

OCCUPATIONAL ASTHMA CAUSED BY ARTIFICIAL CYANOACRYLATE FINGERNAILS

Cyanoacrylates have been previously described as a causative agent of allergic contact dermatitis and occupational asthma (OA).^{1,2} However, cyanoacrylates contained in sculptured nails, which are becoming widely used in beauty saloons, have not been reported as a causative agent of OA to date.

We describe a 25-year-old nonsmoking woman who had worked for 7 years as a manicurist and cosmetologist. She had a history of allergic rhinoconjunctivitis and asthma due to pollen sensitization. She had applied artificial fingernails on the nail plate during the past 6 months. Shortly after applying the sculptured fingernails, she developed rhinoconjunctivitis and asthma symptoms, with worsening several hours later. According to the Material Safety Data Sheets, the only sensitizer contained in the products was cyanoacrylate in a fingernail adhesive gel (Diamond Rock Nails, Valencia, Spain). The patient did not use any respiratory personal protective equipment.

Results of skin prick tests to common environmental allergens (ALK-Abelló, Madrid, Spain) were positive to animal dander (dog and cat) and pollens (grass, *Olea europaea*, *Platanus acerifolia*, *Cupressus arizonica*, and *Plantago lanceolata*). Patch testing with European standard (T.R.U.E. Test; Mekos Laboratories AS, Hillerød, Denmark) and with metals and acrylates series (Chemotechnique Diagnostics, Vellinge, Sweden) produced positive results to nickel sulfate hexahydrate 1.0% aqueous, cadmium chloride 1.0% aqueous, and silver nitrate 1.0% aqueous. Findings from chest radiography were normal.

The total serum IgE concentration (Immulite, Los Angeles, California) was 271 kU/L. Specific IgE (ImmunoCAP; Phadia, Uppsala, Sweden) was positive to *Lolium perenne* pollen (61.80 kU/L), dog dander (0.90 kU/L), and cat dander (4.86 kU/L). Measurements of fractional exhaled nitric oxide (FeNO) were performed using a handheld analyzer (NIOX Mino; Aerocrine AB, Solna, Sweden).

Specific inhalation challenge (SIC) with cyanoacrylate was performed in a 7-m³ challenge chamber by handling the cyanoacrylate adhesive gel as previously described.^{1,2} As a control challenge test, a physiologic saline solution was used. The patient measured her lung function (forced expiratory volume in 1 second [FEV₁] and peak expiratory flow) for 24 hours after SIC using a portable, pocket-sized spirometer (Jaeger Asthma Monitor Software; Viasys Healthcare GmbH, Hoechberg, Germany).

At the first visit, the provocation concentration of methacholine that caused a decrease in FEV₁ of 20% (PC₂₀), measured after the tidal breathing method,³ was negative (PC₂₀ >16 mg/mL), and the FeNO value was increased (65 ppb). At that time, the patient was still at work, but she avoided direct exposure to sculpture nails. On visit 2, SIC with cyanoacrylate for 30 minutes elicited an isolated late asthmatic response. After 11 hours, she had a 23.7% decline in FEV₁ and experienced rhinorrhea and asthma symptoms that worsened progressively until she received short-acting β_2 -agonists (Fig 1). Twenty-four hours after cyanoacrylate SIC, an increase in FeNO concentration (100 ppb) was observed, and results of the methacholine inhalation test became positive (PC₂₀, 0.85 mg/mL).

The first cases of OA due to acrylates were reported by Lozewicz et al,⁴ who described that adequate ventilation and a relative humidity higher than 55% reduce the concentration of environmental acrylates. The widest series of OA due to acrylates were reported by

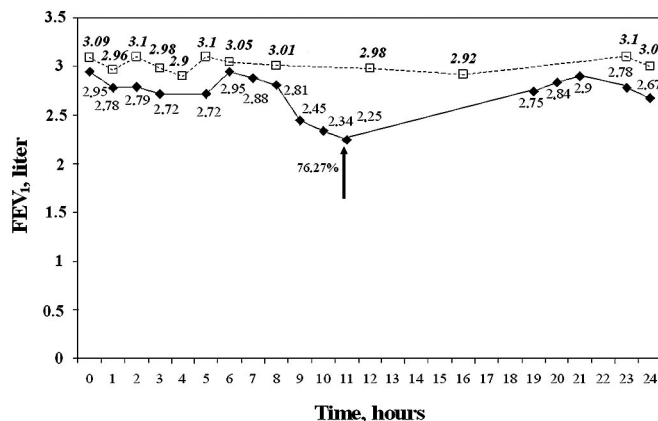


Figure 1. Forced expiratory volume in 1 second (FEV₁) after placebo (control) (—□—) and specific inhalation challenge to cyanoacrylate adhesive gel (—◆—). An isolated late asthmatic reaction was observed. Arrow indicates salbutamol inhalation (200 µg).

