



Occupational nonasthmatic eosinophilic bronchitis

La bronchite professionnelle à éosinophiles non asthmatique

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Abstract

Occupational nonasthmatic eosinophilic bronchitis is characterized by the presence of chronic cough (lasting more than 3 weeks) that worsens at work and sputum eosinophilia (3% in the sputum). Sputum eosinophilia increases on exposure to the offending agent, spirometric parameters, which are normal and not significantly affected by exposure to the offending agent, absence of bronchial hyperresponsiveness to methacholine and adenosine when examined at work and away from work, and when other causes of chronic cough are ruled out. Examination of induced sputum should be part of the diagnostic algorithm for workers who complain of asthma-like symptoms in the workplace. Eosinophilic bronchitis should be regarded as an occupationally-induced condition when work-related changes in sputum samples are significant and reproducible.

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Keywords: Occupational eosinophilic bronchitis; Sputum eosinophilia

Résumé

La bronchite professionnelle à éosinophiles non asthmatique est caractérisée par la présence d'une toux chronique (durée supérieure à trois semaines) qui s'aggrave en période de travail et d'une hyperéosinophilie dans l'expectoration (3 %). L'hyperéosinophilie de l'expectoration se majore avec l'exposition à l'agent causal, que ce soit au travail ou dans d'autres situations. Les paramètres spirométriques sont généralement normaux et non modifiés par l'exposition à l'agent causal. Après avoir écartées les autres causes de toux chronique, il n'existe pas d'hyperréactivité bronchique à la méthacholine et à l'adénosine, mesurée au travail ou en dehors du travail. L'examen de l'expectoration induite devrait faire partie des tests diagnostic chez les travailleurs qui présentent des symptômes similaires à l'asthme dans leur lieu de travail. La bronchite à éosinophiles devrait être considérée comme une pathologie induite par l'activité professionnelle dès lors que les paramètres de l'expectoration sont significatifs et reproductibles.

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Mots clés : Bronchite professionnelle à éosinophiles; Éosinophilie de l'expectoration

Eosinophilic bronchitis causes chronic cough, expectoration, dyspnea, and on rare occasions wheezing. Other main characteristics are:

- normal lung function without variable airflow limitation and normal daily variability in peak expiratory flow (<20%);
- airway hyperresponsiveness absent to methacholine and adenosine;
- eosinophilia in sputum ($\geq 3\%$ in sputum) and in bronchoalveolar lavage;

- cough reflex to capsaicin increased;
- upper airway symptoms are common;
- affects to middle age patients;
- smoking is unusual;
- the prevalence of atopy is similar to general population;
- cough, sputum eosinophilia and cough reflex to capsaicin improve with inhaled corticosteroids [1].

Asthma is characterized by the presence of variable airflow obstruction, airway hyperresponsiveness and an airway inflammatory response often characterized by Th2-mediated eosinophilic inflammation. On contrary, in patients with

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eosinophilic bronchitis, there is a clear dissociation between sputum eosinophilia and airway hyperresponsiveness [1,2].

The pathophysiology of eosinophilic bronchitis and the reason for the absence of airway hyperresponsiveness in this disease remains unclear. One possible explanation is that the eosinophilic airway inflammation is less active than in asthma, with less release of effector mediators. Several studies employing different techniques to assess airway inflammation have shown that the inflammatory component is very similar in patients with asthma and eosinophilic bronchitis [2]. Indeed, asthma and eosinophilic bronchitis share many immunopathologic features, including increased numbers of eosinophils and mast cells in the superficial airway. In addition to airway eosinophilia, both conditions are associated with reticular basement membrane thickening and similar numbers of subepithelial T lymphocytes, mast cells and macrophages. One aspect of the inflammatory response that might be particularly important is the localization of mast cells in the airway wall, since they are present within the airway smooth muscle in asthma but not in eosinophilic bronchitis [3]. Recently, we have found that induced sputum PGE₂ concentrations are strikingly increased in subjects with eosinophilic bronchitis as compared with asthmatic and healthy subjects [4]. These data suggest that the differences in airway function observed in subjects with eosinophilic bronchitis and asthma might be due to differences in PGE₂ production.

Occupational eosinophilic bronchitis is characterized by the presence of isolated chronic cough (lasting more than 3 weeks) that worsens at work, sputum eosinophilia ($\geq 3\%$ in sputum), increase in sputum eosinophils are related to exposure to the offending agent (either at work or after specific inhalation challenge [SIC]), spirometric parameters are normal and are not significantly affected by exposure to the offending agent, absence of bronchial hyperresponsiveness to methacholine and adenosine both at work and away from work and when other causes of chronic cough are ruled out [5,6]. It's considered as a variant form of asthma at work [7]. It should be noted that cases of eosinophilic bronchitis have been described associated with exposure to certain workplace-related substances (Table 1). In

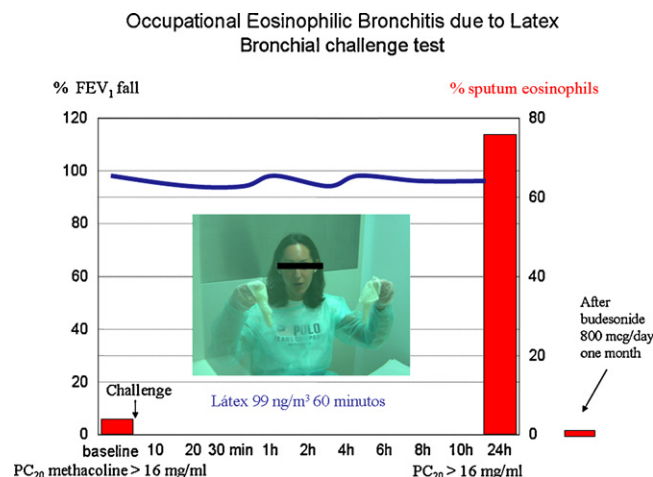


Fig. 1. A case of occupational eosinophilic bronchitis induced by latex.

such cases, and in the absence of recognizable bronchial hyperresponsiveness, diagnosis is provided when significant reproducible changes in the number of eosinophils in sputum are seen to be associated with workplace exposure. In Fig. 1, several characteristic parameters of a case of eosinophilic bronchitis induced by latex are shown [8].

1. Clinical implications

The examination of induced sputum should be part of the diagnostic algorithm for workers who complain of asthma-like symptoms in the workplace. Induced sputum is a diagnostic tool complementary to objective monitoring of lung function during periods at work and away from work, and before/after specific inhalation challenge [9]. Eosinophilic bronchitis (without asthma) should be regarded as an occupationally-induced condition when work related changes in sputum samples are significant and reproducible.

Table 1
Summary of occupational eosinophilic bronchitis cases described in the scientific literature.

Causative agent	No. of workers	Method of confirmation	References
Tetrahydrophtalic anhydride	1	?	[10]
Cyanoacrylate Methacrylate	1	At/off work SIC in the lab	[11]
Latex	1	At/off work/SIC lab	[8]
Mushroom spores	3 (7.1%)	At work	[12]
Lysozyme	1 (4.7%)	SIC in the lab	[5]
Welding fumes	1	At/off work/SIC lab	[13]
Formaldehyde	1	SIC in the lab	[13]
Chloramine T	1	SIC in the lab	[14]
Isocyanate (MDI)	1	At/off work/SIC lab	[15]
Cereal flour	1	At/off work/SIC lab	[15]
Fungal alfa-amylase	1	SIC lab	[16]
Styrene	1	SIC lab	[6]

SIC lab: specific inhalation challenge in the lab.

Conflict of interest statement

The author declares no conflict of interest.

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