Univerzita Karlova v Praze, 3. lékařská fakulta

Disertační práce
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Kondenzát vydechovaného vzduchu v diagnostice plicních nemocí
Breath condensate in the diagnostics of lung diseases
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SUMMARY

Introduction: Examination of exhaled breath condensate is offered as a new, noninvasive diagnostic method in lung diseases. It has been described about 200 markers, which were verified in the condensate, some more, some less developed. The gold standard of examination is exhaled nitric oxide and its metabolites. Other markers are studied in the diagnosis of COPD or pulmonary fibrotic processes.
The aim is to use them not only for diagnosis, but also for monitoring dinase, or preventive measures.

Methods: 124 patients were examined during 3 years at The University Clinics of Pneumology and Thoracic Surgery in Prague Bulovka and the Pulmonary Department of the Regional Hospital of Tomas Bata in Zlín. Among them were assembled subgroups: a) the health of nonsmokers, b) smokers without any symptoms of respiratory illness with normal lung function tests, c) asthmatics with evidence of uncontrolled disease treatment, d) in asthmatics who had controlled disease, e) patients with exacerbated COPD, f) COPD patients without evidence of exacerbation, g) patients with cryptogenic fibrosing alveolitis, who had signs of disease activity detected in BAL and HRCT examination.
Condensate was collected with the EcoScreen (Jaeger Toennies, Germany).

Results: Nitrate concentrations in groups of healthy non-smokers and smokers were mutually comparable ($P = 0.47$) and significantly higher ($P < 0.01$) than the results in groups of sick pe ople. The differences between the other groups were found.
The concentration of nitrite in healthy smokers were about 43 % higher than in non-smokers, but the difference did not reach statistical significance ($P = 0.12$). The concentration of nitrite were higher in patients with asthma and asthma exacerbations compared with healthy subjects ($P < 0.05$) between the groups of patients with asthma and asthma exacerbations did not differ. When analyzing comprising two groups of patients with asthma and healthy persons, it was found that the nitrite concentration increased with decreasing value FEVl.
The level of concentration of nitrite in exhaled breath condensate of patients with exacerbations of COPD was higher than in patients without exacerbation ($P < 0.05$) and healthy subjects ($P < 0.01$), whereas patients without exacerbation had completely comparable results in healthy persons. The correlation between the concentrations of nitrite and FEV1 did not reach statistical significance ($P = 0.12$). Nitrites in condensate were compared to healthy subjects increased among patients with cryptogenic fibrosing alveolitis ($P < 0.05$). Concentrations of IL-1beta were higher than the quantification limit 1 pg/ml only in 9 % of the subjects exami-ned file. For IL-18 was 12 % of the results greater than 0.5 pg/ml. It was in all cases the samples of the patient and the control group were all below the limits of quantification results. Groups comparison could not be performed for a small number of positive findings.

Conclusion: Nitrite in exhaled breath condensate meet the basic characteristics of the useful marker for patients with asthma, COPD and KFA. Rating nitrate concentrations were affected by

falsely elevated concentrations due to sample contamination condensate collection. The concentration of IL-1β and IL-18 ELISA kits were used in the majority of samples measurable.