

## Investigating a Clinical Case of Deluded Gustatory Perception

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### Abstract

**Introduction:** Hypergeusia is a taste disturbance with an increased perception of taste. Delusional hypergeusia has not heretofore been reported.

**Case Report:** A 62-year-old right-handed woman described a plethora of complaints after exposure to a solvent aroma, including headaches, diffuse weakness, fatigue, hallucinated smells and tastes, Burning Mouth Syndrome, and panic attacks. The apogee of her symptoms was that the salty taste was 800% normal. Sugar was also too sweet, 600% of normal.

**Results:** Motor Examination: Drift Test: right pronator drift with right abductor digit minima sign. Gait Examination: heel walking with bilateral decreased arm swing. Reflexes: bilateral quadriceps femoris 3+, positive left (L) Hoffman's reflex. Retro nasal Olfactory Testing: Retro nasal Smell Index: 1 (Anosmia). Waterless Empirical Taste Test: sweet: 4, sour: 3, salty: 7, bitter: 5, brothy: 0, total: 30 (ageusia to Unami, otherwise normogeusia). Neuropsychiatric Testing: Go-No-Go Test: 2/6 (abnormal).

**Discussion:** Perhaps, hypergeusia may not have been true, but a misperception of retro nasal smell associated hypersomnia with physiologic synesthesia manifested as taste. The perceived delusional hypersomnia may intensify the sensory misperception due to underlying dysgeusia. This may represent a variant of the two-factor hypothesis of delusions whereby a distorted sensory perception is then misrepresented in a delusion. Dysfunction of the right hemisphere, which usually acts to censor the left, allows the delusion to manifest. While two different anatomical abnormalities (one left and one right hemisphere) have been postulated to be the foundation of such delusions, it is distinctly possible that a single lesion of the inferior parietal lobule may be sufficient for both sensory distortions to be produced as well as loss of inhibition of delusional interpretation of distorted sensation of the frontal lobe by the right parietal lobe, yclept the sensorial hypothesis. A search for delusional origin is warranted for those who present with hypergeusia.

**Conclusion:** In those who present with hypergeusia, a search for delusional origin is warranted, and for those who present with delusions, a query to perceive hypergeusia may be revealing

**Keywords:** Delusional Disorder, Distorted Sensory Perception, Hypergeusia, Gustatory Dysfunction

### 1. Introduction

While olfactory dysfunction is well described in those who suffer from psychiatric disorders gustatory dysfunction is less frequently noted [1,2]. In depression, hypogeusia and gustatory hallucinations have been reported, whereas in those with schizophrenia, gustatory hallucinations and gustatism have been described [3]. True hypergeusia, In particular to sweet or salt, has been noted in myriad illnesses, including small cell carcinoma of the lung several other forms of cancers, including breast-14.5%, gastrointestinal-14.2%, lung-10.8%, solid tumors-15.2%, hematologic diseases-14.7% after tongue base resection from obstructive sleep

apnea cancer chemotherapy cisplatin-induced bitter hypergeusia hypogeusia induced disinhibition in sweet hypergeusia Myasthenia Gravis induced salt hypergeusia and head trauma induced lipid ageusia and salty hypergeusia [4-11]. While delusional or subjective hypersomnia has been described after COVID-19 infection delusional hypergeusia has not heretofore been reported. Such a case is presented [12].

### 2. Case Report

A 62-year-old right-handed woman described many somatic complaints after exposure to a solvent aroma. Initially, she noted an

intermittent scent of cleaning fluid even though it was not present, a non-throbbing bi-frontal headache, and diffuse weakness and fatigue. The same symptoms recurred on recurrent exposure to the solvent and the aroma of paint. When exposed to solvents, the solvent aroma would replace other ambient aromas and persist for hours. For instance, after solvent exposure, coffee would smell like chemicals. She developed profound weakness after recurrent exposure to solvent smell, which was made better when she left the area. She would feel fatigued with generalized weakness and continue to smell the solvent aroma even though she had left the region. She would feel better with fresh air. She began to notice smells others could not detect, such as chemicals, solvents and cleaning fluid, in locations she had noticed before. These phantom aromas would awaken her at night. The hallucinated smell would vary between the aroma of paint, cleaning fluid, and soap, and it felt as though “soap was blown into my nostrils.” Coincident with this, there would be the taste of soap at the tip of her tongue, 8/10 in severity. She would never notice the taste without the smell is present. With exposure to cologne, she also would develop shortness of breath and would feel an urgent need to leave the area.

She perceived that certain malodors were more robust than usual. For instance, gas smelled 300% more intense than usual. She found that she could smell cologne on individuals far distances away, which would overwhelm her. Chemical odors would replace normal odors that are present. After exposure to certain odors, smell, and taste would persist, for instance, coffee would smell and taste like a chemical. The odors would permeate into her hands and hair and would remain there for hours unless she aggressively washed her hands or rubbed evergreen leaves on them, whereby they acquired a natural smell that did not bother her. Myriad odors caused these symptoms, including smells of chemicals, cleaners, solvents, perfumes, colognes, laundry detergents, artificial odors, rubber tires, and gasoline. The smells that did not bother her were those of nature, trees, and water. When exposed to inciting odors she would cover her nose, drink water, or even eat snow. At times, she found the smells “assaulting” her apartment and needed to escape by ambulance to the emergency room, after which her blood pressure was 189/90 and pulse 100. However, she found that the smells of the emergency room, including alcohol and hospital food odors, would also bother her. On other occasions, when watching a commercial for food on television, she would develop nausea, shortness of breath, and disgust, as occurred with the solvent smell and taste described above. After watching this commercial on television, her throat and ears would close, precipitating emergency room visits and requiring treatment with anxiolytic agents.

