

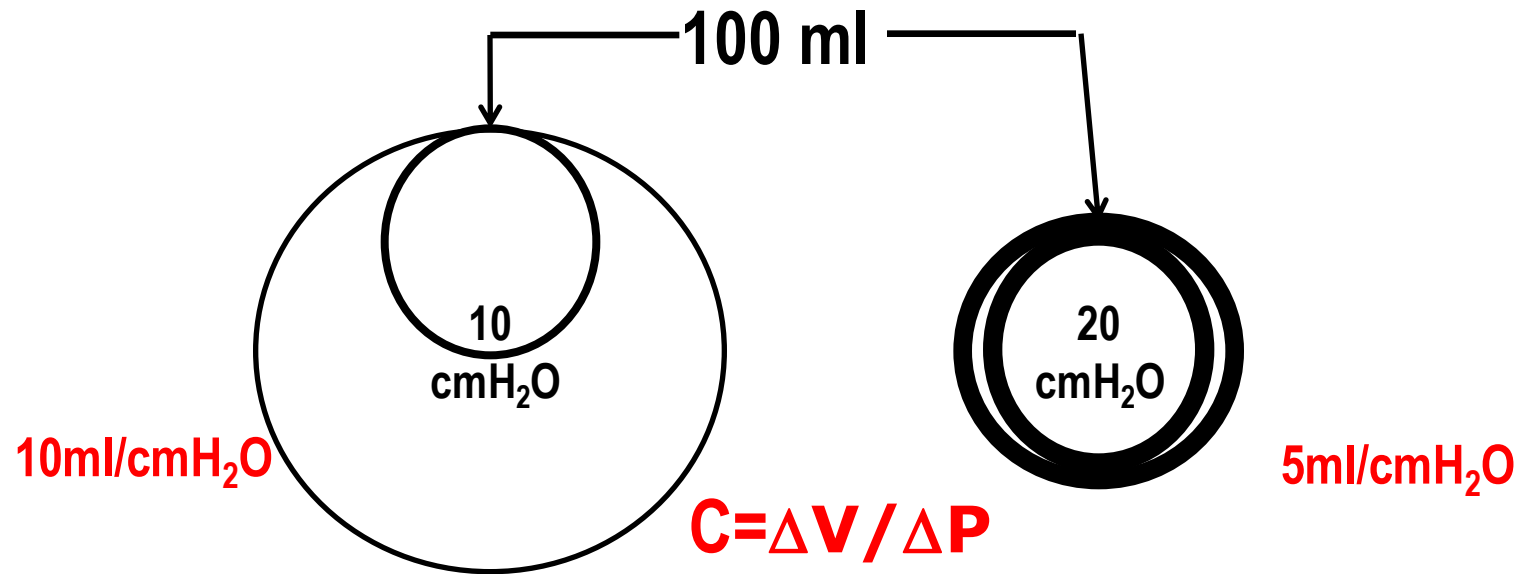
Lecture 4

PULMONARY COMPLIANCE

Objectives

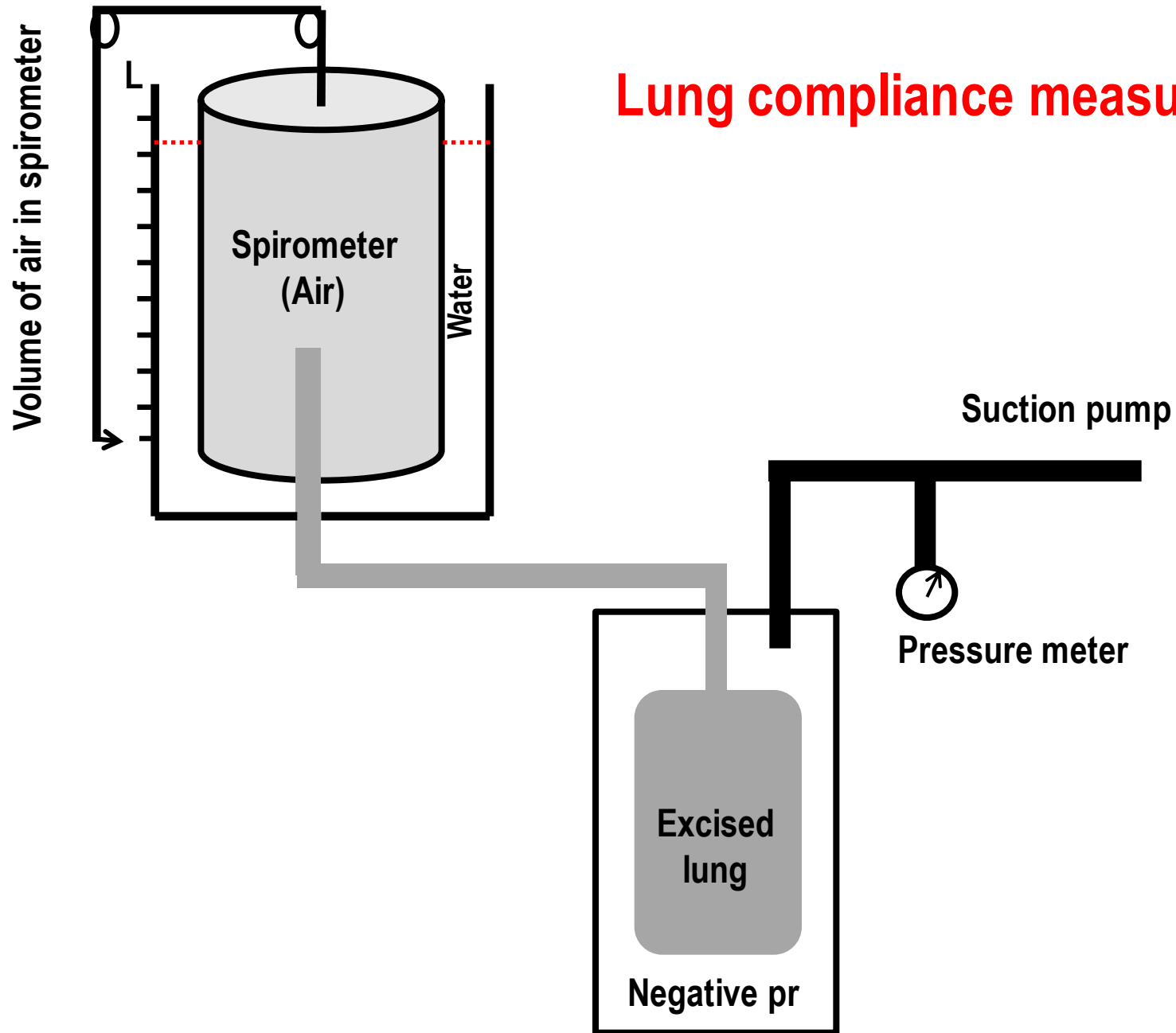
- ✿ Definition of pulmonary compliance
- ✿ Measurement of pulmonary compliance
- ✿ Effects of diseases on pulmonary compliance

Lung compliance (elastic properties of lung: pressure volume relationship)

