**CASE STUDY**

Cocaine-induced Churg-Strauss vasculitis

R. Orriols*, X. Muñoz*, J. Ferrer*, P. Huget**, F. Morell*


ABSTRACT: A freebase cocaine-smoking woman developed relapsing fever, bronchoconstriction, arthralgias and weight loss. Pulmonary infiltrates, arthritis, microhaematuria, pruriginous skin rash and mononeuritis multiplex were later added to the clinical picture. Both skin and muscle biopsies showed eosinophilic angiitis. Improvement or worsening of her clinical picture repeatedly coincided with avoidance or use of smoked cocaine, respectively.

We suggest that Churg-Strauss vasculitis may be a complication of smoking freebase cocaine.

*Servei de Pneumologia and **Servei d’Anatomia Patològica, Hospital General Universitari Vall d’Hebron, Barcelona, Spain.

Correspondence: R. Orriols, Servei de Pneumologia, Hospital General Universitari Vall d’Hebron, Passeig Vall d’Hebron, No. 119-129, 08035 Barcelona, Spain.

Keywords: Churg-Strauss syndrome, cocaine, vasculitis

Received: February 13 1995, Accepted after revision June 25 1995

Various lung diseases related to the use of freebase cocaine have been reported [1, 2]. Pulmonary infiltration with eosinophilia is an uncommon presentation of cocaine smoking [3–6]. We report a case of Churg-Strauss vasculitis in a patient whose clinical symptoms were clearly related to cocaine smoking. To our knowledge, this effect of cocaine abuse has not been described previously.

Case report

A 39 year old woman had been a 40 cigarette · day⁻¹ smoker since the age of 16 yrs. She had been using cocaine for the last 14 yrs and denied other toxic exposures and i.v. drug abuse. Her initial cocaine use had been limited to intranasal administration. Since then, she had occasionally suffered from wheezing which remitted with the inhalation of adrenergic β₂-agonists. She had begun to use freebase "smoked" cocaine 8 months earlier. Shortly afterwards, she presented with dyspnoea on effort, wheezing, 20 kg weight loss and polyarthalgias. The patient was admitted because of sweats, 38°C fever, dry cough and right pleuritic pain of 1 week’s duration.

Physical examination showed right inspiratory crackles and diffuse expiratory wheezes. Nasal examination was normal. Chest radiography disclosed an alveolar infiltrate in the right lower lobe. Electrocardiography (ECG) revealed tachycardia at 110 beats · min⁻¹ with diffuse repolarization changes. Pulmonary function testing showed a forced vital capacity (FVC) of 2.6 L (79% of predicted) forced expired volume in one second (FEV₁) 2.0 L (70% pred) and FEV₁/FVC 77%. Arterial blood gas measurements performed with the patient breathing room air were: pH 7.42; arterial carbon dioxide tension (∕Pa,CO₂) 5.6 kPa (42 mmHg) and arterial oxygen tension (∕Pa,O₂) 6.9 kPa (52 mmHg). Leucocyte count was 11.9×10⁹ cells · L⁻¹ with 3% eosinophils, and serum immunoglobulin E (∕IgE) was 346 IU · mL⁻¹. Erythrocyte sedimentation rate (∕ESR) was 99 mm · h⁻¹. All bacteriological studies were negative. Testing for human immunodeficiency virus was also negative.

The patient stopped smoking cocaine and was treated with bronchodilators and antibiotics. Marked clinical and radiological improvement was observed within a few days and the patient was discharged. Temporal relationship between cocaine exposure and laboratory data is shown in figure 1.

Six months later, the patient began to smoke cocaine again and presented with three episodes of fever, cough, wheezing, arthralgias and peripheral lung infiltrates (fig. 2),

