

## CASE REPORT

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## Olfactory Hallucinations Leading to Weight Loss in a Patient with Migraine

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## ABSTRACT

**Introduction:** Olfactory auras, in the form of hallucinations or phantosmia without an actual stimulus, have been very rarely reported in patients with migraine. This case report aims to raise awareness by presenting a patient whose condition was delayed in diagnosis, resulting in significant weight loss.

**Case:** An 18-year-old female presented with complaints of a foul smell sensation that began a year ago, followed by headaches, loss of appetite, and weight loss. The patient experienced a sensation of rotting and burnt plastic odors lasting 2-12 hours, followed by severe, widespread throbbing headaches lasting 2-6 hours. Her past medical history was unremarkable, and her physical examination was within normal limits. Laboratory tests showed low vitamin D3 levels and low-positive

nonspecific antinuclear antibody (ANA) titers. Electroencephalography (EEG) was normal, and brain magnetic resonance imaging (MRI) revealed a few millimetric nonspecific ischemic gliotic foci without other abnormalities. Otorhinolaryngology (ENT) and psychiatric evaluations were unremarkable. The patient's symptoms were largely controlled with lamotrigine treatment.

**Results:** Due to the rarity of olfactory hallucinations in migraine attacks, patients may experience delays in obtaining an accurate diagnosis and management. Increasing clinical awareness of this rare presentation is therefore of paramount importance.

**Keywords:** Appetite loss, migraine with aura, odor hallucinations, olfactory aura, phantosmia

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## INTRODUCTION

Migraine with aura (MwA) constitutes around 30% of all migraine headaches. Auras generally occur before headaches and are primarily visual (90%), though motor, aphasic, and sensory auras are well-known (1).

Individuals with migraine frequently exhibit heightened sensitivity to olfactory stimuli during attacks, and in some patients, this persists even in interictal periods (2,3). However, olfactory hallucinations or phantosmia, which are olfactory perceptions experienced before a migraine attack without the presence of a physical odor, are rarely seen symptoms during a migraine attack (4). To date, the International Classification of Headache Disorders (ICHD) has not recognized them as a subset of migraine aura (5). Olfactory hallucinations have been documented in association with migraine aura since 1895, and the literature reporting this correlation continues to expand (4-6). Coleman et al. underlined that the olfactory hallucinations of their patients met the aura criteria of the International Headache Society (7). The exact prevalence is not known, but in larger case series, olfactory perception disturbance is observed in approximately 0.1% of adults with MwA and 6.5% of younger patients (8).

The occurrence of olfactory aura is likely underestimated because neither patients nor physicians are typically aware of this unique symptom or expect olfactory aura to be associated with migraine (6). This case report

aims to raise awareness by presenting a patient whose condition, poorly recognized and delayed in diagnosis, led to significant weight loss.

## CASE

An 18-year-old female student presented to our clinic with complaints of foul smell sensations, headaches, loss of appetite, and weight loss. The patient reported that the sensation of a foul smell, which was not actually present, started a year prior, followed by altered taste, widespread headaches, reduced appetite, and weight loss. The olfactory hallucinations started 2-48 hours before the headache, lasted in 2-12 hours and were described as the smell of rotting and burnt plastic, or similar to that of dampness followed by moderate-to-severe widespread throbbing headaches lasting 2-6 hours.

The attack with olfactory disturbance, which had persisted for a year, occurred at unrelated times during the day. Attacks could be triggered by chewing gum, laughing, loud speech, or coughing but never occurred during sleep. The strange odor appeared suddenly, accompanied by a worsening of taste, and was almost always followed by headaches within hours, along with nausea and occasional vomiting. The patient experienced these attacks 16-20 times per month, with no alteration in consciousness. After attacks, the patient experienced tiredness, with

## Highlights

- Olfactory hallucinations are a rare symptom of migraine aura.
- Delayed recognition and treatment of olfactory hallucinations can lead to weight loss.
- Lamotrigine may be effective in controlling olfactory auras in patients with migraine.

no other symptoms. Headaches were bilateral and throbbing, with no phobias, and were slightly worsened by head movements. During the attack, the patient's facial color would pale, but no other seizure-like signs were noted.

The patient's history revealed no previous sensitivity to smells, allergies, or motion sickness. There was no history of COVID-19 or vaccination at the onset of these attacks, the patient had received three doses of the Biontech vaccine without any problems. The patient had undergone scoliosis and adenoid surgery at age five. Physical examination was within normal limits. Family history was noncontributory, though the patient's brother had meningitis without any seizure history. At a height of 157 cm, the patient had lost around 8 kg, dropping to 43 kg. There was no evidence of medication overuse headache, and the patient used NSAIDs a maximum of 5-6 days per month.

