

B-Cell Lymphocytic Bronchiolitis And Alveolar Ductitis In A Man With Exposure To Metalworking Fluids - A Novel Occupational Lung Disease

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Introduction: Identification of a novel lung disease in workers can lead to further understanding of occupational hazards. Four cases of a novel B-cell lymphocytic bronchiolitis and alveolar ductitis occurred among non-smoking workers at a machine fabrication facility. We report one of these cases that resulted in lung transplantation.

Case Report: A healthy male began working at the facility full-time as a machine operator in 1979 at the age of 19 years. He presented in 1995 with productive cough, wheeze, and throat clearing for several months. He was treated for allergic rhinitis. The patient presented in 2004 because of worsening cough, wheeze, and dyspnea on exertion. His oxygen saturation on room air was 91%. Pulmonary function tests showed forced expiratory volume at 1 second (FEV₁), 1.82 L (44% of predicted); forced vital capacity (FVC), 4.51 L (89%); FEV₁/FVC, 0.40 (49%); total lung capacity, 7.12 L (134%); residual volume, 2.19 L (228%); and, diffusing capacity for the lung for carbon monoxide, 15.50 ml/min/mm Hg (55%). Computed tomography (CT) of the chest revealed bibasilar bronchiectasis and prominent peribronchial thickening in right lower and middle lobes, and lingula. Transbronchial biopsy showed chronic peribronchial inflammation and fibrosis compatible with airway disease/bronchiectasis. The patient clinically deteriorated. In 2011, he noted dyspnea with activities of daily living, which caused him to leave the workplace. Spirometry showed FEV₁, 1.18 L (30%), and a 6-minute walk test revealed he required oxygen at 6 liters per nasal cannula to maintain an oxygen saturation >90%. In December 2014, he underwent a successful lung transplantation. Explanted lung tissue showed bronchiolocentric lymphoplasmacytic infiltrates with scattered B-cell lymphoid follicles involving alveolar ducts and bronchioles; the histologic pattern was not previously recognized and similar to open lung biopsy specimens from the three other cases.

Workplace examination suggested potential exposures to metals, paper dust, vacuum pump exhaust, paint, lacquer thinner, and metalworking fluids (MWF) used for cooling and lubrication during metal machining. Culture and non-culture analyses of MWF revealed the presence of multiple species of bacteria and fungi. Endotoxin levels were elevated.

Discussion: A case of progressive B-cell lymphocytic bronchiolitis and alveolar ductitis with novel histologic characteristics (distinct from hypersensitivity pneumonitis and follicular bronchiolitis) shared by three other cases was identified at a single workplace shown to have MWF populated with multiple microorganisms. A potential exists that inhaled bioaerosols contributed to disease pathogenesis, and should be investigated further to determine ongoing risk to current workers.

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