

Figure 15-3 The normal alveolus (left side) compared with the injured alveolus in the early phase of acute lung injury and acute respiratory distress syndrome. (Modified with permission from Matthay MA, Ware LB, Zimmerman GA: The acute respiratory distress syndrome. *J Clin Invest* 122:2731, 2012.) *IL-1*, interleukin-1; *MIF*, migration inhibitory factor; *PAF*, platelet activating factor; *TNF*, tumor necrosis factor.

Epidemiologic studies have shown that ALI/ARDS is more common and associated with a worse prognosis in chronic alcoholics and in smokers. Genetic studies have identified a number of genes that increase the risk of ARDS, including variants that map to genes linked to inflammation and coagulation.

Clinical Course. Individuals who develop ALI are usually hospitalized for one of the predisposing conditions listed earlier. Profound *dyspnea* and *tachypnea* herald ALI, followed by increasing *cyanosis* and *hypoxemia*, *respiratory failure*, and the appearance of *diffuse bilateral infiltrates* on radiographic examination. Hypoxemia may be refractory

MORPHOLOGY

In the acute stage, the lungs are heavy, firm, red, and boggy. They exhibit congestion, interstitial and intra-alveolar edema, inflammation, fibrin deposition, and **diffuse alveolar damage**. The alveolar walls become lined with waxy **hyaline membranes** (Fig. 15-4) that are morphologically similar to those seen in hyaline membrane disease of neonates (Chapter 10). Alveolar hyaline membranes consist of fibrin-rich edema fluid mixed with the cytoplasmic and lipid remnants of necrotic epithelial cells. In the organizing stage, type II pneumocytes proliferate, and granulation tissue forms in the alveolar walls and spaces. In most cases the granulation tissue resolves, leaving minimal functional impairment. Sometimes, however, fibrotic thickening (scarring) of the alveolar septa ensues. Fatal cases often have superimposed bronchopneumonia.

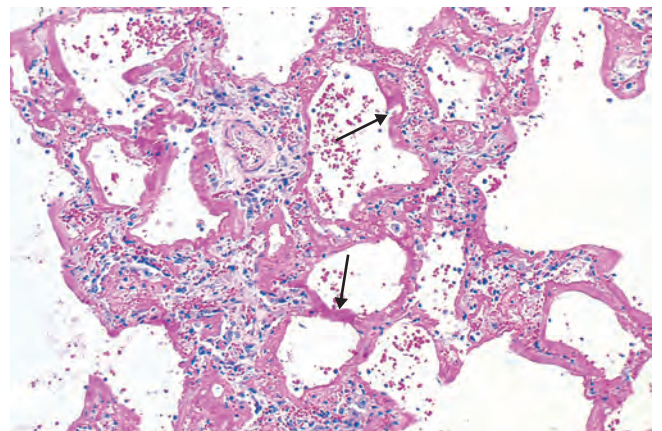


Figure 15-4 Diffuse alveolar damage (acute respiratory distress syndrome). Some of the alveoli are collapsed, while others are distended. Many are lined by hyaline membranes (arrows).