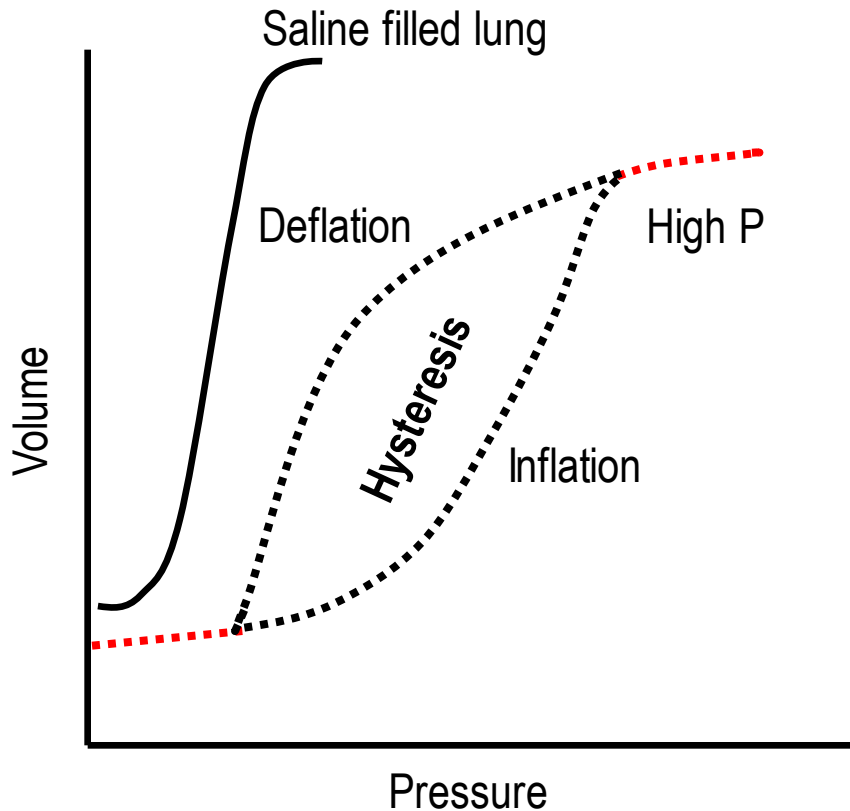


- ⊙ **Definition:** Change in lung volume per unit change in pressure
 - Pressure: transmural pressure (alveolar pr - intrapleural pr)
- ⊙ Measure of **distensibility (expansibility)**
- ⊙ **Normal values:** lung 200ml/cmH₂O, chest wall 200ml/cmH₂O, lung and chest wall 100ml (0.1L) /cmH₂O

Lung compliance measurement

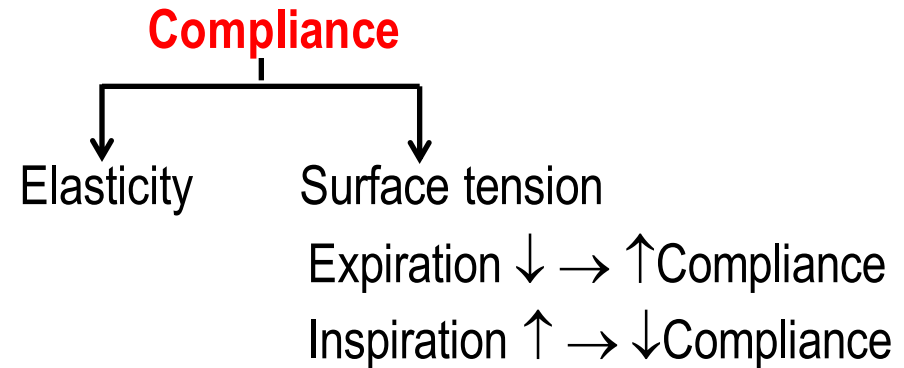


Excised lung



⊙ Pressure volume curve is S shape

- At low pr compliance is low (pr needed to open collapsed alveoli)
- At high pr the compliance is low (lung stretched)

