

## Drug-related taste disturbance

### *A contributing factor in geriatric syndromes*

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Many medications affect taste, smell, or salivation, and lead patients to change their patterns of food or fluid intake. The elderly are particularly affected on account of higher rates of polypharmacy and underlying frailty. Some affected patients consume fewer calories, resulting in nutritional deficiencies and weight loss. Others try to compensate by masking symptoms with additional fluids or by using added salt or sugar. Predictably, these changes can lead to polyuria, incontinence, or exacerbation of pre-existing conditions such as hypertension. Less predictably, changes like these contribute to complex geriatric syndromes and can result in abrupt functional decline.

When assessing medications for frail patients, family physicians are in an ideal position to inquire about taste, smell, and dry mouth. They can also determine whether symptoms or coping mechanisms are putting patients at increased risk of common geriatric syndromes such as anorexia, cachexia, incontinence, and falls.

We present a case of a woman with glaucoma who was severely injured in a fall after attempting to ameliorate the bitter taste resulting from dorzolamide eye drops, a side effect experienced by 25% of users of this medication.<sup>1</sup>

### Case description

An 85-year-old woman was brought to the emergency department one night after falling down 7 steps in her home. On initial evaluation, she was neurologically intact, with no evidence of intrathoracic, abdominal, or pelvic trauma. Imaging demonstrated a type 2 odontoid fracture, bilateral wrist fractures, and punctate intracranial hemorrhages. The odontoid fracture was treated conservatively with a cervical collar. She underwent closed reduction of her wrist fractures, and the intracranial bleeds required no intervention.

Geriatric assessment revealed a cognitively intact older woman with a history of glaucoma, cataracts, and gastroesophageal reflux disease. She had a history of a prior fall, 1 year earlier, which she attributed to poor vision. Her only medication was Cosopt eye drops, which she used nightly. Before admission to hospital, she lived with her daughter in a 4-level

home and was independent in the basic and instrumental activities of daily living.

The patient explained that her bathroom door was located immediately beside a set of stairs leading to a floor below. She woke up to urinate 3 to 4 times each night. This nocturia had developed when she started taking the Cosopt eye drops a few months earlier. She frequently experienced a bitter taste and tried to alleviate this by drinking 1 or 2 glasses of water nightly. On the night of the fall, she got up to urinate, misjudged the location of the bathroom door, and instead walked into the stairwell.

Physical examination revealed normal vital signs, with no postural changes. Findings of cardiovascular and neurological examinations were normal, with no evidence of weakness, rigidity, or sensory impairment in the lower extremities. Cognitive testing results were normal. Osteopenia was identified on radiography. Basic laboratory parameters, including urine dip, were all normal at the time of admission, with the exception of marginally low hemoglobin levels (119 g/L).

### Sources of information

The MEDLINE database was searched twice from 1966 to 2008. The first search included the terms *taste*, *dysgeusia*, *elderly*, and *dorzolamide*. A second search used the terms *falls*, *nocturia*, and *taste*. Results were scanned manually for relevance, and bibliographies from selected articles were reviewed for related references.

### Discussion

More than 250 medications affect smell or taste<sup>2</sup>; in the elderly, impairment of these senses has been correlated with weight loss,<sup>3</sup> mood change, and even functional decline.<sup>4</sup>

Clinicians are generally aware that anticholinergic medications, affect taste by causing dry mouth. However, the effects of other medications on taste are less familiar. **Table 1**<sup>5</sup> lists classes of drugs known to cause taste or smell disturbances. Many of these have been documented only in case reports and might occur at very low frequencies. **Table 2**<sup>5,6</sup> lists medications more commonly associated with a substantial disturbance in taste or smell. More exhaustive lists have been reported by Ackerman and Kasbekar<sup>7</sup> and Doty et al.<sup>5</sup>

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Cet article a fait l'objet d'une révision par des pairs.

