

JULY 2007
QUESTION 12

Briefly describe the factors which effect lung compliance

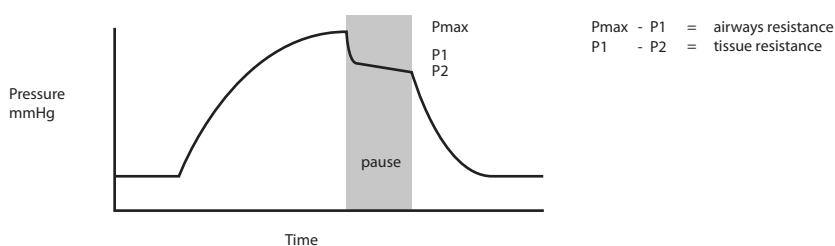
Compliance = change in volume / change in pressure.
measured in ml.cmH₂O⁻¹
normal value is 100ml.cmH₂O⁻¹

$$\frac{1}{\text{Total compliance}} = \frac{1}{\text{Lung compliance}} + \frac{1}{\text{Chest wall compliance}}$$

Classification of compliance

Dynamic compliance measures pressure changes at the end of inspiration and expiration

Static compliance pauses the lung during expiration, then measures the pressure
this removes airway resistance and tissue resistance
it can be shown graphically on a pressure time tracing



Specific compliance enables comparison between patients of difference sizes and is compliance/FRC

Factors which influence compliance

Surfactant is the most important factor with respect to compliance
formed by type II alveolar cells, mostly phospholipid DPPC
decreases surface tension, contrary to Laplace, presumably by packing closer together
result is an increase in compliance, prevention of small alveolar collapsing

Lung volumes

as per equation, a greater change in volume = increased compliance
at the base of the lung there is greater expansion therefore increased compliance
larger lungs also have increased compliance

Extremes of expansion

compliance is decreased at full inspiration and expiration
compliance is highest at FRC

Effects of blood volume

compliance is reduced when vasculature is engorged (eg APO)

Pathological changes

unventilated lungs have reduced compliance
emphysema increases compliance
fibrosis decreases compliance