

Lateral Position: Lung Function

Anesthetic Pearls: Anesthetic Implications and Management of Positioning on Lung Function

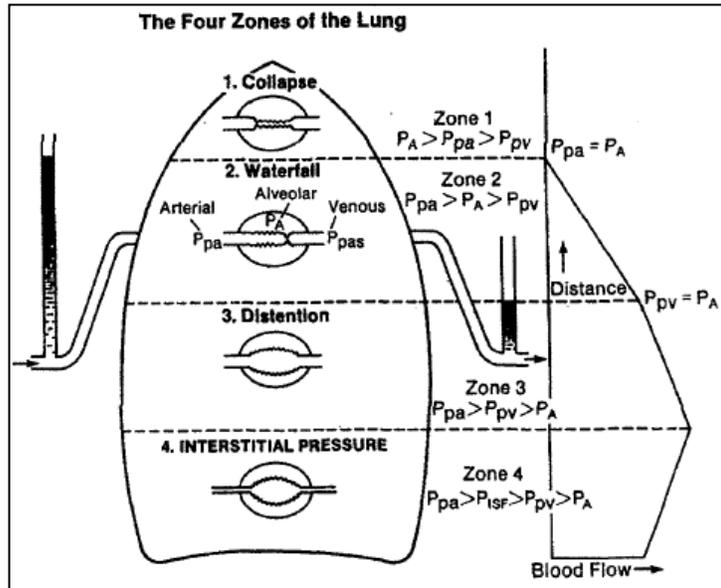
The effects of lateral position on lung function are largely related to gravity-induced changes in ventilation and perfusion. Perfusion is greater to dependant portions of the lung, whether supine, lateral or upright. The differences in ventilation and perfusion in the lung produced by gravity effects can be summarized by **West's Zones of the Lung**.

Zone 1: Airway pressure always greater than blood pressure, no blood flow occurs. Contributes to physiologic dead space.

Zone 2: Arterial pressure is enough greater than airway pressure that perfusion occurs intermittently.

Zone 3: Arterial and venous pressure are greater than airway pressure and perfusion occurs continuously.

Zone 4: Interstitial pressure is greater than arterial and venous pressure, flow may not occur.



Putting the patient in the **lateral position** changes the direction of gravitational effects, in essence putting the upper lung in zones 1 and 2, and the lower lung in zones 3 and 4. Thus 40% of blood flow goes to the upper lung, 60% to the lower lung in lateral position. (Regardless of which lung, the right lung usually gets about 55% of perfusion in upright or supine positions.)

Normal **AWAKE** patient in the lateral position: dependant lung receives majority of blood flow (gravity effect) and ventilation. Ventilation is greater to dependant lung in the awake patient because that lung is on steeper portion of compliance curve compared to upper lung, leading to greater change in lung volume for a given change in transpulmonary gradient.

Normal **ANESTHETIZED** patient in the lateral position, spontaneous or positive pressure ventilation: nondependent lung receives greater portion of ventilation, dependant lung receives greater portion of blood flow. In the anesthetized state, the diaphragm relaxes, leading to a decrease in FRC and small airway closure. This leads to the nondependent lung moving to the steep portion of the pulmonary compliance curve.

