

## **Introductory information about sensory hyperreactivity and airway symptoms induced by chemicals and scents**

**Professor Eva Millqvist, MD, PhD**

### *History*

The condition of chemical sensitivity is not new. General symptoms induced by chemicals have been known variously as multiple chemical sensitivity (MCS), idiopathic environmental intolerance and environmental illness. It seems, however, that chemical sensitivity has become particularly common during the past 50 years and that there is a connection to the Western life style. A search for multiple chemical sensitivity on Medline today will give you about 2300 web pages. The term “sensory hyperreactivity (SHR)” has been used for just the past 10 years and describes chemical sensitivity with symptoms exclusively localized to the airways in combination with a positive capsaicin inhalation cough test.

### *Symptoms in sensory hyperreactivity*

The condition of SHR is easily confused with asthma or allergy, which may lead to misdiagnosis and inappropriate treatment. Besides airway symptoms some patients also have problems with headache, dizziness, tiredness and sweating.

#### **Symptoms that could be misinterpreted as asthma**

- heavy breathing
- difficulties in breathing
- pressure on the chest
- ache/irritation in the chest
- cough/phlegm

#### **Symptoms that could be misinterpreted as allergy**

- eye irritation  
itching  
redness
- nose irritation  
congestion  
rhinorrhea
- throat irritation  
hoarseness  
itching

### *Trigger factors*

These airway symptoms are triggered by low levels of chemicals normally regarded as non-toxic to humans.

- |   |                   |                          |
|---|-------------------|--------------------------|
| • Perfumes, cosmetics, and scented products | • Cigarette smoke | • Cold air, and exercise |
| • Various chemicals                         | • Mold            |                          |
| • Flower scents                             | • Smog            |                          |
|   | • Exhaust fumes   |                          |

### *Investigation in SHR*

As the symptoms easily can be misinterpreted as asthma or allergy most patients with SHR undergo testing for asthma and allergy, including spirometry (which measures lung function) and the skin prick test. In many cases, the test results are completely normal. There is no specific test for “allergy to perfume” or “allergy to smoke”.

*Current research indicates that –*

- Airway symptoms from inhaled chemical irritants are not induced by our sense of smell but by our common chemical sense, which makes us aware of chemical irritants. The stinging feeling in our eyes and nose after contact with ammonia is an example of this common chemical sense. Another is the eye irritation we feel after peeling an onion. It is therefore not the sense of smell that causes irritation, even if many chemicals have a smell that makes both senses react. Chemicals often have a scent, a fact which has misled us to believe that scents *per se* cause symptoms.
- Patients with chemically triggered airway symptoms are more sensitive to inhaled capsaicin than are healthy control persons. Capsaicin is the hot ingredient in hot pepper, or chili. Cough sensitivity to inhaled capsaicin is known to reflect the sensitivity of the sensory nerves in the airway mucosa.

*More research findings have shown that –*

- Airway symptoms induced by inhaled chemicals can be verified in scientific studies.
- The quality of life is reduced in persons with fragrance/chemical-triggered airway symptoms, mainly due to social handicap.
- Airway symptoms may be induced by eye exposure to chemical irritants.
- Our use of perfumed and scented products is on the increase and therefore, we may presume that the problems of SHR will also increase among humans
- A third of the Swedish grown up population get some symptoms from chemicals and strong scents. Most common were symptoms from the nose
- 6% of the adult Swedish population could be diagnosed with SHR.
- Recent findings indicate a neurochemical imbalance in the airways of patients with SHR but we still not know the reasons to this imbalance. It could depend on an increased number of sensory nerves or an augmented expression of the airway sensory nerves.
- Problems with SHR may remain for a long time. Seventeen patients with SHR were followed over a period of five years. Each year they were tested with the capsaicin inhalation test and answered different questionnaires. After five years there were some individual changes, but for the group as a whole the symptoms remained as well as the increased capsaicin cough sensitivity.
- Inhalation of ethanol may augment the airway symptoms in SHR. Since perfumed products are believed to trigger the same nerve receptors as capsaicin do the conclusion is that ethanol; a common dissolvent for fragranced products.
- Exercise in cold air can provoke symptoms in patients with SHR and also increases the cough sensitivity to inhaled capsaicin.
- 

*Occurrence*

The occurrence of different chemical sensitivities is difficult to estimate as the definitions vary but in several population studies, about 30% of all people interviewed regarded themselves as sensitive to chemicals. It is, however, important to remember that the severity of symptoms may vary from very light to fairly disabling. 6% of the adult Swedish population could be diagnosed with SHR. This estimation is based on the combination of a positive capsaicin inhalation cough test and high scoring for a questionnaire measuring the impact of scenting chemicals on daily life activities.

### *Treatment*

There is no specific treatment for hypersensitivity to chemicals. Most patients with SHR have tried drugs for asthma and allergies with little or no noticeable effect. In other words, when they discontinued their medication they often found that symptoms did not deteriorate. It is, however, very important that a patient does not experiment with medicines on his or her own; all changes should take place in consultation with the physician who prescribed the treatment. It could be downright dangerous for someone with asthma and allergies to suddenly discontinue the medication.

### *Prevention*

Those who do not suffer from hypersensitivity to chemicals must try to understand the problem in others and avoid scented products if it is known that they cause discomfort to others. In health care in general, it is not advised to use scented products or sanitary items. Ten years ago, smoking in public was common; today, it would be unthinkable. Perhaps in another 10 years, there will be a similar attitude toward strongly scented products. A problem is the large increase in the consumption of chemicals and perfumed products in the Western world.

Once a patient feels ready to discuss the problem with those around him or her, much has been won. Often, letting others know about one's problems is easier than expected. A person who is hypersensitive to scents must speak about these problems, and what triggers them, with the family, friends, and colleagues. At most workplaces, it is possible to arrange for the environment to be essentially free from strong fragrances.

### *In conclusion*

Why some develop sensitivity to chemicals and scents is still not known. More women than men have such problems and their quality of life is influenced. Patients having sensory hyperreactivity are more cough sensitive to inhaled capsaicin. SHR is not an asthmatic condition and there is no specific treatment or medication.