Hypersensitivity pneumonitis in a high school teacher

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Case report

A 45-year-old man presented with a one year history of cough, shortness of breath and fatigue. He was a lifelong non-smoker, had no pets, and reported no episodes of water damage or mold at his home. He worked at a vocational school as a machine shop teacher. His symptoms showed mild improvement over the summer vacation. His pulmonary function testing was normal, with the exception of an impaired diffusion capacity (DLCO, 57% predicted). Bronchoalveolar lavage revealed 58% lymphocytes and 3% eosinophils; cultures for bacteria, fungi and mycobacteria were negative. A serum hypersensitivity panel was negative. Video-assisted thoracoscopic biopsies were consistent with hypersensitivity pneumonitis (HP), and he was referred to an occupational medicine specialist to confirm the diagnosis of HP.

The patient was excused from work for three months while being treated with a prednisone taper starting with prednisone 60 mg daily. His symptoms and DLCO improved. After changes described below were implemented at his school, he was able to return to work.

A private industrial hygiene company conducted an evaluation of the school machine shop. The metal working fluid (MWF), that was used to cool and lubricate the machines, was over a year old. Air samples did not detect MWF in the school machine shop air. But, a culture of the MWF showed profuse growth of *Pseudomonas pseudoalcaligenes* and it was noted that those performing maintenance on the MWF machines had opportunity for significant inhalational exposure. A serum hypersensitivity panel was negative. Video-assisted thoracoscopic biopsies were consistent with hypersensitivity pneumonitis (HP), and he was referred to an occupational medicine specialist to confirm the diagnosis of HP.

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Since the 1990s, the MDPH Occupational Health Surveillance Program (OHSP) has received Centers for Disease Control and Prevention (CDC) funding to conduct surveillance of work-related asthma. OHSP has recently received five years of new CDC funding to continue surveillance and prevention of work-related asthma and to expand these efforts to include other work-related lung diseases, including, for example chemical pneumonitis, silicosis, and other pneumoconioses. Reporting of patients with work-related lung disease by health care providers to OHSP is critical to this work. We welcome your input as we move forward.

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Hypersensitivity Pneumonitis

Hypersensitivity pneumonitis, also known as extrinsic allergic alveolitis, is a result of immunologically induced inflammation of the lung parenchyma in response to inhalation of a variety of antigens. The prevalence of HP is low and it can be challenging to diagnose as symptoms overlap with other interstitial lung diseases, and laboratory and radiographic findings are non-specific. Among the more familiar HP descriptions are exposures to organic dusts, and aeronautical manufacturing plants.

The most important recommended therapy for HP is minimizing or eliminating exposure to the causal agent. Treatment often involves systemic steroids. If patients with HP are recognized and environmental interventions are conducted, they generally improve.

An important lesson from this case is the vital role of primary prevention—preventing exposures before they cause disease. MWFs are commonly used in a variety of settings to reduce heat and friction and to remove particles in industrial machining and grinding. Over 1 million workers nationwide are potentially exposed, in their work in metal working and metal forming occupations. Both OSHA and NIOSH have guidance about steps to ensure that exposure to MWF is minimized through design of the equipment and local exhaust ventilation, and to make sure that the fluids are maintained and changed properly to prevent microbiological contamination.

OSHA’s website [www.osha.gov/SLTC/metalworkingfluids/](http://www.osha.gov/SLTC/metalworkingfluids/) provides guidance and links to resources from the Independent Lubricant Manufacturers Association:

[www.ilma.org/resources/metalworkingfluids_quickstart.cfm](http://www.ilma.org/resources/metalworkingfluids_quickstart.cfm)


NIOSH’s website also recommends a limit to the concentration of MWF in the air [www.cdc.gov/niosh/topics/metalworking/](http://www.cdc.gov/niosh/topics/metalworking/)

References

2. Brigham and Women’s Hospital, Division of Pulmonary and Critical Care Medicine
3. Diffusion capacity of the lung for carbon monoxide, is the extent to which oxygen passes from the air sacs of the lungs into the blood. (Wikipedia definition)