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Asthma Induced by a Thermal Printer

TO THE EDITOR: Point-of-sale terminals are devices used worldwide for credit-card or debit-card transactions or to print a variety of coupons. These machines print receipts on thermal paper covered with N-propyl-acrylamide and acrylate tints.

We report on a nonsmoking 62-year-old woman without atopy in whom asthma symptoms developed after she had worked for 20 years selling lottery tickets inside a 4-m³ kiosk. For the past 3 years, she had been using a point-of-sale terminal to print lottery tickets. She had a 2.5-year history of rhinoconjunctivitis, facial edema, cough, shortness of breath, and wheezing. These symptoms occurred within 30 to 60 minutes after she arrived at her workplace and diminished during days away from the workplace. She controlled the symptoms by using inhaled bronchodilators and

pulses of oral corticosteroids. She required emergency treatment on three occasions: 8, 6, and 4 months before we examined her.

On evaluation at our clinic, there were no signs of atopy; baseline spirometric measurements were normal, as was the fraction of exhaled nitric oxide (FE_{NO}), at 14 ppb. The provocative concentration of inhaled methacholine required to reduce the forced expiratory volume in 1 second (FEV₁) by 20% (PC₂₀) was 6.18 mg per milliliter (normal value, >16.0 mg per milliliter). Patch tests that included several acrylates (Martí Tor) were negative. We performed a bronchial challenge in a 7-m³ chamber, as previously described.¹ The patient painted on a cardboard for 30 seconds with the tint provided by the lottery company, which contained trimethylolpro-

Table 1. Baseline Characteristics of the Patient and Results of Bronchial-Challenge Tests.*

Variable	Baseline	Placebo Challenge	Bronchial Challenge		
	day 0	day 1	Trimethylolpropane Triacrylate, 30 sec	Trimethylolpropane Triacrylate, 90 sec	Printing Coupons, 90 sec
FEV ₁	1.96 liters (95% of predicted value)	No change for 24 hr	19% decrease at 30 sec	45% decrease at 1 min; no late asthmatic reaction	15% decrease at 1 min; no late asthmatic reaction
Methacholine PC ₂₀ — mg/ml	6.2	ND		1.68 at 24 hr after challenge	3.91 at 24 hr after challenge
Eosinophil count in sputum — cells/ml (% of total cells)†	262,056 (7.2)	ND		775,422 (18.7) at 24 hr after challenge	ND
FE _{NO} — ppb	14	12		22 at 24 hr after challenge	8 at 24 hr after challenge

* FE_{NO} denotes the fraction of nitric oxide in exhaled air, FEV₁ forced expiratory volume in 1 second, ND not done, and PC₂₀ provocative concentration of inhaled methacholine.

† Sputum eosinophils were measured by means of flow cytometry. Data are from Sastre et al.²

pane triacrylate; a decrease in the FEV₁ of 19% was observed (Table 1). A new exposure for 90 seconds elicited a decrease in the FEV₁ of 45% (from 1.96 to 1.10 liters). No late asthmatic reaction was observed. Twenty-four hours after the challenge, the methacholine PC₂₀ was still low and the FE_{NO} was elevated. The eosinophil count in induced sputum after the challenge was higher than the count at baseline. Eight days later, a challenge was performed in which the patient's work environment was simulated; using her own point-of-sale terminal, the patient printed tickets for 90 seconds. A decrease in FEV₁ of 15% was observed 1 minute after exposure, with no late asthmatic reaction. Twenty-four hours after the challenge, she still showed methacholine hyperresponsiveness but had a normal FE_{NO} (Table 1). She no longer works in the kiosk and is now asymptomatic without the use of any medication. We have no data on the mechanism leading to this reaction.

Acrylates are known causative agents of occupational asthma,^{3,4} and workers in printing facilities may be affected.^{3,5} However, this description of occupational asthma in a worker using a point-of-sale terminal indicates that such a diagnosis

should be considered in cases of adult-onset asthma in workers exposed to these devices.

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Dr. Sastre reports serving as a consultant to Phadia, Schering-Plough, and GlaxoSmithKline, receiving lecture fees from Novartis, GlaxoSmithKline, and Stallergenes, and receiving grant support from Phadia, GlaxoSmithKline, and ALK-Abelló. No other potential conflict of interest relevant to this letter was reported.

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