Laboratory tests showed a nonspecific positive antinuclear antibody (ANA) at 1/60 and low 25-Hydroxy Vitamin D levels, but replacement of vitamin D did not improve her condition. Other blood counts and routine biochemistry parameters were normal. Her two-hour electroencephalography (EEG), including hyperventilation, intermittent photic stimulation and sleep was normal. Brain magnetic resonance imaging (MRI) showed a few millimetric nonspecific, gliotic foci in the deep white matter but was otherwise normal.

An internal medicine consultation revealed normal findings with no evidence of gastric reflux. Otorhinolaryngology (ENT) consultation showed no significant findings except for serous drainage in the nasopharynx, which did not explain the patient's symptoms. Ophthalmology consultation was normal except for corrected vision. Psychiatric evaluation suggested secondary anxiety related to the situation but no psychiatric diagnosis.

Despite performing well in school, the patient was reluctant to eat due to nausea and the fear of experiencing the olfactory sensation, since the beginning of these attacks. Lamotrigine was started with a diagnosis of migraine with olfactory aura and gradually increased to 200 mg. Over six months of follow-up, there was a significant reduction in the duration, frequency, and severity of both the olfactory auras and the headaches, and the patient's appetite improved markedly. At the final follow-up, the olfactory auras occurred around two-three times per month, were of much shorter duration, and the patient only rarely required anti-inflammatory drugs for headaches, which were well-controlled.

The authors have confirmed that details of the cases presented have been disguised to protect patient privacy.

## DISCUSSION

As demonstrated in our case, migraine can manifest with unusual sensory perceptions that may significantly impair the patient's quality of life due to delayed diagnosis. Phantosmia defined as the sensation of smelling an

odor without any stimulus and unrelated to the onset of the headache, was found in 4% of patients in total (3% without aura, 5% with aura) (9). Some researchers differentiated between phantosmia and olfactory hallucinations, defining the former as the perception of an odor in the absence of a stimulus not associated with migraine (occurring without subsequent headache) and olfactory hallucinations as the perception of an odor 5-60 minutes before the onset of the headache (a type of aura immediately preceding the headache). This perception is distinct from cacosmia, which involves the distortion of a real odor stimulus (9).

Fornazieri et al. evaluated 113 patients with migraine with or without aura and found that 6% experienced olfactory hallucinations 5-60 minutes before the onset of the headache as a typical aura (3% in the group without aura, 8% in the group with aura) (9). In our case, the patient also reported the onset of migraine attacks with olfactory auras, but the migraine headaches were not always severe enough to require medication.

Olfactory symptoms have also been reported in conditions such as intracranial aneurysm, Parkinson's disease, and intracranial mass (6). Remarkably, a 58-year-old patient experienced olfactory hallucinations as the sole symptom during a migraine and had a hemorrhage in the left uncinate lobe (6). In our case, all tests and consultations failed to identify a cause that could explain the olfactory hallucinations.

In a study, 39 patients (14 females) with primary headaches reported complaints of olfactory hallucinations. In these patients, aura was visual and associated with olfactory hallucinations, lasting from a few minutes to several hours. Olfactory symptoms appeared in 56.4% of patients within 60 minutes of pain onset, 9.5% simultaneously with pain, and 7.7% between 2-72 hours before the pain. A minority described olfactory hallucinations as vague and unidentifiable, while the majority (74.4%) complained of unpleasant odors. Nine patients had psychiatric comorbidities (depression, anxiety, panic disorders), and eight had cognitive and emotional symptoms, including irritability, difficulty in concentrating, memory problems, confusion, or a "feeling of instability" (7). In our case, the unpleasant odor occurred 2-48 hours before the headache. The patient had an anxiety disorder without a serious psychiatric diagnosis. The patient also experienced significant weight loss and lack of appetite, which were not reported in any other cases and were considered related to delayed diagnosis.

Out of 11 cases with olfactory hallucinations, eight experienced occasional olfactory auras years after their first migraine attack, while three patients experienced olfactory auras during their initial migraine attacks. In addition, during a migraine attack, a slight decrease or increase in olfactory function was reported (10). Another study showed that migraineurs (n=42) had normal olfaction at baseline, however a minority (n=8) had decreased olfactory acuity during migraine attacks and olfaction turned to normal after successful treatment (11). We could not test olfactory functions during migraine attack, but the presented patient did not report any changes in olfactory sensitivity in normal life or prior to these attacks.

The amygdala is highly involved both in odor intensity and odor memory (12). Olfactory auras, may result from cortical spreading depression affecting deep temporal lobe structures responsible for olfaction. Another hypothesis is that changes in neurotransmitters, such as dopamine, may trigger prodromal symptoms, including olfactory dysfunction (1). Supporting these hypotheses, fMRI studies revealed increased activity in limbic structures and the rostral pons in response to olfactory stimulation during migraine attacks (13).

