

Lung Recruitment and Acute Respiratory Distress Syndrome

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During normal breathing, inspiration is achieved by contraction of the diaphragm increasing the volume of the thoracic cavity, and elevation of the ribs by the external intercostals. When the ribs are elevated they swing anteriorly, and the width of the thoracic cage increases along its anterior-posterior axis. Expiration is achieved by relaxation of the diaphragm decreasing the volume of the thoracic cavity, and the depressing of the ribs and reducing the width of the thoracic cavity by the internal intercostals.

Acute respiratory distress syndrome (ARDS) is also called non-cardiogenic pulmonary edema, increased-permeability pulmonary edema, stiff lung, shock lung, and adult respiratory distress syndrome. It is a life-threatening condition where inflammation of the lungs and accumulation of fluid in the alveoli leads to low blood oxygen levels. This fluid buildup also makes the lungs heavy and stiff decreasing the lungs' ability to expand. Blood concentration of oxygen can remain dangerously low in spite of supplemental oxygen delivered by a mechanical ventilator through a breathing tube. Unfortunately, routine suctioning to remove debris that may be blocking their airways can cause lung tissue to collapse. New research published in *Critical Care* explains how a new technique involving the re-inflation of lungs after suctioning can lead to a marked improvement in the condition ARDS patients.

Many people think that lung recruitment holds that some overdistention will occur when positive end-expiratory pressure (PEEP) is administered because each lung area behaves differently. Luciano Gattinoni, MD, a Professor of Anesthesia and Critical Care at the University of Milan in Italy believes this to be

untrue. He says recruitment is a strategy aimed at re-expanding collapsed lung tissue and "is unrelated to PEEP, which is an expiratory maneuver. During recruitment, lung opening occurs along the entire pressure-volume curve without significant overdistention. PEEP simply keeps recruited lung areas open."

In order to recruit collapsed lung tissue, sufficient pressure must be imposed to exceed the critical opening pressure of the affected lung. A new strategy was designed to limit trans-alveolar pressures in the upper lobes, and provide sustained high pressures in the lower areas of the lungs sufficient to cause recruitment. The idea behind this strategy is that prone ventilation splits the thoracic cage, especially the anterior portion and the area around the upper lobes. If the diaphragmatic excursion is promoted by freeing up the abdomen then preferential ventilation of the lower lobes is encouraged, and overdistention of the upper lobes is prevented.

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