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Reversibility Testing

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The history of the bronchial reversibility tests and knowledge started at the end of the 1950s when airway diseases were divided into reversible and non-reversible depending on the response to bronchodilator drugs. Despite the long history of the bronchodilator response (BDR) as a diagnostic tool still, there are no commonly accepted rules for its performance.

According to the latest statement paper of the ATS/ERS Task Force for standardization of lung function tests in 1995, there is no consensus on the molecule, dose, and route of administration of a bronchodilator drug. [1] There is no clear consensus about what affects the reversibility in patients with bronchial obstruction.

The proof of bronchial hyperreactivity in the context of clinical symptoms provides further details in the mosaic of diagnosis and monitoring of childhood asthma. [2]. The demonstration of bronchial lability by measuring the response to inhaled bronchodilators to simplify the diagnosis and monitoring of asthma in childhood continues to represent scientific interest despite the long history of BDR.

The "perfect" formula for the expression of BDR should be independent of baseline FEV_1 and to reflect the actual response to the drug; to correlate well with the clinical response; to allow comparison between subjects with different baseline values and to provide information on the severity of post-bronchodilator obstruction. [3]

The validity of the most commonly used definition for positive BDR (ΔFEV1≥12%) is controversial for children. This threshold is clinically significant in adults with asthma and healthy controls. The lack of consensus on the formula and the indicator that reflects the BDR leads to several studies in children and adults, conducted in demand to find the ideal threshold and the "ideal" parameter. [4]

BDR is a test with very high specificity, but relatively low sensitivity for confirming asthma diagnosis. Probably it would have better clinical use in childhood asthma management, especially before the initiation of therapy with inhaled corticosteroids (ICS). [5] High BDR is associated with poor control of the disease, increased exacerbation risk, and presence of active inflammation of the airways, bronchial hyperreactivity, and excellent therapeutic response to ICS. [6]

Pulmonary function tests are an essential element of the study of respiratory diseases in children. They are a sensitive and objective way to identify and evaluate the severity of pulmonary dysfunction, monitoring the progression of the disease and the evaluation of the therapy. BDR is widely used in confirming the diagnosis of asthma, but it can be a reliable method for monitoring and control of children with asthma.

The clinical significance of BDR in children was emphasized once again with the following data. In severe pediatric asthma, it has been shown that an increased BDR may be associated with a higher risk of impairment of lung function [7]. Moreover, a persistent BDR may also be related to the poor therapy compliance or the wrong inhaler technique.

Nevertheless, the bronchodilator response (BDR) phenotype (≥ 12%, ≥ 10%, ≥ 9%) has been shown to be associated with biomarkers of inflammation [3-6] and responsiveness to ICS [7,8], as well as predicting long-term outcomes. [7,9]

Establishing an adapted for childhood spirometry criteria in addition to the assessment of clinical symptoms, physical examination, and determination of atopic status would improve asthma control substantially, making proper therapeutic decisions and identifying the risk of progressive loss of lung function.

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