Loss of Smell in Allergic Rhinitis and Related Disorders

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Introduction

Although smell disorders have a great impact on patient’s burden and quality of life, they have been scarcely studied in our environment. In recent years, the study of smell has become relevant because several studies have suggested that olfactory dysfunction is a marker of health deterioration and disease severity2,5.

Anosmia and hyposmia are the result of olfactory system dysfunction at different pathway levels. The ability to detect/recognize/identify all odours is named normosmia, while the partial or total loss of smell is named hyposmia or anosmia, respectively. Olfactory detection is related to the most peripheral part of the olfactory system, while the identification and recognition involve cognitive tasks of central structures, such as the orbitofrontal region and other areas of the limbic system1,2.

Etiology

Several epidemiological studies have focused on the prevalence (from 1 to 20%) of olfactory disorders in the general population while investigating the influence of certain factors on olfactory function. Mullol et al. carried out the OLFACAT survey in the population of Catalonia3. By means of epidemiological and health-status questionnaires and 4-odorant olfactory assessment, they found a general prevalence of olfactory dysfunction of 19.4% (19.1% of hyposmia and 0.3% of anosmia).

Several etiological factors1-7 of olfactory disorders have been described such as common cold or acute rhinosinusitis6, posttraumatic hyposmia7, and inflammatory sinonasal diseases such as allergic rhinitis1-8 and chronic rhinosinusitis, with or without nasal polyps9-10. Among others, neurodegenerative disorders such as Alzheimer and Parkinson diseases11 also produce smell dysfunction.

Diagnosis

A differential diagnosis among the most frequent causes of loss of smell should be done in most of the patients12 by using four steps in the diagnosis (Figure 1). In addition to the identification of loss of smell as a symptom by discontinuous or continuous (visual analogue scale or VAS) scales, several screening and smell identification tests have been validated in different countries worldwide. As a summary the following are briefly described:

1. Smell Identification Tests in Adults
   - University of Pennsylvania Smell Identification Test (UPSIT): 40 odorants (US)13.
   - Connecticut Chemosensory Clinical Research Center (CCCRC): 8 odorants (US)14.
   - Smell Diskettes: 8 odorants (Switzerland)15.
1. Sniffin’ Sticks: 16 odorants (Germany)
2. Barcelona Smell Test-24 (BAST-24): 24 odorants, includes gustometry (Catalonia, Spain)

2. Smell Identification Tests in Children
   - Sniffin’ kids: 14 odorants, derived from Sniffin’ Sticks (Germany)
   - Smell Wheel: 11 odorants (US)
   - U-Sniff test: 12 odorants (universal, 19 countries worldwide including Japan, US, and Spain)
   - Paediatric Barcelona Olfactory Test (pBOT-6): 6 odorants, includes gustometry (Catalonia, Spain)

3. Screening Smell Tests
   - 12-item Cross-Cultural Smell Identification Test (CC-SIT): 12 odorants, derived from the UPSIT (US).
   - Pocket Smell test: 3 odorants, derived from the UPSIT (US).
   - Japanese Odor Stick Identification Test: 13 odorants (Japan).
   - Scandinavian Odor Identification Test (SOIT): 16 odorants (Sweden).

Treatment

Improvement on the loss of smell can only be obtained...
by treating the causative disease. In allergic rhinitis, anti-
histamines, intranasal corticosteroids, and MP-AzeFlu (the
intranasal formulation of fluticasone propionate and azelastine)
have shown improvement on the loss of smell. In chronic
rhinosinusitis several treatments such as antileukotrienes,
aspirin desensitization, and initial endoscopic sinus surgeries
have proven some efficacy. Intranasal corticosteroids, short
courses of oral steroids and, more recently, biological therapy
such as Dupilumab have proved a stronger and more main-
tained effect on the sense of smell. The loss of smell and its
improvement have been recently adapted by an EUFOREA
(Education, Innovation and Research in Allergy and Airway
Diseases) international consensus as a criteria for both the
indication of biologics and its response to treatment in severe
chronic rhinosinusitis. In addition, olfactory training has also
proved efficacy on improving loss of smell from postviral
and post-traumatic origin.

Conclusions and Key Messages

- The sense of smell subsides with age in both genders, im-
 pairong good nutrition and often producing considerable
disability with poor quality of life.
- Smell dysfunction is a challenging condition of significant
prevalence that has a major impact on individual’s safety
and QoL.
- Smell loss related to upper airway inflammatory diseases
(allergic rhinitis and acute or chronic rhinosinusitis, with
or without nasal polyps) are the most common causes of
gradual/progressive olfactory dysfunction. This loss of
smell is always correlated to the disease severity and can
be used as a clinical marker of severity.
- Loss of smell must be systematically assessed with a com-
 plete medical history and nasal examination, including
smell testing, to find out the original cause and then offer
to the patient the best available treatment.
- Validated olfactory tests are useful tools to objectify the
olfactory loss and to quantify its degree of severity.
- Management of olfactory dysfunction is mainly based on
diagnosing and treating the cause, upper airway inflam-
matory diseases being among the most successfully treated
forms of smell loss by using anti-inflammatory drugs
(antihistamines, antileukotrienes, aspirin desensitization,
corticosteroids, and biological therapies in the most severe
cases) or even initial surgery.
- Patient’s education, prevention, and olfactory training are
also strongly recommended in all causes of olfactory dys-
function.

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