EVALUATION OF A 4-STEP 1-DAY WHOLE BODY CHALLENGE PROTOCOL FOR THE DIAGNOSIS OF OCCUPATIONAL ASTHMA DUE TO DIISOCYANATES

L. Scheidler, K. Sucker, D. Taeger, V. van Kampen, E. Heinze, B. Marczynski, C. Monse, T. Bruening, R. Merget

Institute for Prevention and Occupational Medicine of the German Social Accident Insurance, Institute of the Ruhr University (IPA), Bürkle-de-la-Camp-Platz 1, 44789 Bochum, Germany

Inhalative challenges play an important role in the diagnosis of occupational asthma due to diisocyanates. As existing protocols are time-consuming and costly, it was the aim of this study to develop a short duration whole body exposure protocol. Ninety-three subjects with suspected occupational diisocyanate-induced asthma and verified current or previous occupational exposure to diisocyanates as well as 10 control subjects without diisocyanate exposure but bronchial hyperresponsiveness were investigated. After baseline examination on the first day subjects underwent a standardized whole body multiple-steps-1-day challenge with exposures of up to four times 30 minutes to concentrations of 5, 10, 20 and 30 ppb of the dominant diisocyanate used at work on the second day. Common spirometric and bodyplethysmographic parameters were used as positivity criteria. Overall, 14 subjects demonstrated a positive diisocyanate challenge, 19 were considered doubtful, and 60 were negative. All controls had negative challenges. No subject was sensitized to diisocyanates. Positive reactions occurred during the challenge (n=10) or during follow-up (n=4). Eight subjects showed a more than 40% fall of FEV1 at any time during the study, five of these inhaled a bronchodilator after the positive reaction. These severe reactions with need of medication occurred after 5 ppb (n=2) or 10 ppb (n=3), while isolated late reactions after 2 hours of follow-up were not observed. Multivariate analysis showed an association between a positive challenge and both the degree of previous occupational exposure and the presence of baseline bronchial hyperresponsiveness. Conclusions: The proposed 4-steps-1-day diisocyanate challenge protocol induced pronounced bronchial reactions in a small number of subjects. As these reactions were more likely to occur after low concentrations, it is recommended to shift the initial concentration/dose step to lower exposures. Whether 1-day protocols can be performed with sufficient safety needs further study.