

Inflammation and clinical immunology

Local irritating effects, exhaled breath condensate pH and exhaled nitric oxide in humans after ethyl acrylate exposure

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Question:

Ethyl acrylate is an irritant known to affect the nose and the eyes. An increase of the eye blink frequency in humans was observed during exposure to 5 ppm. Studies on the lower airways are scant and our study objective was the evaluation of pH in exhaled breath condensate (EBC-pH) and nitric oxide in exhaled breath (FeNO) as markers of inflammation.

Methods:

Sixteen healthy volunteers were exposed for 4 h to ethyl acrylate in concentrations of 5 ppm and to sham (0.005 ppm) in an exposure laboratory. Clinical irritation symptoms, EBC-pH (at a pCO₂ of 5.33 kPa, blood-gas analyzer) and FeNO (NioxMino) were assessed before and after exposure. Differences after ethyl acrylate exposure were adjusted for those after sham exposure (net response).

Results:

5 ppm ethyl acrylate induced clinical signs of local irritation of the nose and the eyes but in any case of lower airways. EBC-pH demonstrated a significant negative net change (Δ pH -0.7%, p=0.036). Concerning FeNO, we did not observe significant changes compared to sham exposure.

Conclusions:

Sensory irritation induced by 5 ppm ethyl acrylate mainly consists of eye and nose irritation (trigeminal stimulation). In addition, acute ethyl acrylate exposure at 5 ppm resulted in a net decrease of EBC-pH in subjects. Whether this can be interpreted in terms of airway irritation or/and inflammation needs further investigations.