Hypersensitivity Pneumonitis induced by a CPAP Ventilator?

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Introduction
Continuous positive airway pressure (CPAP) ventilation is the gold standard treatment for obstructive sleep apnea (OSA) and has so far not been associated with treatment-related inflammatory or allergic adverse reactions including hypersensitivity pneumonitis.

Case presentation
A 69-year-old man with severe OSA presented with progressive dry cough and exertional dyspnea. On presentation the patient was alert and in no apparent respiratory distress. Chest auscultation revealed right basal inspiratory velcro-type crackles. Computed tomography of the chest showed reticulo-nodular opacities and interstitial thickening in both lower lung fields with a marked right-sided predominance. Ground glass opacities were also present in the right lower lobe. Pulmonary function tests were normal apart from a reduced diffusion capacity for carbon monoxide (DLCO; 68% predicted). Arterial blood gas analysis at rest showed hypoxemia and an elevated alveolar-arterial oxygen gradient (AaDO2). Bronchoalveolar lavage showed an increased total cell count with a marked lymphocytosis of 84%. Transbronchial biopsies revealed a mild chronic inflammation, with presence of macrophages, histiocytic granuloma and mild interstitial fibrosis. The diagnosis of hypersensitivity pneumonitis was retained. Identification of an inciting antigen at the patient’s home failed. A treatment with systemic corticosteroids was started, but the patient relapsed after withdrawal. Symptoms, radiological and functional findings did not improve until CPAP therapy - which included a heated humidifier - was stopped. CPAP therapy was resumed later with new equipment without humidification. Since, the patient remained free of symptoms without medication.

Discussion
In case of hypersensitivity pneumonitis the identification of the correct source of the pathogenic antigen is very important. After elimination of the CPAP device & humidifier as the potential source, our patient’s symptoms resolved within a few weeks without further steroid treatment. Authors argued that the conditions in the water bath of a heated humidifier are bactericidal and heated humidifiers...
produce molecules of water too small to carry pathogens. Therefore, the use of sterilized water is not generally recommended. Interestingly, our patient handled his humidifier very carefully by changing the water daily and using only pre-boiled water. Nevertheless, given the clinical course, an association between a bacterial or fungal antigen in the CPAP device or humidifier seems to be the most likely cause of our patient’s hypersensitivity pneumonitis.