

patients with ages ranging from 32 to 79 years. Ciprofloxacin was prescribed for urinary tract infections (1, 4), osteomyelitis (2), epididymo-orchitis (3), and respiratory infection (4). Four out of the five patients developed the vasculitic rash within 10 days of taking ciprofloxacin, with a range of 3–35 days. The patients usually presented with skin rash involving the trunk and limbs but sparing the palms and soles (1, 3). The three reported male patients also had accompanying fever and joint inflammation (1–3). One patient even had renal involvement with worsening of the serum creatinine (2). Skin biopsies of reported cases typically revealed small-vessel vasculitic lesions with a leukocytoclastic picture (1–4). Resolution of the skin rashes occurred 1–4 weeks after withdrawal of the offending drug, usually without any steroid administration (1, 4). Tomas et al. postulated that an immunocomplex-mediated mechanism was responsible for the cutaneous vasculitis. They also demonstrated a close causal relationship with ciprofloxacin therapy by observing clinical improvement and relapse after drug rechallenge in their patient (3).

In our patient, the time course strongly suggested an adverse reaction due to ciprofloxacin. The vasculitic rash started 4 days after ciprofloxacin was prescribed and progressively became more extensive until ciprofloxacin was stopped on day 10. There were two features which were different from previously reported cases. Firstly, the rash was extensive, involving the face, palms, and soles. Secondly, although the rash resolved 1 week after discontinuation of the antibiotic, it was unusual in that it recurred transiently for only 2 days, 4 days later. We postulate that an immunocomplex mechanism was probably responsible for this.

In summary, although cutaneous vasculitis induced by ciprofloxacin is a rare condition, it is important that clinicians be aware of this potential adverse effect, which is easily treated by drug withdrawal alone.

Key words: allergy; elderly; hypersensitivity; vascular disorders.

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Occupational asthma in poultry-slaughterhouse workers

EXPOSURE to various animals can cause occupational asthma (OA) (1). In poultry workers, asthma and allergic alveolitis have been reported. Various possible causal agents have been suggested: poultry mites (2), feed (3), and feed contaminants (4). Although significant across-shift decrease in lung function has already been recorded in poultry-slaughterhouse workers (5), no cases of OA have been described. We herein report four cases of OA in poultry-slaughterhouse workers, confirmed by serial monitoring of spirometry at work and away from work.

■ Subjects' characteristics are reported in Table 1. Work in the slaughterhouse entailed hanging live chickens and turkeys onto a moving line; this took place in a confined environment. Cages containing birds that had arrived at the slaughterhouse were stored outside for a few hours, and then conveyed, one by one, into the hanging department. There, as the birds were taken out of the cages, they flapped

Four cases of significant fall in FEV₁ during work and positive skin tests to chicken-feather extracts.

their wings wildly, producing significant quantities of feather dust. All four subjects performed this task for at least 40 h a week. Three subjects wore a paper mask at work. After a mean period of 6 years (range 3 weeks to 24 years), subjects started to complain of asthma symptoms; in three of them, these were associated with rhinoconjunctivitis symptoms. Symptoms usually came on after 20–120 min of exposure at work. Symptoms improved during periods off work. None of the subjects complained of malaise or fever. All subjects reported symptoms in relation to exposure both to chicken and turkey; subject no. 3 had noticed that his symptoms were worse under exposure to chicken.

Table 1. Subjects' characteristics and results of skin tests and of FEV₁ monitoring at work

Patient no.	Sex	Age (years)	Smoking	Personal atopic history	Duration of exposure before onset of symptoms	Duration of exposure after onset of symptoms	Interval between last exposure and challenge	Skin-test results (feathers)			Maximum changes in FEV ₁ during exposure day at work (%)
								Chicken (no. 1)	Chicken (no. 2)	Turkey	
1	M	24	Yes	—	3 weeks	4 weeks	12 weeks	+	+++	—	-22
2	M	20	No	—	3 weeks	16 weeks	16 weeks	++	++	+++	-24
3	M	23	Yes	—	0.5 year	1 week	12 weeks	+++	+	—	-41
4	M	58	Yes	—	24 years	1.5 years	9 years	++	+	—	-43

Skin-test results: diameter of wheal between 1/4 and 1/2 of histamine wheal (+), between 1/2 and whole histamine wheal (++), larger than histamine wheal (+++) in absence of reaction to negative control.

■ Skin tests were performed by the prick method (6) with common inhalants and feather extracts (hen, turkey, duck, budgerigar, pigeon, canary) (Miles, Inc., Elkhart, USA, for common inhalants; Bencard and Bayer, Inc., for feathers). Histamine phosphate (1%) was used as a positive control and diluent (glycerinated 0.9% saline solution) as negative control.

All subjects underwent monitoring of FEV₁ at the workplace. This consisted of hourly assessments over a minimum of 7 h, with a progressive duration of exposure (starting with a 30-min exposure), while they were performing their usual task of handling chickens. The test was preceded by a control day in the laboratory, during which three subjects had no exposure to any specific product, and the other was exposed to wood dust by tipping it from one tray to another for 30 min. Two poultry-slaughterhouse workers in whom the diagnosis of OA was excluded were used as negative controls for skin tests.

■ The four subjects with OA showed positive skin tests to house-dust mites, cats, and chicken feathers. Skin tests with chicken feathers were negative in the two workers without OA. During the control day, there were no significant changes in FEV₁ (variation <10% from baseline). On the exposure day at work, maximum FEV₁ falls ranged from -22% to -43% and were observed after 90–420 min from the beginning of exposure. FEV₁ returned to baseline values spontaneously or after inhalation of salbutamol (200 µg).

■ Several reports have documented the effects of exposure on poultry-farm workers. Airborne contaminants in these poultry confinement buildings include a mixture of aerosolized agents, such as organic poultry, dust-skin debris, broken feather barbules, insect parts, aerosolized feed, poultry excreta, ammonia, and various viable bacteria as well as airborne Gram-negative bacterial endotoxins. Some authors have confirmed the diagnosis of allergic extrinsic alveolitis and asthma, identifying

as causes fish meal (3), antibiotics (4), and poultry mites (2).

We can only speculate as to which of the agents subjects were exposed to in the slaughterhouse caused the symptoms. We tend to exclude the possibility that feed, excrements, and poultry mites, the last of which have been nearly eradicated in modern poultry, could be the causal agents. The fact that all four subjects with OA showed cutaneous sensitization to chicken feathers and one to turkey as well while the two control subjects did not suggests feathers as the responsible agent, though we cannot exclude the possibility that cutaneous reactivity to feathers merely represents a marker of exposure. Inhalation challenges with feathers might have been helpful, but obtaining pure feathers without contaminants would have been difficult.

Key words: asthma; occupational asthma; poultry.

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