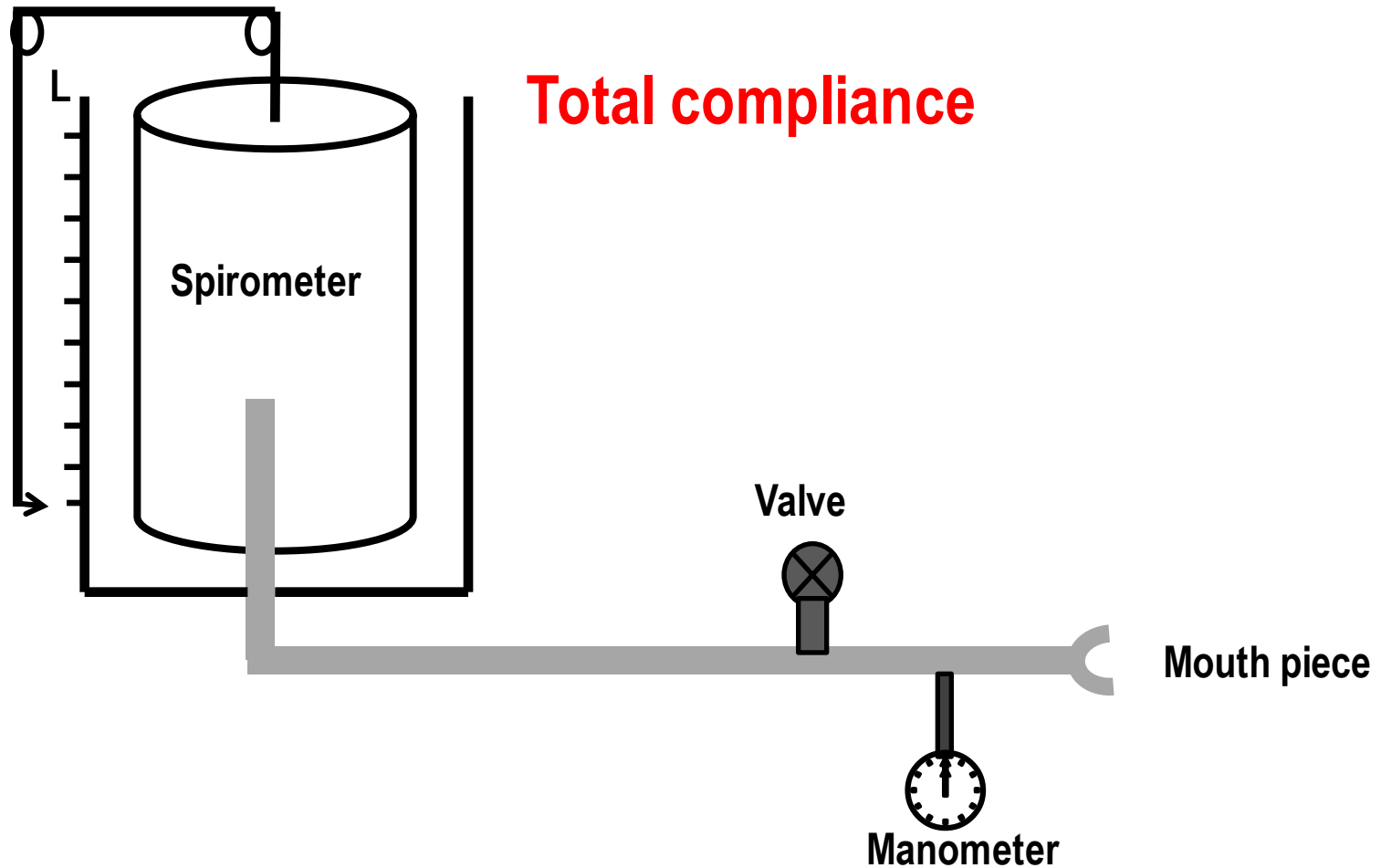


⊙ Deflation curve > inflation curve

- Deflation → alveoli small → ↑ surfactant concentration → ↓ surface tension → ↑ compliance