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**Table 1. Types of medications reported to affect taste or smell**

CLASS	AGENTS
Antibiotics	Ampicillin, macrolides, quinolones, sulfamethoxazole, trimethoprim, tetracycline, metronidazole
Neurologic medications	Antiparkinsonians, CNS stimulants, migraine medications, muscle relaxants
Cardiac medications	Many antihypertensives, diuretics, statins, antiarrhythmics
Endocrine medications	Most thyroid medications
Psychotropics	Most tricyclic antidepressants, some antipsychotics, anxiolytics, mood stabilizers, hypnotics
Other	Antihistamines, antineoplastics, bronchodilators, anti-inflammatories, smoking cessation aids, antifungals, antivirals

CNS—central nervous system.  
Adapted from Doty et al.<sup>5</sup>

**Table 2. Incidence of taste disturbance with common medications**

MEDICATION	INCIDENCE, %
Acetazolamide	12-100
Maribavir	83
Cisplatin	77
Eszopiclone	16-32
Topiramate	8
Captopril	2-7
Lithium	5
Procainamide	3-4
Terbenafine	3
Amiodarone	1-3

Data from Doty et al.<sup>5</sup> and Henkin.<sup>6</sup>

Cosopt, a brand-name drug often prescribed for glaucoma, contains a combination of timolol and

dorzolamide hydrochloride, a carbonic anhydrase inhibitor similar to acetazolamide. Bitter taste is a frequent side effect of dorzolamide.<sup>1</sup>

Identifying patients with drug-related changes in taste is clinically important because such changes can lead to poor compliance with medications<sup>8</sup> and negatively affect chronic disease management. Those with diminished taste acuity might also have increased preference for salt or sugar,<sup>2,9</sup> complicating treatment of conditions like diabetes and hypertension.

Taste disturbance also affects nutritional status. In one study, patients with severe taste distortion consumed 500 fewer calories per day than their healthy counterparts and ate fewer healthy foods such as fruits and vegetables.<sup>9</sup> Taste disturbance has also been associated with impaired wound healing, which is also related to nutritional status.<sup>7</sup>

For patients who find ways to compensate for taste disturbances, other complications can occur. As in the case of our patient, some patients compensate for bitter taste or dry mouth by increasing their fluid intake, and the associated urinary frequency puts them at risk of falls or incontinence.

Like other geriatric syndromes, falls result from the interaction of multiple predisposing factors and the person's environment. Common risk factors include arthritis, depressive symptoms, orthostasis, cognitive impairment, the use of 4 or more medications, and impaired vision, balance, or gait.<sup>10</sup> Falls affect more than one-third of persons aged 65 years and older annually,<sup>7</sup> so it is important to seriously consider all modifiable risk factors. Nocturia and overactive bladder have also been identified as risk factors for falls in older patients.<sup>11</sup> If patients increase their fluid intake, particularly in the evening, they are at increased risk.

Many older individuals are frail and thus highly vulnerable to adverse health outcomes. Even

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minor challenges, such as changes in taste or smell, can be sufficiently disruptive to cause harm when a patient has limited physiologic or social reserves. Like most who experience geriatric syndromes, our patient's falls and subsequent injuries were multifactorial. Visual impairment, physical environment, and osteopenia all played a role; however, on this occasion, the added challenge of nocturia related to taste disturbance exceeded her capacity.

### Recommendations

Clinicians should consider taste or smell impairment in elderly patients with weight loss, poor adherence to diet or medications, slow wound healing, or sudden onset of polyuria or incontinence.


Examination of the head and neck is warranted to rule out infection or malignancy and to determine if a change to taste, smell, or salivation is the principle problem. Review of medications often reveals multiple offenders, and polypharmacy should be reduced if possible. The effect of medications on caloric intake, fluid consumption, food or seasoning preferences, and mood should also be assessed.

Smoking, alcohol, and suboptimal oral hygiene might also contribute to taste disturbance and should be addressed through patient education and support.

