



**NONINVASIVE METHODS FOR MONITORING AIRWAY INFLAMMATION IN  
CHRONIC OBSTRUCTIVE PULMONARY DISEASE**

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Airway inflammation has a pivotal role in the pathophysiology of chronic obstructive pulmonary disease (COPD). Assessment of airway inflammation in patients with COPD is currently based on invasive techniques such as bronchoscopy and bronchoalveolar lavage, semi-invasive techniques such as sputum induction, and the measurement of inflammatory markers in plasma and urine, which are likely to reflect systemic rather than lung inflammation. Measurement of exhaled nitric oxide (NO) is a well accepted and standardized technique for assessing airway inflammation in patients with asthma who are not treated with inhaled corticosteroids, but its utility in patients with stable COPD is controversial (1). This is due to the fact that most patients with COPD have a history of smoking and that exhaled NO is strongly affected by NO content in cigarette smoke. Exhaled breath condensate (EBC) is a completely noninvasive technique for studying the composition of airway lining fluid. (2). The collection of EBC samples is simple and easy to perform consisting of cooling down the exhaled breath in a refrigerated collecting device (3). Several inflammatory mediators including hydrogen peroxide, 8-isoprostane, leukotriene (LT) B<sub>4</sub>, and NO-derived products have been detected in EBC in healthy subjects and found elevated in patients with COPD (3,4). The presence of 8-isoprostane, LTB<sub>4</sub>, and prostaglandin E<sub>2</sub> in EBC has been confirmed by spectrometry techniques (3). However, in most studies, biomolecules in EBC were measured using commercially available immunoassay kits which need to be validated for EBC analysis by comparison with reference analytical techniques. Measurement of EBC pH, which is highly reproducible, has been proposed as a noninvasive method for assessing airway inflammation in patients with COPD (4). However, its specificity has been questioned as EBC pH can be affected by volatile salivary acids (5). As it is easy to perform and completely noninvasive, EBC is potentially useful for monitoring airway inflammation in patients with COPD. However, due to the lack of standardization, this technique is currently limited to research purposes. Several methodological issues need to be addressed before EBC analysis can be considered in the clinical setting.

#### References

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