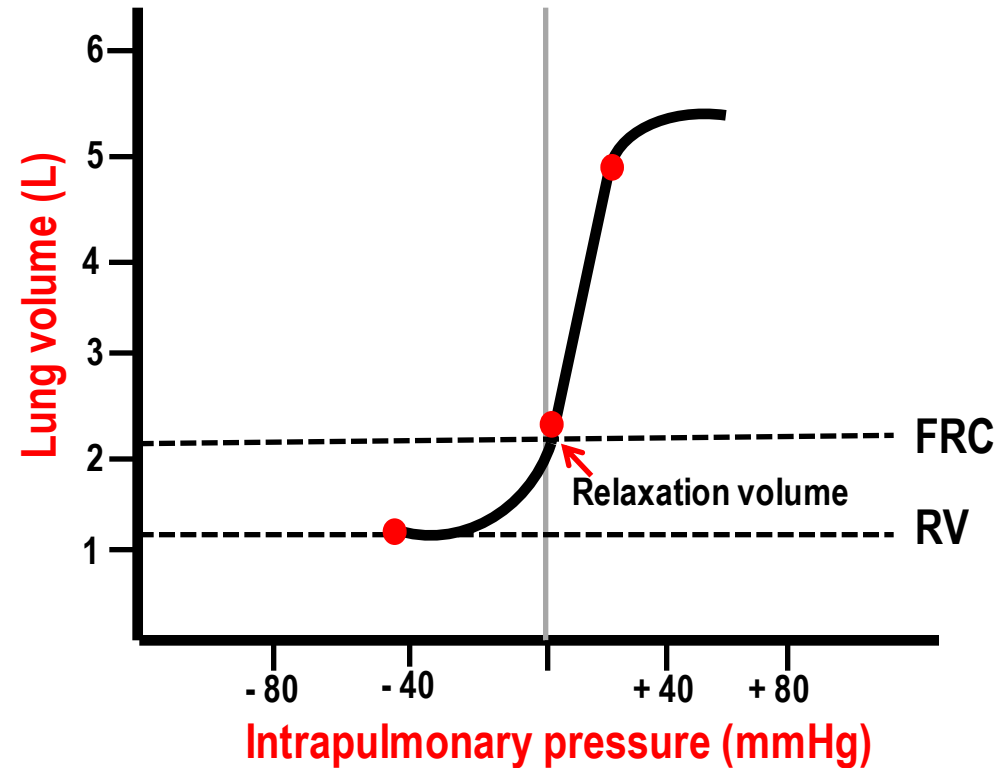
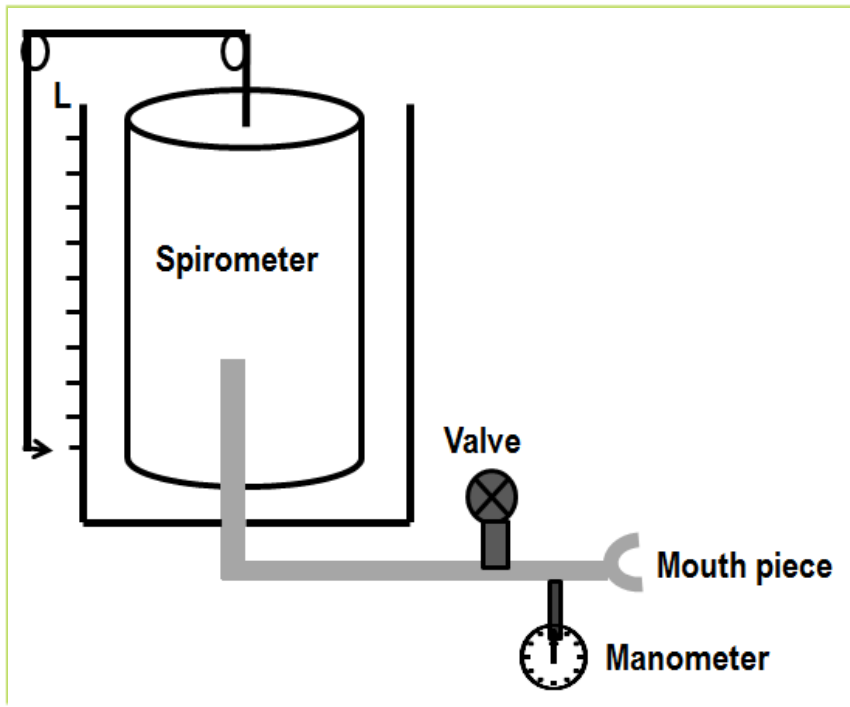
⊙ Compliance more in saline filled lung

