Phantom Rhinitis

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Established Facts

- Abnormalities in olfaction can be common in patients with both allergic and non-allergic rhinitis.

Novel Insights

- The differential diagnosis of disordered olfaction is discussed with a summary of the appropriate workup.
- Potentially life-threatening disorders can mimic rhinitis.

Key Words

Aura • Dysosmia • Epilepsy • Neurogenic rhinitis • Olfactory aura • Phantosmia • Refractory rhinitis • Seizures • Temporal lobe

Abstract

Sensitivity to strong odors has a broad differential diagnosis. A presentation is made of a 60-year-old man with lifelong mild allergic rhinitis and a superimposed 4-year history of sensitivity to smells. He had no response to medical treatments or allergic immunotherapy. His physical examination was unremarkable. After obtaining a detailed history, a definitive imaging study was performed and the patient underwent corrective treatment for his potentially life-threatening disorder. A detailed differential and strong clinical history is sometimes required to uncover the etiology of

non-allergic rhinitis. Overwhelming sensations of strong odors may be a sign of a more serious condition and require investigation. This presentation discusses the differential diagnosis and suggested evaluation for patients with abnormalities in olfaction.

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Case Report

A 60-year-old African-American male presented for an evaluation of 4 years of sensitivity to smells. Since the age of 4 he experienced congestion, post-nasal drip, and dry eyes during the late fall months. He was diagnosed with allergic asthma as a child based on a history of seasonal wheezing. He did not have infections at a greater frequency or severity compared to his peers.

The patient remained well for several years after returning to the US from combat service in Vietnam where he sustained a head

injury. When his full-time nasal symptoms returned he sought care with a local allergist. Skin prick testing was positive to house dust, dust mite, and wool. After failing nasal steroids and oral antihistamines he went on subcutaneous allergen immunotherapy to dust and dust mite for 2 years until moving from the Ohio River Valley to the West Coast. The patient was reevaluated by an allergist but was negative to all allergens tested. He was then treated with homeopathic medications for 2 years along with nasal sinus rinses. Overall, his clinical health was good with the exception of a diagnosis of mild hypertension that was controlled with lifestyle modification.

A year into homeopathic treatment, he began to notice the occurrence of overwhelming sensation of odors. The odors were always of a varying and unidentified chemical nature. Most often he would associate the smells with strong perfume from someone nearby, but the odors did not always occur in the presence of other people or in situations that might be expected to have strong smells. There was no seasonality to the odors. Outside of these chemical smell occurrences, the patient was still able to detect odors that were in his environment, however taste and smell were not formally evaluated. These symptoms were thought a manifestation of his underlying allergic rhinitis and he was unsuccessfully continued on symptomatic medical treatment.

There was no other significant medical history. He was a former smoker and had quit more than 5 years earlier. He worked in an office building as a computer engineer. At the time of clinical evaluation the patient was mildly hypertensive at 140/93 mm Hg, but the remainder of the physical examination was normal. The nasal mucosa was without abnormality, there was no evidence of rash, and the lungs were without adventitious sounds. The patient's routine blood workup including blood counts with differential, complete metabolic panels and IgE levels were unremarkable.

Two years later, due to continued symptoms, a CT of the sinus was performed (fig. 1b) and was read as normal with the exception of concha bullosa. The sensation of odors continued without abatement.

The patient was referred to a neurologist for concern of possible sinus migraines. More suspicious of an intracranial lesion, the neurologist ordered a brain MRI. The MRI (fig. 1a) revealed an abnormality in the right temporal lobe region that was suggestive of an aneurysm. An MRA revealed a $7 \times 5 \times 5$ mm right temporal aneurysm which was confirmed by angiography (fig. 2b). An EEG was diagnostic of right temporal lobe seizure activity (fig. 3). Surgical clipping of the aneurysm was performed without complication. The sensation of overwhelming odors completely resolved after surgery and the patient has remained free from these symptoms for 2 years. He continues to have mild nasal congestion in the late fall treated with seasonal intranasal corticosteroids with great success.