Moreover, she noted that the taste was too intense. She felt that the salty taste was 800% normal; she became disgusted with food that she formerly had liked had now become too salty. For instance, she could no longer tolerate potato chips, pizza, spaghetti sauce, Coca-Cola, root beer, Sprite, 7-Up, and even bottled water due to their extreme saltiness. She also observed that sugar was too sweet, 600% of normal, which she found disgustingly sweet. Un-

bearably sweet foods included cookies, sugar, breakfast cereals, and salad dressing. She felt that all her other tastes were usual. She observed that her olfactory ability to some smells were too intense, 10,000% of normal, including cigarette smoke, marijuana, and wood burning. She complained of phantosmia of constant cigarette smoke smell in both nostrils, with 10/10 intensity, when she was inside her domicile. She also observed palinopsia four hours or longer after exposure to an aroma. She complained of burning mouth symptoms precipitated either from acid reflux or aromas of cleaning fluids. She admits to anxiety and depression but denies suicidal ideation. She also complained of panic attacks from chronic exposure to odors. The patient provided informed consent.

### 3. Results

Abnormalities in Physical Examination: General: scalloped tongue. Neurological Examination: Mental Status Examination: sad mood with congruent affect, crying, hyperverbal, loud, overly inclusive, circumstantial, irritable with pressured speech; disheveled, racing thoughts, tangential. Immediate Memory: able to recall six digits forwards and three digits backward. Recent Memory: 3 out of 4 objects in 3 minutes without improvement with reinforcement. Remote Memory: Presidents: Obama, Bush. Cranial Nerve (CN) Examination: CN II: Visual Acuity: 20/70 OU with correction. Motor Examination: Drift Test: right pronator drifts with right abductor digit minim sign. Gait Examination: heel walking with bilateral decreased arm swing. Reflexes: bilateral quadriceps femoris 3+, positive left (L) Hoffman’s reflex. Chemosensory Testing: Olfaction: Alcohol Sniff Test: 14 (hyposmia). Brief Smell Identification Test: 12 (norm Osmia). Olfactometer Identification Test: Left (L) nostril: 19 (norm Osmia), right (R) nostril: 16 (hyposmia). Pocket Smell Test: 3 (norm Osmia). Sniffing Sticks Identification Odor Test: L nostril <1, R nostril <1, dirhinous <1 (anosmia). Dirhinous Identification Test: 14 (norm Osmia). Olfactory Threshold Testing: L Nostril 36, R nostril 36, dirhinous 36. Odor Discrimination / Memory Test: 3 at 10 seconds, 3 At 30 seconds, 3 at 60 seconds, total 9 of 12 (hyposmia). Retro nasal Olfactory Testing: Retro nasal Smell Index: 1 (Anosmia). Gustatory Testing: Propylthiouracil Disc Taste Test: 10 (normogeusia). Waterless Empirical Taste Test: sweet: 4, sour: 3, salty: 7, bitter: 5, brothy: 0, total: 30 (ageusia to Unami, otherwise normogeusia). Neuropsychiatric Testing: Go-No-Go Test: 2/6 (abnormal). Clock Drawing Test: 4 (average). Center for Neurological Studies Lablity Scale: 17 (abnormal). Animal Fluency Test: 24 (average).

### 4. Discussion

There are many mechanisms whereby hypergeusia may have manifested in this patient. The hypergeusia may not have been true, but a misperception of retro nasal smell associated hypersomnia with physiologic synesthesia manifested as taste [13]. Peradventure, the perceived hypergeusia is just one component of a generalized delusional paradigm, where many sensory perceptions are intensified. Such distortion or intensification of a sensory phenomenon has been described with other neurological conditions such as migraine, panic attack-induced Mickey Mouse Hand Syndrome

and temporal lobe epilepsy, as well as in well-defined specific delusional disorders such as Alice in Wonderland Syndrome [14,15]. On the other hand, the perceived delusional hypersomnia may intensify the sensory misperception due to an endogenous or exogenous (medical or environmental induced dysgeusia). This may represent a variant of the two-factor hypothesis of delusions whereby a distorted sensory perception is then misrepresented in a delusion [16-20]. Dysfunction of the right hemisphere, which generally acts to censor the left, allows the delusion to manifest [21]. Such a nidus of delusion has been described in crucifixion cenesthopathy in Marfan's syndrome drug-induced parkinsonism in Cotard's syndrome and drug-induced parkinsonism in the xylological variant of reverse Fregoli syndrome [22-24]. While two different anatomical abnormalities (one left and one right hemisphere) have been postulated to be the foundation of such delusions, it is distinctly possible that a single lesion of the inferior parietal lobule may be sufficient for both sensory distortions to be produced as well as loss of inhibition of delusional interpretation of distorted sensation of the frontal lobe by the right parietal lobe yclept the sensorial hypothesis [16,25]. Dry mouth, from common medications including antihistamines, induced xerostomia, and hyposalivation as it, has been observed to be the origin of the change in taste sensation [26]. In the current case, hypergeusia is the focus of her delusion and may reflect the importance of taste in flavor perception in a pre-delusional state. Hypergeusia as a complaint is seen in 7.4%, and for sweets is under 5% of those who present to the chemosensory clinic [26,27].

## 5. Conclusion

In those who present with hypergeusia, a search for delusional origin is warranted, and for those who present with delusions, a query to perceive hypergeusia may be revealing.

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