A 50-Year-Old Woman With Gradual Deterioration of Oxygenation After Lung Transplantation*

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A 50-year-old woman develops a gradual deterioration in oxygenation shortly after single lung transplantation. This patient, with alpha-1-antitrypsin deficiency, undergoes right lung transplantation for emphysema. The surgery performed through a right thoracotomy is uncomplicated and the patient is transferred to the ICU for recovery. Shortly after arrival, the nurses notice a gradual but persistent deterioration in her oxygenation. Pulmonary artery balloon flotation catheter readings show a pulmonary artery balloon occlusion pressure of 10 mm Hg. The chest tubes are draining serosanguinous fluid without gross blood. A chest roentgenogram is obtained (Figure 1). The most likely cause of the patient’s problem is:

A. Hyperacute rejection  
B. A vascular anastomotic complication  
C. The pulmonary reimplantation response  
D. Cytomegalovirus infection  
E. An infection harbored in the donor lung

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Answer: C. The pulmonary reimplantation response.

The likely cause of the alveolar infiltrates noted in the chest roentgenogram is the pulmonary reimplantation response. This response is a form of reperfusion injury encountered to some degree in 80% of lung transplant recipients. It is characterized by new roentgenographic findings of alveolar and interstitial infiltrates, a decrease in pulmonary compliance, and abnormal gas exchange shortly after transplantation. These findings can persist for hours to days. The mechanism has not been completely delineated and could be due to a combination of factors including disruption of lymphatics and bronchial vasculature, as well as injury occurring during preservation of the lung graft or following reperfusion. Animal studies have suggested that oxygen-free radical production may be a cause of the lung injury seen in this situation. Treatment is supportive hemodynamic and ventilator management.

Hyperacute rejection rarely occurs in lung transplantation as opposed to transplantation of other solid organs. On the other hand, Cytomegalovirus infection is a common complication following lung transplantation but rarely occurs within the first 2 weeks. A volume overload state has been effectively ruled out by the normal pulmonary artery balloon occlusion pressure. Occasionally, a donor lung is the nidus of postoperative infection, but this would develop over the first several days not in the first several hours postoperatively. Anastomotic complications at the vascular site present with blood loss into the pleural space or rarely as hemoptysis but not as a parenchymal infiltrate.

REFERENCES
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