Discussion

Temporal lobe seizures presenting as purely olfactory symptoms may be unusual for an allergist office but is not unheard of in the world of neurology. French et al. [1] published a case series of 67 patients with isolated tempo-

ral lobe epilepsy and found 5 (7%) with olfactory manifestations of their seizures. In the same series the authors outlined that the most frequent symptom was abdominal visceral sensations such as nausea, pressure, and rising epigastric sensations. It is foreseeable that a patient with these symptoms could be misdiagnosed with acid reflux disease and resultant non-allergic rhinitis.

A series by Fried et al. [2] also described olfactory auras in patients with hippocampal sclerosis and extratemporal lesions at an overall rate of 12%. Temporal lesions such as tumors, hamartomas, glial scars, or vascular abnormalities such as in this case can also cause olfactory auras. Similar to our patient, those patients in the series who were rendered seizure-free by surgical correction of the offending temporal lobe lesion also saw resolution of their auras [2]. The possibility of olfactory abnormalities stemming from the temporal lobe is further supported by evidence of deficits in olfaction among patients after therapeutic temporal lobectomy [3]. Other studies have shown that olfactory auras are independent of age, whereas the more classical signs of seizures (motor and lateralizing signs) are more frequently found in younger patients [4]. Risk factors for temporal lobe epilepsy include head trauma, CNS infection, and severe hypotensive events [1]. The patient's finding of concha bullosa has been linked to disordered olfaction by obstruction, but is not a cause of phantosmia and is most often considered a normal variant [5].

While the terminology for abnormal or dysfunctional olfaction can be confusing, the most important aspect is to understand the different categories to best define the problem at hand. Dysosmia is the umbrella term for dysfunction in the sense of smell. Parosmia describes a distortion of the sense of smell most often referring to the change of smell associated with the common head cold. Decreased sense of smell is referred to as hyposmia, while complete lack of olfaction is anosmia [6]. Troposmia is when a patient misperceives a typically pleasant odor as one that is noxious and foul [7]. These definitions are important because, while allergic and non-allergic rhinitis is often associated with parosmia or hyposmia, this patient presented with hallucinations of odors – which are referred to as either phantosmia or cacosmia [6] – and thus presented a different differential. Another sign in this patient's history pointing to a non-allergic cause of olfactory disturbance was the fact that even at times when all other allergic symptoms were controlled he continued to report dysosmia.

Other causes of dysosmia include brain injury without seizure, psychiatric illness such as depression or schizo-

Fig. 1. **a** Brain MRI. Arrow indicates aneurysm of the right middle cerebral artery near the trifurcation. **b** Sinus CT.

Fig. 2. MRA (**a**) and angiogram of cerebral vessels (**b**). Arrow indicates the aneurysm.

phrenia [8], a primary disorder of the olfactory neurons [7], and Parkinson's disease [6]. In rare cases, migraine can also present with hypersensitivity to smells (hyperosmia) but requires an odor trigger rather than a hallucinated smell [9]. In contrast to this case, the workup for phantosmia should always include a detailed evaluation and examination by an otolaryngologist [7]. Nasal endoscopy should be performed to evaluate the olfactory pathways, along with unilateral and bilateral nasal occlusion studies, and unilateral threshold olfactory testing using sprays of standardized solutions to measure olfaction [8]. After ENT exclusion of peripheral olfactory abnormalities, MRI or CT evaluation should be performed to assess for endocranial abnormalities [7].

Treatment for each of these causes of phantosmia is control of the underlying disorder. However, medication and surgical resection as treatments for temporal lobe epilepsy only render about 20% of patients free from their auras, even if full seizure control is obtained [2]. This case illustrates how neurogenic abnormalities may masquerade as rhinitis and why the differential diagnosis of refractory nasal symptoms must always be kept broad.

Fig. 3. Spike and wave pattern consistent with seizure activity in the right temporal lobe.

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