

Airway sensitivity to chemicals and scents, symptoms, trigger factors, and the capsaicin inhalation test

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Some patients with airway symptoms, induced by chemicals and scents, but who lack bronchoconstriction or allergy, have shown increased cough sensitivity to inhaled capsaicin. Capsaicin stimulates cough via the sensory nervous system, and a suggested diagnosis for this condition is *sensory hyperreactivity* (SHR).

The aims of this thesis were to; (I) study airway sensitivity to inhaled capsaicin, and the occurrence of airway symptoms induced by chemicals and scents in patients with airway symptoms of unclear aetiology; (II) clarify whether patients with multiple chemical sensitivity (MCS) according to Cullen's criteria have a physiologically substantiated reaction (cough) to inhaled capsaicin that differed from healthy controls; (III) compare tidal breathing and dosimeter methods in terms of agreement and repeatability of cough response to capsaicin inhalation in patients with SHR and in healthy controls; (IV) evaluate the long-term persistence of airway symptoms induced by chemicals and scents and their influence on health-related quality of life (HRQL), and determine the long-term reproducibility of cough response to capsaicin inhalation.

Cough sensitivity to capsaicin was dose dependent and was significantly higher among the patients than in the healthy controls (I–IV).

Fifty-two patients underwent methacholine and capsaicin inhalation tests. Twenty-three percent (12/52) of the patients had a positive methacholine test, of these nine were diagnosed as having asthma. Seventy-seven percent (40/52) of the patients reported airway symptoms induced by chemicals and scents and they coughed significantly more to inhaled capsaicin than did those without such sensitivity (I).

Twelve patients with MCS, all having airway symptoms induced by chemicals and scents, were provoked with inhalation of capsaicin, in a double-blind randomised order, and the resulting responses were compared with 12 healthy controls.

The patients coughed significantly more and experienced more other airway symptoms upon capsaicin inhalation than the controls did (II).

In 15 patients with SHR and 15 healthy controls, capsaicin inhalation tests were performed twice using tidal breathing and twice using the dosimeter method. The dosimeter method caused significantly more coughs and other airway symptoms in both patients and controls than did the tidal breathing method. Both methods showed good repeatability and a similar ability to distinguish patients with SHR from controls (III).

Eighteen patients with airway symptoms induced by chemicals and scents were followed for five years. In most patients the symptoms and a reduced HRQL persisted, and the capsaicin cough sensitivity was increased, reproducible, and long lasting (IV).

Conclusion: In patients with SHR and MCS airway sensory reactivity is increased, suggesting that neurogenic factors may be of importance. Though the methacholine inhalation test may be of some value in assessing these patients, in that it can exclude the possibility of bronchial asthma, the capsaicin inhalation test seems to be a more useful diagnostic tool. In conducting capsaicin inhalation testing it is important to know the type of inhalation device used, particle size, airflow rate, and inspiratory flow rate, as these factors influence the strength of reaction. SHR appears to be a chronic condition; it is associated with reduced HRQL and the long-term persistence of increased capsaicin cough sensitivity.

Key words: asthma, capsaicin, cough, dosimeter method, health-related quality of life, methacholine, multiple chemical sensitivity, Nottingham Health Profile, sensory hyperreactivity, tidal breathing method

ISBN 91-628-6501-3 Göteborg 2005