. *Cephalalgia* 34(1):14–21
9. Silva-Neto RP, Rodrigues AB, Cavalcante DC, Ferreira PH, Nasi EP, Sousa KM, Peres MF, Valenca MM: May headache triggered by odors be regarded as a differentiating factor between migraine and other primary headaches? *Cephalalgia* 2017, 37(1):20–28
10. Gazerani P, Cairns BE, Yassin H, Yousefi JT, Sherzaman AR, Nedergaard BS, Boldsen SK (2019) Amplification of glyceryl trinitrate-induced headache features by noxious craniofacial stimuli in pain-free healthy humans. *Pain management* 9(1):17–35
11. Hascalovici JR, Robbins MS (2017) Peripheral Nerve Blocks for the Treatment of Headache in Older Adults: A Retrospective Study. *Headache* 57(1):80–86
12. Ziegeler C, May A (2019) Facial presentations of migraine, TACs, and other paroxysmal facial pain syndromes. *Neurology* 93(12):e1138–e1147
13. Lin KH, Chen YT, Fuh JL, Wang SJ (2016) Increased risk of trigeminal neuralgia in patients with migraine: A nationwide population-based study. *Cephalalgia* 36(13):1218–1227
14. Mungoven TJ, Meylakh N, Marciszewski KK, Macefield VG, Macey PM, Henderson LA (2020) Microstructural changes in the trigeminal nerve of patients with episodic migraine assessed using magnetic resonance imaging. *J Headache Pain* 21(1):59
15. Guyuron B, Yohannes E, Miller R, Chim H, Reed D, Chance MR (2014) Electron microscopic and proteomic comparison of terminal branches of the trigeminal nerve in patients with and without migraine headaches. *Plastic reconstructive surgery* 134(5):796e–805e
16. Jacobs MR, Jones RN, Giordano PA (2007) Oral beta-lactams applied to uncomplicated infections of skin and skin structures. *Diagn Microbiol Infect Dis* 57(3 Suppl):55S–65S
17. Pinho-Ribeiro FA, Baddal B, Haarsma R, O'Seaghdha M, Yang NJ, Blake KJ, Portley M, Verri WA, Dale JB, Wessels MR et al (2018) Blocking Neuronal Signaling to Immune Cells Treats Streptococcal Invasive Infection. *Cell* 173(5):1083–1097 e1022
18. Iyengar S, Johnson KW, Ossipov MH, Aurora SK (2019) CGRP and the Trigeminal System in Migraine. *Headache* 59(5):659–681

Figures

Figure 1

Facial folliculitis around the left nosewing. On regional skin around the left nosewing, small purulent heads of folliculitis were found (B) and some keloids with different degrees of pigmentation which as described by the patient as antecedent purulent heads (Square a and b on image A). B is the image magnified from square c on image A.