Case report. Multiple chemical sensitivities, occupationnal health, odor sensitivity.

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Abstract.

A 35 year old woman lost her job following symptoms according to a multiple chemical sensitivities. Her antecedents are common. The numerous complementary examinations are largely negative. An olfactory exploration was performed in order to evaluate the capacities of the patient. The perception threshold was normal, but this patient feels the odours (hedonism) almost at the another side of a normal noses jury. Perhaps, this observation may be explained by a profound disturbance of the olfactory function in tablecase of “multiple chemical sensitivities”.

Keywords
Occupational health, multiple chemical sensitivities, olfactory hedonism.

Titre : Cas clinique. Sensibilité chimique multiple, santé au travail, sensibilité aux odeurs.

Résumé.
Une femme de 35 ans perd son emploi suite à des symptômes attribués une “sensibilité chimique multiple”. Ses antécédents sont sans particularité. Les examens complémentaires sont largement négatifs. Un examen olfactif est réalisé pour explorer les capacités de la patiente. Le seuil de perception était normal, mais la patiente percevait les odeurs (hédonisme) le plus souvent d'une façon inverse à celle d'un jury de nez « normal ». Peut-être que cette observation montre une profonde perturbation de la fonction olfactive dans le cadre d'une « sensibilité chimique multiple ».

Mots-clé
Santé au travail, sensibilité chimique multiple, hédonisme olfactif.
Case presentation.

A 35-year-old woman lost her job of hairdresser which she had occupied for 7 years. According to the occupational health record, during 6 years, she did not show any respiratory, dermatological or other symptoms. Her antecedents are common; an atopy was evoked, but could not be highlighted. She did not smoke nor consume alcohol and she did not take any medication. She does not declare any apparent cause, e.a. no brutal exposure to a substance, no habit modifications, no close childbirth, no current traumatism, no residence change, no usual product modifications at her workplace or at home.

The use of the CDHS questionnaire (California Department of Health Services) shows the existence of complaints and symptoms whose gravity (severe) is higher than the average found by Caress et al. \[1\]. The cause appears of chemical origin (hairstyle products). The symptoms immediately begin in the presence of perfume, deodorants, cleaners and tobacco smoke. Fresh ink and pesticides are also in cause. She complains about headache, burning eyes, loss of mental concentration, nausea and stomach distress, muscle pain, dizziness, fever sensation, breathing difficulty, chronic fatigue, cough, sore throat, and short memory problems. Moreover, by applying the Q16/18 questionnaire (evaluation of first stage psycho-organic syndrome in workers exposed to solvents) \[2\], it appears that she complains about palpitations, irritability, loss of libido, numb in hands, feet and hands tremble. She currently takes benzodiazepines and non steroidal anti-inflammatory drugs.

The numerous complementary examinations, realised outside, are largely negative. Among other things, the dermatological check-up is negative, except a positive rast to dust mite and cat hairs. ENT check-up is negative. The functional respiratory tests are normal, in particular a provocation test to persulphates is negative as well on the pulmonary level as ENT, but starts the already described symptomatology. The hematologic examination is normal, e.a. no inflammatory signs. The neurological examination and brain IRM are normal.

The symptoms have gradually decreased in gravity since she was ousted from her work. Nowadays, residual significant symptomatology is still persisting.

During the expertise, an olfactory examination was performed in order to evaluate the olfactory capacities of the patient. Different test were used, such as the “Olfactory Clinical Test (O.C.T.)” \[3\] and the “European Olfactory Clinical Test” \[4\] and the methodology of the “Field of Odours” (Champ des Odeurs®) \[5\], actually frequently used in environmental odour annoyances \[6\].

Results of the patient for two perception threshold tests are compared with reference laboratory and resumed (Personal communication of C. Rouby: Neurosciences Sensorielles Comportement Cognition, Université Claude Bernard. Lyon, France, table 1).

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<tr>
<td>Detection</td>
<td>15.0</td>
<td>15.7</td>
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<td>Identification</td>
<td>13.0</td>
<td>13.8</td>
<td>1.5</td>
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<td>Perception threshold (odor 2)</td>
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<td>2.0</td>
<td>0.7</td>
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<tr>
<td>Perception threshold (odor 1)</td>
<td>3.0</td>
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Table 1: Results for the patient and comparison with those of reference laboratory \[8\].

The perception threshold of the patient is situated in the population average.

The second test includes a part of detection and identification of 16 fragrant molecules among 16 series of 4 solutions. Results of the patient are 1 mistake for detection and 3 mistakes for identification. As for the perception, her capacity of detection and identification fragrant molecules is also in the population average (Table 1). But these results can be considered as not excellent \[8\]).

Another series of fragrant molecules stemmed from the “Field of Odours” (“Champ des Odeurs®”) was used in order to evaluate the sensitivity of the patient via two characteristics of odours, the intensity and the
hedonicity. The scale of intensity starts at level «0», corresponding to «no odour» and rises until level «6», describes by «extremely strong odour». The hedonicity scale is comprised between level «-3» for «extremely unpleasant» and «+3» for «extremely pleasant» by the way of level «0» corresponding to «neutral level». The responses were compared to our normal noses jury (10 experimented persons).

Results are showed in Figure 1 and Figure 2.

![Graph showing odour intensities for different molecules](image)

**Figure 1 :** Comparison between results of the patient (white point) and those of a jury of noses, expressed in term of minimum, maximum and average of odour intensities of 12 fragrant molecules.

Concerning the intensity of fragrant molecules, the patient seems to present a normal behaviour since her results are close to those of the jury. On the contrary, when the patient has to describe the odours in term of hedonicity, results are very different from those of the jury. For example, odours characterised as very unpleasant by the jury are less unpleasant for the patient. On the other hand, pleasant odours for the jury are systematically perceived as unpleasant to extremely unpleasant. However, an exception to this result occurs with the fragrant molecule of “ethylmaltol”, associated with a sweetened odour and for which the intensity is similar to the jury’s one. The most important difference between results of patient and jury is for the “vanillin”, generally considered as a very pleasant odour. Patient describes this odour as extremely unpleasant. This result can be explained by the fact that the level of intensity for this odour is maximum for the patient. But the other negative results in hedonicity can not be simply explained in this way.
Figure 2: Comparison between results of the patient (white point) and those of a jury of noses (average) for the odour hedonicity of 12 fragrant molecules.

Discussion

We do not enter in the discussion of the nosologic reality for this pathological entity ("multiple chemical sensitivities") which does not encounter the causality criteria of Hill [7]. This case takes place in a more general group of "chronic syndromes that are frequently unexplained" [8]. It is an important issue in public health [9].

From occupational health viewpoint, three arguments seem to have to be raised for imputation to the working conditions: the health problem arises like a thunderclap in a blue sky, which evolve quickly to job loss, with apparently absence of another causes, and finally with the improvement of symptomatology after ousting from her job.

The case report is classic in the description of the pathological entity "multiple chemical sensitivities", especially for its social, professional or health cost. Indeed, important measures are taken to make the environment viable, employability is becoming precarious and a very significant number of negative health examinations are realised.

We want to underline the characteristics of the olfactory examination. Although the olfactory capacity to perceive and detect fragrant molecules is within normal limits (this was already described [10]), the contribution of this case report in our knowledge of "multiple chemical sensitivities", is the fact that this person feels the odours (hedonism) in a paradoxical way, almost systematically at the opposite side of an experimented noses jury and generally in an unpleasant way. The signification of this may be a profound disturbance of a sensorial function, e.a. olfactory function. Others observations are necessary to confirm this first observation.
References


