Chapter 20

VETERANS AFFAIRS SYMPOSIUM: CASE REPORTS

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INTRODUCTION

The inhaled airborne hazards related to southwest Asia deployment have resulted in higher rates of respiratory symptoms and potentially unique manifestations of respiratory disease. While the extent and chronicity of lung disease has not been delineated for deployed military personnel, common diseases such as asthma and less common etiologies should be considered. This chapter reviews several unusual manifestations of lung disease in two cases and describes the difficulties associated with establishing specific diagnoses in these symptomatic military personnel.

CASE 1

In November 2009, a 39-year-old active duty male initially presented to the Pulmonary Clinic at Brooke Army Medical Center (Fort Sam Houston, TX) with symptoms of progressive dyspnea. The soldier had previously deployed to Iraq for 12 months (from 2005 to 2006) as a helicopter door gunner. He denied any pulmonary symptoms during deployment and upon return was able to pass the semiannual Army Physical Fitness Test. Because of the onset of nystagmus from a medullary central nervous system lesion, he was unable to perform any regular exercise for the following 2 years. After gradual resolution of neurological symptoms, he noted the onset of progressive exertional dyspnea. He denied any rest symptoms, cough, or sputum production in association with his exertional symptoms. The patient had a previous 4-pack-year tobacco history, but quit in 1996. His past medical history included posttraumatic stress disorder, anxiety disorder, and sleep disturbances. Physical examination was unremarkable, with body mass index unchanged at 28 to 29. Pulmonary and cardiac examinations were normal.

The initial chest X-ray radiograph was unremarkable, with no consolidations or infiltrates. Initial spirometry demonstrated a mixed obstructive/restrictive pattern with a forced vital capacity (FVC) of 3.98 L (64% predicted), a forced expiratory volume in 1 second (FEV_1) of 2.79 L (57% predicted), and a normal FEV_1/FVC ratio with a 7% increase in postbronchodilator FEV_1. The inspiratory flow volume loop was likewise noted as partially truncated during baseline spirometry. Full pulmonary function testing (PFT) demonstrated a total lung capacity of 7.04 L (86% predicted), with a residual volume of 2.46 L (116% predicted) and a diffusing capacity of the lung for carbon monoxide at 27.1 mL/mm Hg/min (61% predicted). Further evaluation included methacholine challenge testing, which was stopped after the initial dose because of a 37% decrease in FVC and a 42% decrease in FEV_1.

The patient was referred to speech therapy and had a normal laryngoscopic examination with no evidence of gastroesophageal reflux disease. He had normal vocal cord appearance and motion. The patient underwent cardiopulmonary exercise testing and worked out for 9 minutes using a cycle ergometer. His exercise capacity was normal with a maximal oxygen consumption of 93% predicted, an anaerobic threshold of 65% maximal oxygen consumption, and no cardiac or respiratory limitation to exercise. Computed tomography (CT) imaging of the chest revealed mild ground-glass opacities at medial-to-posterior lung bases on selected high-resolution supine inspiratory and prone expiratory images with mild reticular prominence. Flexible fiberoptic bronchoscopy was normal, with negative cultures and cytology. There was no acute or chronic inflammation in the transbronchial biopsies.

Because of the persistent findings on CT imaging, the patient was referred for surgical lung biopsy where right upper lobe, middle lobe, and lower lobe samples were obtained. Tissue specimens were sent to the Armed Forces Institute of Pathology (Washington, DC; closed in September 2011). Scanning electron microscopy revealed specimens of mild, focal, nonspecific interstitial pneumonia with possible hypersensitivity pneumonitis; mild peribronchiolar fibrosis and emphysema; and mild anthracosilicotic deposits with occasional small, colorless, birefringent particles containing silicon. Further testing of the transbronchial biopsy specimens with scanning electron microscopy with energy dispersive X-ray analysis identified both gold and Teflon (E I DuPont de Nemours and Company, Wilmington, DE) particles. Based on previously described findings, there was no distinct etiology for the patient's symptoms. However, possible diagnoses included the following:

- mixed obstructive/restrictive PFTs with no clear demonstration of airway hyperreactivity,
- possible upper airway involvement, and
- deconditioning contributing to symptoms of mild interstitial lung disease.

The role of silicates and other metals to interstitial findings is unclear.

CASE 2

In November 2011, a 30-year-old active duty male was referred for abnormal imaging to the Pulmonary Clinic at Brooke Army Medical Center. The soldier was previously deployed to Iraq for 15 months in 2008 to 2009 to perform vehicle recovery. He specifically described ongoing exposure to burning vehicles from improvised explosive devices. He developed a nocturnal cough while still deployed, but was not evaluated or treated in theater. Postdeployment treatment included an inhaled corticosteroid/long-acting beta-agonist combination that did not relieve his cough symptoms. He developed both progressive exertional dyspnea and chronic cough, but denied any rest symptoms or productive sputum. The patient was an active smoker with a 6-pack-year history at the time of initial evaluation, but later quit. Past medical history was only notable for a chronic back injury and left ear deafness. Physical examination was notable for a body mass index of 32 and oxygen saturation of 97%. Cardiac and pulmonary examinations were normal. Initial spirometry revealed an FVC of 4.62 L (84% predicted), an FEV_1 of 3.61 L (81% predicted), an FEV_1/FVC of 78%, and a 7% increase in postbronchodilator FEV_1. Full PFTs demonstrated a total lung capacity of 5.48 L (77% predicted), with a residual volume of 0.70 L (40% predicted) and a diffusing capacity of the lung for carbon monoxide at 26.8 mL/mm Hg/min (65% predicted).

These findings were consistent with a mild restrictive defect. Given the mild decrease in the FEV_1/FVC ratio, mannitol challenge testing was performed, and the patient completed a maximum dose of 160 mg, with only a 1% decrease in FEV_1 (normal bronchial responsiveness). Chest X-ray radiograph demonstrated nonspecific linear opacities in the left lower lung, and CT of the chest identified a wedge-shaped opacity within the left lower lobe with subjacent pleural thickening likely related to rounded atelectasis. Because of this finding on chest CT, he underwent diagnostic fiberoptic bronchoscopy. Bronchoalveolar lavage was negative for bacterial or fungal infection, and cytology was noninflammatory. Transbronchial biopsies demonstrated focal acute inflammation with a suggestion of organization, but were otherwise nondiagnostic. Based on these findings and stable dyspnea symptoms, he opted for repeat imaging, and repeat CT performed in March 2012 showed no interval change. The patient's chronic dyspnea was thought to be deployment-related and multifactorial in etiology because of the following:

- left lower lobe rounded atelectasis,
- chronic pleural thickening with pleurisy,
- mild restrictive lung disease, and
- limited exercise from chronic back pain.

SUMMARY

These case reports highlight the complexity of lung disease found in deployed military personnel and the need for an extensive evaluation by specialists to discern the various contributing factors for their symptoms. It has been well established that deployment to southwest Asia is associated with increased respiratory symptoms and the possibility of chronic lung disease.[1,2] Potential hazards may include suspended particulate matter from geological dusts, proximity to burn pit smoke, vehicle exhaust emissions, industrial air pollution, and specific exposure incidents.[3] Other factors that may play a role in these complaints include increased rates of cigarette smoking, multiple deployments, and higher rates of posttraumatic stress disorder and traumatic brain injury affecting a significant number of military personnel. Although a specific diagnosis may not be established, a complete evaluation can establish the severity of symptoms and underlying lung disease.

REFERENCES

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