

Occupational eosinophilic bronchitis without asthma: An unknown occupational airway disease

C. Lemi re, MD, A. Efthimiadis, MLT, and F. E. Hargreave, MD

Hamilton, Ontario, Canada

The introduction of reliable methods to measure inflammatory cells in sputum has made it possible to identify the occurrence of eosinophilic bronchitis without asthma.¹ Patients are first seen with a chronic cough without variable airflow limitation or airway hyperresponsiveness, and the condition is reversed by glucocorticoid treatment.² For the first time, we describe a case of eosinophilic bronchitis related to exposure to acrylates in the workplace.

CASE REPORT

A 50-year-old woman was employed for 2 years at a company that produced weather strips for vehicles. The job required her to use glue containing cyanoacrylate and methacrylate, which are known to induce occupational asthma. Three months after starting this work she noticed shortness of breath, chest tightness, wheezing, and persistent dry cough, as well as nasal symptoms such as a runny, stuffy nose and sneezing when at work. These symptoms improved substantially on weekends. She was a 15 pack-year smoker and quit 20 years ago. Her family history was negative for allergies and asthma. Results of physical examination and chest radiography were normal. Allergy skin prick test responses to 19 common extracts were negative. Her treatment had consisted of albuterol inhaler as needed and budesonide nasal spray (200 µg/day) for 1.5 months and Tegretol (200 mg/day) for petit mal epilepsy.

A symptoms questionnaire was completed, and spirometry, a methacholine inhalation test,³ sputum induction,¹ and phlebotomy were performed regularly while the patient was at work and after 3 weeks off work (Table I). When at work she had severe dyspnea; chest tightness; dry cough; wheezing; a runny, stuffy nose; and sneezing, and her spirometry and airway responsiveness were normal. Eosinophil counts in sputum and blood were increased. After 3 weeks off work, only very slight symptoms of dyspnea, chest tightness, cough, and wheezing remained. There was an improvement in airway responsiveness within the normal range, and sputum and blood eosinophil counts fell to normal.

The patient did not return to work because of the prominence of her previous symptoms. Three months later we performed inhalation tests in a 6.7 m³ exposure chamber and measured the FEV₁ every 10 minutes for the first hour, every 30 minutes for the second hour, and then hourly for the next 5

hours (Table I). On the first day (control day) she sat next to a dish filled with 100 ml of paint diluent (Varsol) for 30 minutes. It had no effect over 7 hours. On two subsequent days she was exposed to an open container with 30 ml of the glue she had used at work for 4 and 30 minutes, respectively. No significant change in the FEV₁ or methacholine responsiveness occurred. However, at the end of the second day of glue exposure the patient complained of dyspnea, chest tightness, and dry cough, and induced sputum showed an increase in the eosinophil, metachromatic cell, and neutrophil counts.

DISCUSSION

The results of the challenge indicate that the patient had eosinophilic bronchitis caused by cyanoacrylate or methacrylate exposure at work. Although she had symptoms suggestive of asthma, she had no variable airflow limitation, and so the presence of asthma was not objectively confirmed.

Cyanoacrylate-based glues produce a high-bond strength between a variety of materials. Methacrylates are chemically distinct from cyanoacrylate and serve as bases for acrylic resins. Both acrylates can cause occupational asthma.⁴ In our patient the changes observed in the sputum cell counts after exposure to acrylates were similar to those observed in allergen or chemical sensitizer-induced occupational asthma.⁵ However, the physiologic abnormalities of asthma were not present. Although the challenge with acrylates in the laboratory was performed 3 months after the end of work exposure and might be falsely negative for asthma, this is unlikely because the challenge result was positive in reproducing the same features that occurred at work without asthma.

The heightening of airway responsiveness within the normal range at work suggests that the eosinophilic bronchitis without asthma might progress to asthma if not treated. This has been reported in nonoccupational settings.² However, in that report no heightening of airway responsiveness was observed. The reasons why asthma does not occur need further investigation. They include supernormal baseline airway responsiveness, the severity of the eosinophilic reaction, and, in relation to this, a more central location of the reaction in the airways and the occurrence of infiltration with eosinophils without activation.

We conclude that occupational eosinophilic bronchitis without asthma needs to be considered when cough or symptoms of asthma occurring at work are not associated with evidence of variable airflow limitation.

From the Asthma Research Group and the Department of Medicine, St. Joseph's Hospital and McMaster University, Hamilton, Ontario.

Reprint requests: F. E. Hargreave, MD, Firestone Regional Chest and Allergy Unit, St. Joseph's Hospital, 50 Charlton Avenue East, Hamilton, Ontario, Canada, L8N 4A6.