![Fig. 1. - Temporal relationship between cocaine exposure and laboratory data. PRED TX: prednisone treatment; IgE: immunoglobulin E; ESR: erythrocyte sedimentation rate.](image-url)
residual volume (RV) 2.46 L (157% pred), total lung capacity (TLC) 4.75 L (96% pred), single breath transfer factor for carbon monoxide ($T_L,CO$) 70% pred and transfer factor/alveolar volume ($T_L,CO/V_A$) 107%. Bronchodilator test was positive with a FVC and FEV1 improvement of 13 and 16%, respectively. Arterial blood gas measurements performed with the patient breathing room air were: pH 7.41; $P_{a,CO_2}$ 5.6 kPa (42 mmHg) and $P_{a,O_2}$ 6.1 kPa (46 mmHg). Leucocyte count was $21.9 \times 10^9$ cells·L$^{-1}$ with 48% eosinophils, serum IgE was 730 IU·mL$^{-1}$ and ESR 82 mm·h$^{-1}$. Urine sediment showed microhaematuria of 25 erythrocytes·field$^{-1}$. Negative investigations at that time included antinuclear antibody (ANA), rheumatoid factor, antinuclear cytoplasmic antibody (ANCA), hepatitis B surface antigen, aspergillus precipitins, syphilis serology, human immunodeficiency virus serology, parasite study and blood, sputum, stool and urine cultures.

Neurophysiological studies showed mononeuritis multiplex with diminished amplitude of motor and sensory potentials of sural and right common peroneal nerves. Severe denervation of the extensor digitorum brevis muscle was also observed. Skin and muscle biopsies showed eosinophilic infiltrate of moderate intensity in small arterioles and venules with fibrinoid necrosis (fig. 4). Muscle fibres presented degenerative changes, basophilia and myophagia in areas of vascular involvement.

The patient stopped smoking cocaine and treatment with prednisone 1 mg·kg$^{-1}$·day$^{-1}$ was started, with rapid improvement in symptoms and normalization of the radiographic changes. The pulmonary function testing showed a FVC of 3.03 L (92% pred), FEV1 2.64 L (92% pred), FEV1/FVC 87%, $T_L,CO$ 106% and $T_L,CO/V_A$ 131% pred. Arterial blood gas measurements performed with the patient breathing room air were: pH 7.38; $P_{a,CO_2}$ 5.5 kPa (41 mmHg) and $P_{a,O_2}$ 12 kPa (90 mmHg). While...
under treatment, the patient resumed her cocaine smoking habit for two separate periods of time. Once again, her fever, arthralgia, arthritis, skin rash and mononeuritis multiplex improved or worsened with avoidance or use of cocaine, respectively.

**Discussion**

Our patient developed features typical of Churg-Strauss vasculitis, including late-onset asthma, heavy blood eosinophilia, pulmonary infiltrates, mononeuritis multiplex and raised serum IgE. Skin and muscle eosinophilic infiltration and necrotizing angiitis were demonstrated. Granulomas were not found. However, the three histological components of the disorder often do not coexist temporally or spatially, and are found together only in a minority of cases [7]. The relationship to cocaine use is supported by the reappearance of the syndrome during periods of cocaine smoking. Thus, it seems evident that Churg-Strauss vasculitis might have been induced by a hypersensitivity reaction to smoked freebase cocaine.

Aetiological or precipitating factors of Churg-Strauss vasculitis are not established in the majority of cases. However, allergic desensitization in 25 reported cases [8, 9], and biliary tract infection by ascaris in one patient [10], have been implicated as precipitating factors of Churg-Strauss vasculitis. Inhaled antigens have also been suggested as possible causes. Guillevin et al. [11] described a patient who developed Churg-Strauss syndrome after exposure to pigeons.

Some reports suggest that cocaine could cause vasculitis. Bacharach et al. [12] reported a case of thoraco-abdominal aortitis with aneurysm formation, consistent with possible cocaine-induced vasculitis. In another report, Kaye and Fainstat [13] suggested that cocaine might cause cerebral vasculitis. Whilst histological confirmation was not established in this case, the angiographic findings were consistent with vasculitis and the patient responded to steroid therapy. Krendel et al. [14] reported the cases of two cocaine users who developed transient blindness, persistent headache and progressive widespread cerebral dysfunction while smoking freebase cocaine. Brain biopsy showed vasculitis involving small vessels in both patients.

The mechanism by which cocaine may interact with the vascular epithelium and provoke vasculitis remains unknown. As in our case, IgE production, eosinophilic chemotaxis and subsequent release of mediators with vascular injury may be induced by inhaled cocaine.

**Acknowledgement:** The authors thank C. O'Hara for help with translation.

**References**