CASE REPORT

Anosmia and hypogeusia in Churg-Strauss syndrome

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SUMMARY

Churg-Strauss syndrome is a rare disorder that is often misdiagnosed. In this report we describe a 57-year-old man with Churg-Strauss syndrome who presented with symptoms of lessened smell and taste function that occurred approximately 3 months before the onset of his neurological symptoms. Psychophysical testing using a battery of well-validated smell and taste tests revealed that the patient had total anosmia and marked hypogeusia. While one anecdotal report exists in the Spanish literature that alludes to the presence of anosmia in a single case of this syndrome, no further confirmation of such dysfunction has appeared in the literature. These findings support the concept that smell and taste loss may be an early sign of this disorder.

BACKGROUND

In 1951, Churg-Strauss described a syndrome characterised by asthma and a strikingly uniform clinical picture of fever, eosinophilia, and symptoms of cardiac failure, renal damage and peripheral neuropathy. This rare disorder, which is now known as Churg-Strauss syndrome (CSS) or eosinophilic granulomatosis with polyangiitis, is characterised by vasculitis of the small-sized and medium-sized arteries and veins. Up to 40–60% of cases are accompanied by perinuclear antineutrophil cytoplasmic antibody positivity. The UK incidence of the condition was reported in 2005 at 4.2/million/year.¹ It usually presents between the ages of 40 and 60 years, with a mean age at diagnosis of 49 years.

The pathogenesis of CSS is still unclear, although the asthma and eosinophilic components suggest a skewed T-cell balance. Six classification criteria defined by the American College of Rheumatology to differentiate CSS from other vasculitides are asthma, eosinophilia >10%, neuropathy, non-fixed lung infiltrates, paranasal sinus abnormalities and extravascular eosinophils on biopsy. When four or more of these criteria are met, vasculitis can be classified as CSS with a sensitivity of 85% and a specificity of 99.7%. Unfortunately, because of the common association between asthma and allergic rhinitis, some cases of CSS are diagnosed only after the nervous system becomes involved and when the chances of mortality are high.

In this report we describe a case of CSS in which chemosensory dysfunction, that is, anosmia and hypogeusia, is present. To the best of our knowledge, this is the first case of CSS for which quantitative testing of the senses of taste and smell has been performed.

CASE PRESENTATION

A 57-year-old man presented to the Smell and Taste Center at the Hospital University of Pennsylvania,

USA, reporting of decreased smell and taste function that began in February 2009. He reported that on returning to the USA from a trip to South America in January 2010, he experienced some upper respiratory symptoms. A CT of the sinuses raised the possibility of fungal infection for which he was unsuccessfully treated with fluconazole. Approximately 6 weeks later he developed numbness in his right leg and forearm. On 14 March he experienced an abrupt but transient loss of vision in his left eye. His medical history was positive for adult onset asthma, but was negative for smoking, excessive alcohol use and dental or oral pathology. The possibility of multiple sclerosis was considered, but neither MRI nor the results of a lumbar puncture supported this diagnosis. Electrical testing revealed the involvement of common peroneal and radial nerves. Neurological examination was notable for numbness in the medial aspect of the right forearm and in his second and third fingers. Blood analysis revealed leucocytosis with persistently elevated eosinophils >18%. The patient had strongly positive myeloperoxidase, which is generally the antineutrophil cytoplasmic antibody specific in CSS. He had an erythrocyte sedimentation rate of 59.7. He was negative for anticardiolipin antibodies, antinuclear antibodies, SS-A, SS-B, Scl-70, Lyme disease, hepatitis, toxoplasma, HSV-1 and HSV-2 and Venereal Disease Research Laboratory. Creatinine was normal and urine analysis was without active sediment. MRI was negative for white matter and olfactory bulb and tract disease. A high dose of prednisone (60 mg/day) did not alter his chemosensory symptoms. Chemosensory testing (table 1) revealed total loss of smell function, as measured by the University of Pennsylvania Smell Identification Test (UPSIT)² and a standardised test of odour discrimination and memory.³ Detection threshold values, determined using a staircase method, were bilaterally elevated for the odorant phenyl ethyl alcohol. Nasal cross-sectional area, as measured by acoustic rhinometry, and nasal resistance, as measured by anterior rhinomanometry, were unremarkable. Whole-mouth identification of suprathreshold concentrations of representatives of each of the four basic tastes (sucrose, citric acid, caffeine and sodium chloride) was depressed (total score: 25/40; normal >80% of 40 trials).⁴ Intensity and pleasantness ratings given to concentration series of these agents were relatively flat. Taste quality identification was at chance levels bilaterally on anterior and posterior tongue regions innervated by CN VII and CN IX, respectively. Electrogustometric thresholds were elevated bilaterally.