If it is not possible to discontinue or switch an offending medication, scheduling doses to avoid dysgeusia at mealtimes or polyuria overnight can be considered. Monitoring weight and early referral for dietary consultation can help to minimize effects on nutritional status. Intentionally discussing ways that patients are currently coping with bland or bitter tastes and suggesting alternatives to patients, their families, or long-term care providers might be helpful. Artificial saliva or sugar-free candy can help in cases of xerostomia and allow patients to avoid excessive fluid consumption.

### Conclusion

Dorzolamide is a generally well-tolerated medication. However, the case described here demonstrates that even seemingly minor side effects, such as altered taste, can have important ramifications for elderly patients. This is an important issue to consider when prescribing medications that alter smell and taste or cause dry mouth.

Choosing alternative medications, monitoring weight and nutritional status, and suggesting lifestyle changes can prevent further complications. Ultimately, being aware of offending medications and remaining sensitive to seemingly benign complaints will better help physicians tailor prescribing practices to frail older patients. 

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### EDITOR'S KEY POINTS

- Many medications affect taste, smell, or salivation; because of higher rates of polypharmacy and underlying frailty, the elderly are particularly affected by these unpleasant side effects.
- When prescribing medications to the elderly, physicians should inquire about medication side effects and ascertain whether these symptoms and patients' coping mechanisms (eg, drinking more fluids, eating fewer calories) are putting them at increased risk of common geriatric syndromes, such as anorexia, cachexia, slow wound healing, polyuria and incontinence, and falls; conversely, clinicians should also consider if sudden onset of these syndromes is a result of taste or smell impairment due to medication use.
- Drug-related changes in taste can also lead to poor compliance with medications and diet, negatively affecting chronic disease management; those with diminished taste acuity might also increase their intake of sugar and salt, complicating or exacerbating conditions like diabetes and hypertension.
- Many older individuals are frail and highly vulnerable to adverse health outcomes; minor challenges, such as changes in taste or dry mouth, can be sufficiently disruptive to cause harm. Being aware of offending medications and remaining sensitive to patient complaints will help physicians better tailor their prescribing practices for geriatric patients.

### POINTS DE REPÈRE DU RÉDACTEUR

- De nombreux médicaments ont un effet sur le goût, l'odorat ou la salivation; en raison des taux plus élevés de polypharmacie et de la fragilité chez les personnes plus âgées, ces dernières sont particulièrement affectées par ces effets secondaires déplaisants.
- Quand ils prescrivent des médicaments aux personnes âgées, les médecins devraient s'informer des effets secondaires, et vérifier si ces symptômes et les mécanismes de réponse des patients (p. ex. boire plus de liquide, réduire l'apport calorique) accroissent le risque de syndromes gériatriques fréquents comme l'anorexie, l'émaciation, la lenteur de cicatrisation, la polyurie, l'incontinence et les chutes; réciproquement, les cliniciens devraient aussi chercher à savoir si l'apparition soudaine de ces syndromes est le résultat d'une déficience dans le goût ou l'odorat due à l'usage de médicaments.
- Les changements au goût reliés aux médicaments peuvent aussi mener à une faible observance de la prescription de médicaments et d'un régime alimentaire, affectant ainsi la prise en charge des maladies chroniques; les patients dont le sens du goût est diminué peuvent aussi consommer plus de sucre et de sel, ce qui peut compliquer ou exacerber des problèmes comme le diabète et l'hypertension.
- De nombreuses personnes plus âgées sont frêles et très vulnérables aux résultats indésirables pour la santé; des problèmes mineurs comme un sens du goût diminué ou la sécheresse de la bouche peuvent déranger suffisamment pour causer du tort. En étant au courant des médicaments susceptibles d'avoir de tels effets et en restant sensibles aux plaintes du patient, les médecins peuvent mieux adapter leurs pratiques d'ordonnance en fonction des patients gériatriques.

**Competing interests**

None declared

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