EXHALED NITRIC OXIDE IN SPECIFIC INHALATION CHALLENGE

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Introduction: Exhaled nitric oxide (eNO) is a biological mediator in human lungs and can be measured easily in exhaled air. Increasing eNO concentrations after specific inhalation challenges (SIT) are described for subjects with occupational asthma. Nevertheless, interpreting eNO concentrations after SIT is still a challenge because eNO concentrations depend on various confounding factors. The goal of our study was to analyze factors influencing the concentrations of eNO after SIT. **Methods:** 24 women and 43 men were examined due to suspected occupational asthma. History, physical examination, routine laboratory testing, skin prick testing (atopy: at least 1 test > 3 mm wheal reaction), lung function including methacholine testing and SIT with various occupational allergens were performed. Airway medication was discontinued at least 12 hours before SIT. SIT was evaluated synoptically by clinical and lung function (decrease of FEV_1 >= 20 percent or increase of sRt of >= 100 percent to > 2 kPa*s). eNO was measured at a flow rate of 50 mL/s before SIT (t0), 4 (t1) and 20 to 22 hours (t2) afterwards (NIOX Flex, Aerocrine, Sweden). In addition to descriptive statistics, we modeled the absolute concentrations of eNO after SIT using a mixed linear model with subject as random variable. Potentially influencing variables of the eNO concentration were sex, smoking behavior, atopy, classification of allergen (high or low molecular weight), bronchial hyperresponsiveness, latency of symptoms, time since cessation of exposure, medication, and result of SIT. **Results:** Before SIT, we observed lower eNO concentrations in smokers than in non-smokers (median: 10.7 vs. 24.3 ppb), in non-atopics than in atopics (11.9 vs 24.4 ppb), and in subjects exposed to low molecular weight allergens than in subjects exposed to high molecular weight allergens (11.3 vs 24.9 ppb). In subjects with a negative SIT (n=45) eNO concentrations showed no change after SIT (t0: 16.0, t1: 12.3, t2: 16.0 ppb). 22 SITs were considered positive. In this group, eNO concentrations showed no increase at t1, but doubled at t2 (t0: 22.9, t1: 19.9, t2: 42.0 ppb). This strong increase of eNO concentrations could not be observed in all subgroups. Atopics showed only a small increase at t2 (n=12, t0: 24.9, t2: 27.9 ppb), as well as subjects exposed to high molecular weight allergens (n=7, t0: 25.4, t2: 27.6 ppb). Relevant factors influencing eNO after SIT were eNO at baseline, result of SIT, time of measuring, smoking behavior, atopy and the molecular weight of allergens. **Discussion:** eNO after SIT is influenced by different factors. In positive SIT, eNO doubles after 22-24h, but this strong increase could not be detected in atopics and subjects exposed to high molecular weight allergens. Due to small numbers statistical significance was not given in all tested situations. Nevertheless, we are able to present a model, estimating eNO concentrations after SIT for the first time. More cases are required to advance the model.