While migraine auras typically precede the headache phase and are transient—lasting between 5 to 60 minutes—prolonged olfactory auras,

as observed in our case, that may persist for up to a week even after the headache subsides, have been documented in case reports (1,14).

Karlı et al. reported osmophobia in 30% and olfactory hallucinations in 21% of their patients with MwA (15). Findings from a recent systematic review on multisensory hallucinations and atypical sensory experiences in migraineurs provide preliminary evidence suggesting that such phenomena may be more prevalent than previously acknowledged. This review underscores the necessity for additional research to properly integrate these manifestations into current classifications (4).

In conclusion, our report highlights a young migraine patient whose daily life was significantly impacted by weight loss due to the delayed recognition of olfactory hallucinations as a symptom of migraine aura. It also demonstrates that olfactory auras responded well to lamotrigine treatment. Larger prospective studies investigating olfactory function and perceptions in migraine patients would provide further insights into this phenomenon. Additionally, increased clinician-patient awareness is essential for effectively managing associated distress.

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## REFERENCES

1. Tiriticco M, Vanotti A, Mantica D, Coppola A: Migraine with exclusive olfactory aura: case report and literature review. *Headache* 2020; 60:2544-2547. [\[Crossref\]](#)
2. Saisu A, Tatsumoto M, Hoshiyama E, Hirata K. Evaluation of olfaction in patients with migraine using an odour stick identification test. *Cephalalgia* 2011; 31: 1023–1028. [\[Crossref\]](#)
3. Zanchin G, Dainese F, Trucco M, Mainardi F, Mampreso E, Maggioni F. Osmophobia in migraine and tension-type headache and its clinical features in patients with migraine. *Cephalalgia*. 2007; 27:1061-1068. [\[Crossref\]](#)
4. Li Y, Yolland COB, Rossell SL, Sommer IEC, Toh WL. Multisensory hallucinations and other unusual sensory experiences in the context of migraine: a systematic review. *J Neurol*. 2024; 271:1717-1746. [\[Crossref\]](#)
5. Headache Classification Committee of the International Headache Society (IHS) The International Classification of Headache Disorders, 3rd edition. *Cephalalgia*. 2018;38: 1-211. [\[Crossref\]](#)
6. Partovi O, Tolebeyan AS. Various presentations of the olfactory hallucination in two patients with migraine disease: Case report. *Front Neurol*. 2022;13:992763. [\[Crossref\]](#)
7. Coleman ER, Grosberg BM, Robbins MS. Olfactory hallucinations in primary headache disorders: Case series and literature review. *Cephalalgia* 2011;31: 1477-1489. [\[Crossref\]](#)
8. Ahmed MA, Donaldson S, Akor F, Cahill D, Akilani R. Olfactory hallucination in childhood primary headaches: case series. *Cephalalgia*. 2015;35:234-239. [\[Crossref\]](#)
9. Fornazieri MA, Neto AR, de Rezende Pinna F, Gobbi Porto FH, de Lima Navarro P, Voegels RL, et al. Olfactory symptoms reported by migraineurs with and without auras. *Headache*. 2016 ;56:1608-1616. [\[Crossref\]](#)
10. Mainardi F, Rapaport A, Zanchin G, Maggioni F. Scent of aura? Clinical features of olfactory hallucination during a migraine attack (OHM). *Cephalalgia* 2017; 37:154-160. [\[Crossref\]](#)
11. Marmura MJ, Monteith TS, Anjum W, Doty RL, Hegarty SE, Keith SW. Olfactory function in migraine both during and between attacks. *Cephalalgia*. 2014 ;34:977-985. [\[Crossref\]](#)
12. Buchanan TW, Tranel D, Adolphs R. A specific role for the human amygdala in olfactory memory. *Learn Mem*. 2003; 10:319-325. [\[Crossref\]](#)
13. Stankewitz A, May A. Increased limbic and brainstem activity during migraine attacks following olfactory stimulation. *Neurology* 2011 ;77(5):476-482. [\[Crossref\]](#)
14. Vgontzas A, Burch R. Episodic migraine with and without aura: key differences and implications for pathophysiology, management, assessing risks. *Curr Pain Headache Rep* 2018; 22:78. [\[Crossref\]](#)
15. Karlı N, Zarifoglu M, Calisir N, Akgoz S. Comparison of pre-headache phases and trigger factors of migraine and episodic tension-type headache: do they share similar clinical pathophysiology? *Cephalalgia* 2005;25(6):444-451. [\[Crossref\]](#)