Savonius et al⁵ and Piirilä et al.⁶ Jaakkola et al⁷ reported that the risk of adult-onset asthma, nasal symptoms, and other respiratory symptoms significantly increases with daily use of methacrylates in dental assistants' work. Sauni et al⁸ recently described the first 2 cases of OA caused by sculptured nails containing methacrylates. Both patients had a dual type of asthmatic reaction after a work simulation test, and 1 also had allergic contact dermatitis from exposure to methacrylates.⁸ In contrast, the present patient developed an isolated late asthmatic reaction, and results of patch testing with acrylates were negative. To our knowledge, this is the first case report of OA due to cyanoacrylates contained in sculptured fingernails, confirmed by means of SIC, significant changes in airway hyperresponsiveness to methacholine, and an increase in FeNO concentration.

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TOXIC EPIDERMAL NECROLYSIS INDUCED BY LEVOFLOXACIN

Toxic epidermal necrolysis (TEN) is a severe bullous dermatitis with a mortality rate of 30% to 35%.¹ Fluoroquinolones, especially ciprofloxacin, have been implicated in cases of TEN.^{2–7} However, there is little published information on levofloxacin-induced TEN.^{4,6,7} We report a fatal case of TEN induced by levofloxacin.

A 59-year-old woman with a history of endometrial carcinoma (stage III), type 2 diabetes mellitus, and allergy to streptomycin and penicillins was admitted to the oncology department with pyelonephritis. Treatment with levofloxacin, 500 mg/d, was started. On the ninth day of treatment, the patient developed generalized purpuric exanthema. Levofloxacin use was discontinued, and the exanthema improved spontaneously. Four days later, the patient was discharged from the hospital, in good health. Forty-eight hours after discharge, the patient visited the emergency department with urinary syndrome and fever (temperature, 39°C). During the interview with the patient, a possible allergy to quinolones was not acknowledged and treatment with levofloxacin was restarted. Six hours after the administration of the first dose, the purpuric exanthema reappeared; after 24 hours, it had extended to 40% of the total body surface and became painful. Progression to desquamation and formation of conjunctival and epidermal erosions were observed in the next 24 hours. A characteristically lateral displacement of the necrotic epidermis in response to slight pressure was confirmed (Nikolsky sign) (Fig 1). The skin and mucous lesions involved the chest, back, face, neck, hands, legs, mouth, eyes, ears, and vagina. The laboratory results revealed normal red and white blood cell counts with a slightly increased erythrocyte sedimentation rate of 18 mm/h. The level of total serum proteins was 5.5 g/L; glucose, 221 mg/dL; creatinine, 1.5 mg/dL; and urea, 69 mg/dL. Levels of total bilirubin, aspartate aminotransferase, alanine aminotransferase, γ -glutamyltransferase, potassium, and sodium were within normal limits.

The patient was transferred to the intensive care unit and treated as a severe burnt patient. Protection of the skin and denuded areas and replacement of fluids and electrolytes were begun immediately. The patient also received methylprednisolone, 1 mg/kg intravenously, for 2 days, with no improvement. Laboratory test results showed abnormal liver and kidney function, hyperglycemia, hypalbuminuria, and hypopotassemia. Her fever continued, and *Pseudomonas aeruginosa* was isolated from the blood and urine cultures. Five days later, the patient died.

TEN and Stevens-Johnson syndrome are 2 forms of the same life-threatening process.¹ Characteristically, severe mucosal erosions with widespread erythematous cutaneous maculae are the main features of the disease. The cutaneous lesions often become confluent, with a positive Nikolsky sign and epidermal detachment. TEN is defined as an epidermal detachment of more than



Figure 1. Evidence of the Nikolsky sign in a 59-year-old woman with toxic epidermal necrolysis.

30% of the skin, and it has the highest mortality rate (range, 30%–35%). Stevens-Johnson syndrome–TEN is essentially a drug-induced disease. A few cases are related to infections, such as herpes simplex and mycoplasma; also, genetic susceptibility has been suggested.

Fluoroquinolones have seldom been implicated in TEN.^{2–7} Levofloxacin is effective against a number of gram-positive and gram-negative bacteria. Because of its broad spectrum of action, levofloxacin is empirically prescribed for a wide range of infections but there is little published information on levofloxacin-induced TEN.^{4,6} To our knowledge, there is only 1 report of a fatal outcome.⁷

The risk of death in patients with TEN can be accurately predicted by the TEN-specific severity-of-illness score.⁸ According to this scale, our patient had a final score of 6 and a mortality risk higher than 90%. Patients with TEN must be quickly referred to burn or intensive care units for supportive management and nutritional support (correction of electrolyte disturbances, administration of high-caloric enteral nutrition, and prevention of sepsis).

There are no randomized controlled trials of pharmacologic agents in the treatment of this disorder. Consequently, although case reports of a variety of therapeutic approaches have emerged, more research is needed to determine the real efficacy of any new treatment. These new agents include intravenous immunoglobulin, systemic corticosteroids, tumor necrosis factor α inhibitors, cyclosporine, cyclophosphamide, plasmapheresis, and hemodialysis.⁹

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