



Hotel - Cartagena, Columbia



PIC QUESTION OF THE WEEK: 1/24/11

Q: How is the mannitol challenge test employed in the diagnosis of asthma?

A: Asthma is a disorder of the airways associated with inflammation, airway hyperresponsiveness (AHR), and airflow limitation. AHR is evaluated through use of bronchial challenge tests (BCT) that contribute to the diagnosis and management of asthma. BCTs have a higher sensitivity than spirometry, but may be more time consuming and technically challenging. Ideal BCTs are standardized, reproducible, and correlate with the degree of airway inflammation. There are two types of BCTs: *direct* and *indirect*. Direct tests, such as methacholine or histamine, act directly on bronchial smooth muscle. Indirect tests, including exercise testing, adenosine monophosphate, hypertonic saline, and inhaled mannitol, induce the release of bronchoconstricting mediators from mast cells. Direct tests yield more sensitive results while indirect tests are more specific. A positive response to an indirect challenge confirms the presence of asthma. Methacholine is currently the most commonly used BCT in clinical practice; however, this method is time consuming and may result in misdiagnosis. The most recent FDA approved indirect test of AHR utilizes mannitol (Aridol™ - Pharmaxis). It is available as a dry powder in capsules and administered using standard inhalers. Mannitol increases the osmolarity of airway surface liquid, thus triggering mast cell release of bronchoconstrictors such as histamine, prostaglandins, and leukotrienes. The test is conducted by administering titrated doses spaced at one minute intervals. The initial blank challenge is used to establish a baseline FEV₁ and then followed by a series of doses ranging from 5 - 80 mg. Three 160 mg doses, again at one-hour intervals, complete the challenge test. FEV₁ measurements are completed one hour after each challenge dose. A 15% decrease in FEV₁ from baseline or a 10% reduction in FEV₁ between two consecutive doses is considered a positive result and could suggest the need to add or increase the dose of an inhaled corticosteroid (ICS). The mannitol test can also be used throughout ICS therapy to determine the need for dosage adjustment. The most common adverse effect of the mannitol challenge is cough secondary to direct airway irritation. Other reactions include headache, pharyngolaryngeal pain, and nausea. There are multiple benefits in using mannitol as a BCT; most importantly, the test provides a rapid point of care method for assessing AHR. Additionally, it requires no expensive equipment or calibration and can be used repeatedly to guide ICS therapy.

References:

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The PIC Question of the Week is a publication of the Pharmaceutical Information Center, Mylan School of Pharmacy, Duquesne University, Pittsburgh, PA 15282 (412.396.4600).