TREATMENT

Intravenous cyclophosphamide was started beginning with a dose of 500 mg/m² under close

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Table 1 Results of chemosensory and cognitive tests

Test	Result				Comments
UPSIT	6/40				Total anosmia
PIT	39/40				Normal
PEA threshold	Left >−2	Right >−2	Bilateral >−2		Total anosmia
Odour memory	10 s 0/4	30 s 0/4	60 s 1/4		Total anosmia
Taste quadrant	21% R rear	25% R front	29% R rear	29% R front	Hypogeusia
WMS	Sucrose 9/12	NaCl 6/12	Caffeine 5/12	Citric acid2/12	Hypogeusia
Acoustic rhinometry	Left 7.6	Right 5.6			Mild obstruction
Electrogustometry	Left >160 μA	Right >100 μA			Hypogeusia
MMSE	30/30				Norma

MMSE, mini-mental state examination; PEA, phenyl ethyl alcohol threshold; PIT, picture identification test; UPSIT, University of Pennsylvania Smell Identification Test; WMS, whole mouth suprathreshold.

haematological observation and repeated infusion with 750 mg/m² at 3 weeks interval, in addition to prednisolone 60 mg orally daily. Trimethoprim/sulfamethoxazole was added to prevent pneumocystis pneumonia prophylaxis and adequate calcium and vitamin D supplements were started.

OUTCOME AND FOLLOW-UP

Cyclophosphamide has been transitioned to azathioprine 150 mg daily and prednisolone reduced to 5 mg daily and the patient had no major flare-up of the disease since then. Nerve conductive studies were within normal limits; chest X-ray showed no pulmonary infiltrate and eosinophil counts had decreased to 4.3%. The patient reported overall subjective improvement in smell and taste function after immunosuppressive therapy.

DISCUSSION

Our findings provide empirical support for a suggestion by Ruiz in 2003 that anosmia can be a presenting symptom of CSS and imply that deficits in olfaction and gustation are likely present in this disease. It is noteworthy that loss of smell was noticed before the onset of other disease symptoms, suggesting that such dysfunction may precede the clinical symptoms by a number of months, conceivably in a manner analogous to that observed in some other diseases.⁵ The basis of chemosensory dysfunction in CSS is not clear,⁶ although several possibilities should be considered. In the case of olfaction, even subtle inflammation of the neuroepithelium can alter smell function, although total loss is the exception rather than the rule. In the case of taste, it should be noted that CSS is an autoimmune disease and that interferon (INF)-mediated signalling pathways have been identified in the taste bud tissue.⁷ INFs are one of the major cytokines that mediate immune responses to infection, and at high levels can be toxic, inducing gene expression and apoptosis. Interestingly, a range of autoimmune diseases is associated with olfactory or gustatory dysfunction, including myasthenia gravis,⁸ Sjogren's syndrome and multiple sclerosis.⁹ Other considerations that cannot be ruled out are (1) the adverse influences of granulomas on neural transduction in afferent pathways, (2) small vessel vasculitis in the epithelium of the peripheral nerves or the central nervous system (mononeuritis multiplex occurs in up to 76% of patients with CSS) and (3) adverse influences of the disease on neurotransmitter systems involved in sensory modulation. Importantly, the anticholinergic medications employed in the treatment of asthma might influence chemosensory function in the light of evidence of involvement of the cholinergic system in the modulation of olfactory function in neurodegenerative diseases.¹⁰

Learning points

- ▶ This is the first documentation that Churg-Strauss syndrome is accompanied by significant loss of smell and taste function and that they may appear early in the disease process.
- ▶ This important observation bolsters recent findings of early chemosensory dysfunction in a range of autoimmune disorders, including myasthenia gravis.
- ▶ Evidence that olfactory testing may be of assistance in the differential diagnosis of some neurological diseases will likely add to the importance of quantitative olfactory testing in medical practice.

Contributors HFT drafted the manuscript and analysed and interpreted the data. RLD consulted on the chemosensory testing and revised the manuscript for content.

Competing interests RLD received a grant funding from the NIH (R01 MH59825; R01 MH63381) and the department of defence (USARMAA W81XWH-09-01-0467). RLD is a consultant to NIH grants R01 AG041795 and U54 HD028138, and a mentor on NIH K01 MH090548-01. RLD is president and a major shareholder of Sensonics, Inc, a manufacturer and distributor of tests of smell and taste. Over the last 2 years, he has been a consultant to Intelligent Beauty, Pfizer Inc, PBS Television, NIH, Western Medical Assessment, and witness or consultant for legal proceedings.

Patient consent Obtained.

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