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BRONCHIAL ALLERGEN CHALLENGES - DOUBLING OR QUADRUPLING DOSE STEPS?

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Introduction: Inhalation challenges with allergens are considered the gold standard for the diagnosis of occupational asthma. However, no standardized methods are available. One open question among others is the degree of dose augmentation in the stepwise challenge protocols. Recently, Cockcroft and Davis recommended to increase the allergen concentrations by not more than doubling between dosing steps for safety reasons (Cockcroft DW, Davis BE: Allergen challenge dose-response slope. J Allergy Clin Immunol 2008;122;1034-5). Inspired by this study, we analyzed retrospectively our dosimeter allergen challenges within the last 10 years which were performed with quadrupling dose steps. **Methods:** The allergen was inhaled with 5 or 10 breaths (depending on the allergen) by an APSpro dosimeter and a DeVilbiss 646 nebulizer. Inhalations were performed as described by the American Thoracic Society (ATS) for metacholine challenges, with minor modifications. Ten minutes-intervals were chosen between dose steps. The test was determinated if a fall of FEV? of at least 20% occurred within 30 minutes after allergen inhalation. If a fall of FEV? between 15 and 19% was measured (near positive), spirometry was performed after another ten minutes. If the test criterion was fulfilled, the test was terminated and another maesurement was performed after 10 to 20 minutes. Isolated late reactions were not included. All spirometric maneuvres were performed according to the ATS and met reproducibility criteria. All subjects were without medication that might influence the test results. Inhalations were performed for the diagnosis of occupational asthma and approved by the ethic's committee of the Ruhr University. Allergens were Platinum salts (n=7 tests; final dose range 175-700 ng), Rhodium salt (n=1; 36 ng), barn mites (n=3; 1125-18000 ng protein), house dust mites (n=3; 4500-18000 ng protein), ?-amylase (n=1; 616 ng protein), cow dander and soapnut (n=1 each; 348 and 2814 ng protein). **Results:** Seventeen tests in 13 subjects were considered positive. Mean baseline FEV? was 95.5 % predicted. All positive reactions occurred after the second dose step or later. One subject preferred to inhale a short acting bronchodilator after the reaction had been documented. The mean FEV? decrease 10 minutes and 20-30 minutes after the last allergen dose was 26,7?6,4 and 26,2?6,5 %baseline, respectively. The maximal decrease of FEV_1 was 39 %baseline (10 minutes) and 37 %baseline (20-30 minutes). Terminal dose response slopes did not differ between doubling (values from Cockcroft and Davis) and quadrupling doses, nor were there any differences concerning the maximal response. All but two positive reactions occurred after 10 minutes. (2 near positive reactions). There were no differences between the fall of FEV? after 10 and 20 to 30 minutes after allergen inhalation. **Conclusion:** The results of this retrospective analysis of routine challenge tests need to be interpreted with caution due to the low number of subjects. Nevertheless it suggests that quadrupling dose steps may be an acceptable alternative, without serious increase in risk of severe asthmatic

reactions. This is accompanied by a noticable shortening of the test duration. We assume that by shortening the test duration, physicians might choose lower starting doses and thus make allergen inhalation challenges safer. However, further observations about the potential risk of dose augmentation in allergen challenges are needed, preferably in prospective studies in larger numbers of subjects.