J Allergy Clin Immunol 1997;100:852-3.

Copyright   1997 by Mosby-Year Book, Inc.

0091-6749/97 \$5.00 + 0 1/54/85223

TABLE I. Characteristics of the subject in relation to the exposure to occupational sensitizers (cyanoacrylate and methacrylate)

	Normal values	At work (3 mo)	Off work (3 wk)	Control inhalation test 7 hr after	Glue inhalation test 30 min exposure	
					7 hr after	24 hr after
Chest symptoms		+++	+	+	++	+
Nose symptoms		+++	0	0	0	0
Treatment		200 µg/day (A) 200 µg/day (B)	200 µg/day (B)	0	0	0
FEV ₁ (L [% pred])	2.2	2.3 (100)	2.5 (108)	2.4 (105)	2.4 (103)	2.6 (114)
VC (L [% pred])	2.7	3.0 (111)	3.0 (111)	3.3 (120)	ND	3.3 (120)
PC ₂₀ (mg/ml)	>16	24	>64	>64	ND	>64
Induced sputum						
TCC (10 ⁶ /ml)	<4.5	1.0	1.3	2.7	3	1.4
Neutrophils (%)	<35	16.2	26.7	28.7	65.5	54.2
Eosinophils (%)	<2	13	0	0	5.8	5
Metachromatic cells (%)	<0.07	0.13	0.06	0	1.5	0.26
Blood eosinophils (10 ⁹ /L)	<0.4	0.5	0.1	0.2	ND	0.4

A, Albuterol; B, budesonide (nasal spray); +++, severe; ++, moderate; +, mild; TCC, total cell count; ND, not done; PC₂₀, provocation concentration of methacholine to cause a fall in FEV₁ of 20%.

REFERENCES

- Pizzichini E, Pizzichini MMM, Efthimiadis A, Evans S, Morris MM, Squillace D, et al. Indices of airway inflammation in induced sputum: reproducibility and validity of cell and fluid-phase measurements. *Am J Respir Crit Care Med* 1996;154:308-17.
- Gibson PG, Hargreave FE, Girgis-Gabardo A, Morris M, Denburg JA, Dolovich J. Chronic cough with eosinophilic bronchitis: examination for variable airflow obstruction and response to corticosteroid. *Clin Exp Allergy* 1995;25:127-32.
- Juniper EF, Cockcroft DW, Hargreave FE. Histamine and methacholine inhalation tests: a laboratory tidal breathing protocol. Lund: Sweden AB Draco; 1994.
- Lozewicz S, Davidson AG, Hopkirk A, Burge PS, Boldy DAR, Riordan JF, et al. Occupational asthma due to methyl methacrylate and cyanoacrylates. *Thorax* 1985;40:836-9.
- Fabbri LM, Boschetto P, Zocca E, Milani G, Pivrotto F, Plebani M, et al. Bronchoalveolar neutrophilia during late asthmatic reactions induced by toluene diisocyanate. *Am Rev Respir Dis* 1987;136:36-42.

Acute cardiac and pulmonary arrest after infusion of vancomycin with subsequent desensitization

Alan T. Villavicencio, MD,^a Lloyd A. Hey, MD,^b Dhavalkumar Patel, MD, PhD,^c and Peter Brössler, MD^c Durham, N.C.

A 43-year-old woman who had undergone a posterior lumbar fusion with bone grafting and instrumentation 1 week previously was readmitted with a draining-wound hematoma. She subsequently underwent irrigation and debridement after general anesthesia was achieved with-

Abbreviation used
D₅W: 5% dextrose in water

From ^athe Divisions of Neurosurgery; ^bOrthopedic Surgery; and ^cRheumatology, Allergy, and Immunology; Duke University Medical Center, Durham.

Reprint requests: Alan T. Villavicencio, MD, Box 3468, Division of Neurosurgery, Duke University Medical Center, Durham, NC 27710. *J Allergy Clin Immunol* 1997;100:853-4.

Copyright © 1997 by Mosby-Year Book, Inc.

0091-6749/97 \$5.00 + 0 1/54/85514

out complication. After the operation she was doing well with systolic blood pressure readings ranging from 112 to 166 mm Hg. Her postoperative hematocrit level was 31, and serum electrolytes, blood urea, and creatinine values were in the normal range. On postoperative day 2, the patient started receiving vancomycin after intraoperative wound cultures tested positive for methicillin-resistant *Staphylococcus*. One gram of vancomycin in 250 ml of