Right to privacy and informed consent. The authors declare that no patient data appears in this article.

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Hypersensitivity pneumonitis caused by metalworking fluid

To the Editor,

Metalworking fluids (MWF) or cutting oils have been recognised as causes of work-related respiratory problems.[1] Most workers who are affected by these problems are employees of the automotive industry.

Case reports of occupational asthma (OA) due to MWF have been reported previously.[2,3]

The first cases of alveolitis due to MWF were reported by Bernstein et al., who described six cases of hypersensitivity pneumonitis.[4] In some cases included in this study precipitating antibodies to a number of microbial isolates were found, the most common being *Pseudomonas fluorescens*. Other outbreaks[5,6] are thought to have been caused by bacterial (particularly mycobacteria) or fungal contamination of MWF, but no specific agent has fulfilled the criteria for a specific cause. A more recent report[7] described 12 workers who produced heterogeneous clinical, radiological and pathological findings, but all met the case definition for HP. Only one worker with suspected HP was challenged with used and clean MWF, exhibiting a late reaction only when exposed to the used fluid.[8] It was therefore confirmed that the chemical constituents alone were unlikely to have caused the disease; rather, the contaminated MWF was the cause of the disease in most cases.

We report a 30-year-old male non-smoker who developed recurrent episodes of malaise and shortness of breath related with his job. In his workplace, metallic parts were cut using MWF. As a part of the process used, the fluid is heated, producing aerosol. The product labelling and material safety data sheet showed that the substance contains aminoethanol and other unspecified products. The man had worked in the same job for ten years. He did not use a protective mask at work. He had a previous diagnosis of mild seasonal allergic rhinoconjunctivitis. Following a one-month sick leave, the patient was symptom-free. Two months after the sick leave, a CT scan was reported as normal and spirometry revealed FVC of 66% and FEV1 of 77%. Three months later the patient was referred to our unit. At this time, spirometry was normal, as was the fraction of exhaled nitric oxide. A methacholine inhalation test revealed no airway hyperresponsiveness (PC20 > 16 mg/ml) and diffusing capacity was normal (DL_{CO} 98%). The MWF he used during the symptomatic phase was submitted for microbacterial analysis of possible bacteria and mycobacteria. All cultures yielded negative results. After signing an informed consent a specific inhalation challenge with an MWF that was of the same brand but new was performed by heating the product. The patient was exposed to a concentration of 0.87 mg/m^3 (DustTrack model 8520, TSI, St. Paul, MN, USA) for 30 min in a closed chamber for exposure to particles and fumes.[9] Clinical symptoms and body temperature were monitored hourly until bedtime, and spirometry measurements were taken using a portable electronic spirometer (Amos, Jaeger, Germany). He presented a late (eight hours) fall of FVC of 15%. Twenty-four hours after this challenge diffusing capacity and lung volumes did not change, and neither did the haemogram. The next day the patient was exposed to the MWF for two hours while inside the chamber. Seven hours after the exposure was concluded, and over a duration of three hours, he presented with malaise, up to 37.5 °C, shortness of breath and a fall of FVC of 17%. Twenty-four hours after the second challenge diffusing capacity and haemogram did not change although there was an increase of residual volume to 158%.

There is no single specific radiological, physiological, or immunological test suitable for the diagnosis of hypersensitivity pneumonitis,[10] but changes in body temperature and FVC are predicting values of chronic HP.[11,12] The bronchial challenge test in this case showed significant late drop in FVC and an increase in residual volume suggestive of a peripheral lung reaction together with a rise in body temperature. Therefore, the results of the clinical symptoms and challenge test in this worker strongly suggest that he had developed hypersensitivity

pneumonitis caused by some component of the MWF and not by bacterial products. There are few cases of alveolitis due to MWF demonstrated by bronchial challenge test.

Ethical disclosures

Protection of human subjects and animals in research. The authors declare that the procedures followed were in accordance with the regulations of the responsible Clinical Research Ethics Committee and in accordance with those of the World Medical Association and the Helsinki Declaration.

Patients' data protection. Confidentiality of data. The authors declare that they have followed the protocols of their work centre on the publication of patient data and that all the patients included in the study have received sufficient information and have given their informed consent in writing to participate in that study.

Right to privacy and informed consent. The authors have obtained the informed consent of the patients and/or subjects mentioned in the article. The author for correspondence is in possession of this document.

Conflict of interest

None of the authors declare conflict of interest concerning this article.

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