

SUMMARY

Asthma is the most common chronic disease in the pediatric population and one of the most prevalent chronic respiratory diseases in adults. Its management requires taking into account the progressive nature of the therapy, the duration of therapy with all its potential side effects, and the variability of the course of the disease over time. All of the above entails regular patient monitoring as well as assessing the disease's symptoms along with its level of control and severity.

The position of exhaled nitric oxide (FeNO) testing in the diagnosis of the inflammatory process and monitoring of treatment in patients with asthma has been well established for many years.

The aim of the study was to evaluate the application of various fractions of exhaled nitric oxide measurement. It was carried out in a group of 161 asthmatic patients with different degrees of disease control and severity, and 38 healthy volunteers. The tests were performed at the flows of 50 ml/s (standard measurements) and 150 ml/s (NO fraction from the small respiratory tract) and a new parameter was developed - Index FeNO 150/50 (indicating the NO pool from the small respiratory tract in total exhaled nitric oxide). The results were then correlated with the ones obtained in additional tests results performed in the routine course of asthma diagnosing, treatment and monitoring. The level of disease control, severity and treatment with extra-fine inhaled glucocorticosteroids also remained within the study's focal point.

The exhaled nitric oxide measurements performed with the standard exhaled air flow of 50 ml/s (FeNO₅₀) significantly correlated with the parameters of asthma control/severity (ACT, daytime and night symptoms, use of rescue medication), spirometric parameters and peripheral blood eosinophilia. The performed statistical analysis showed significantly stronger correlations for the NO measurements at the air flow of 150 ml/s (FeNO₁₅₀) and the FeNO 150/50 Index, which values increased significantly with the deterioration of the disease control and severity. The highest values were observed in the groups with severe and difficult to treat and uncontrolled asthma. It has been shown that with the increase of the FeNO 150/50 Index value, the frequency of extra-fine inhaled glucocorticosteroids use among patients decreased.

The obtained results indicate the relevance of nitric oxide analysis. The inflammatory process located in the small airways is especially prevalent in more severe clinical forms of asthma (FeNO₁₅₀ and Index FeNO 150/50) and is correlated with the degree of disease control

and severity. It may prove to be useful as an indicator of when to intensify anti-inflammatory treatment aimed precisely at small airways. Nitric oxide measured in the small airways may be also used to predict the treatment response especially in the context of the small airways and severe asthma phenotype.