- No surface tension → ↑ compliance



- ⊙ Nose is clipped and after maximum expiration, the subject is asked to inspire 50 ml of air from the spirometer through a mouth piece.
- ⊙ Close the valve in the mouth piece in front of the manometer and allow the respiratory muscles to relax. The intrapulmonary pressure is measured
- ⊙ Repeat the procedure for every 50 ml increments

Pressure –volume curve of the total respiratory system (P_{TR})



- ⊙ Compliance is measured in the pressure range where the relaxation pressure curve is steepest.
- ⊙ Relaxation Volume: the pressure is zero at a volume corresponds to FRC.
- ⊙ Pressure is positive at volumes greater than FRC
- ⊙ Pressure is negative at volumes lesser than FRC

↓ Total compliance

- Restrictive diseases of the thorax (kyphosis, scoliosis)
- Fibrosis of respiratory muscles

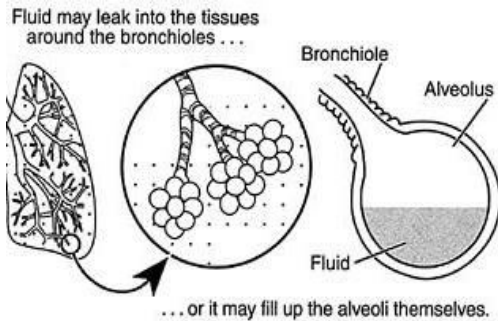


kyphosis

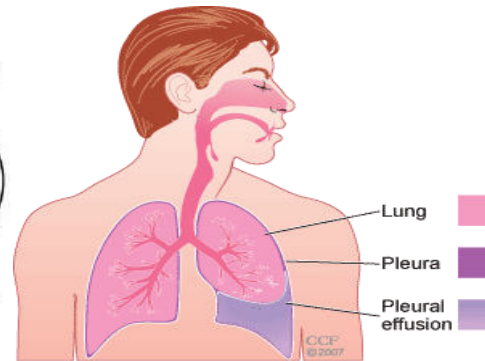


scoliosis

↓ Lung compliance (lung diseases)



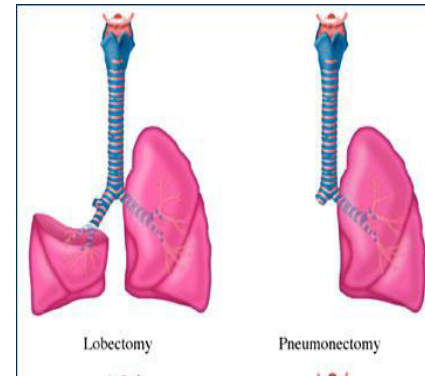
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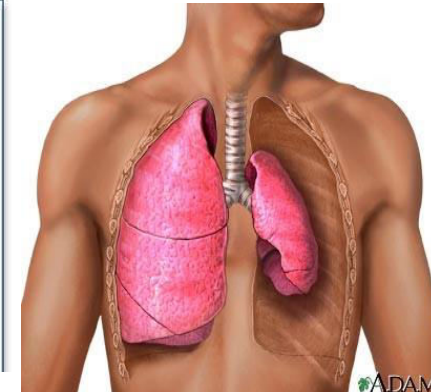
1. Pulmonary edema

2. Pleural effusion

5. Pulmonary fibrosis



3. Lobectomy & pneumectomy



4. pneumothorax

↑ Lung compliance

- Loss of lung elasticity (old age & emphysema)

