



Intermittent Positive-Pressure Ventilation (IPPV)

Is the process of manually or mechanically (via a ventilator) ventilating a patient with the use of an endotracheal or tracheostomy tube, and an anaesthetic breathing system.



- ❖ A patient may have difficulty with spontaneous respiration when under anaesthesia due to medication or disease, during thoracotomy or when intra-thoracic pressure is compromised due to a rupture in the thoracic cavity or diaphragm.



Physiological Consequences

1. Interaction between mechanical ventilation with the elastic and flow resistive properties of lung and chest.
2. How the change from the negative inspiratory intrathoracic pressures of spontaneous breathing to the positive pressures of IPPV affects cardiovascular

Factors affected by IPPV

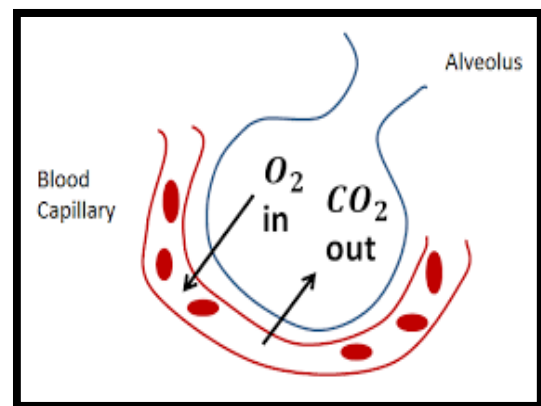
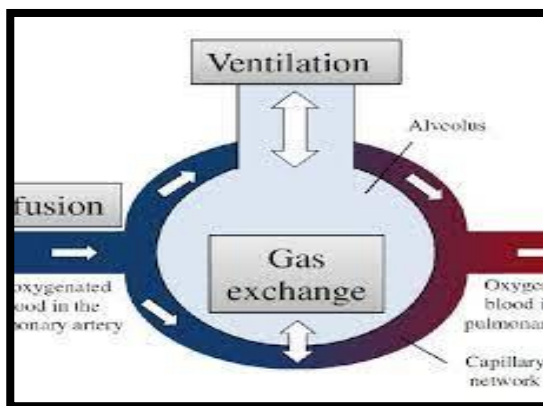
- 1- The **mechanical properties** of the lungs and chest wall during (IPPV):
 - a. Tidal volume;
 - b. Flow rate;
 - c. Airway pressure.
- 2- The increase in **intrathoracic pressures** associated with IPPV has consequences for:
 - a. Distribution of ventilation and perfusion (gas exchange);
 - b. Cardiac output;
 - c. Regional blood flows.

Influence of Lung and Chest wall Properties on Mechanical Ventilation

- ❖ The compliance and resistance of the lungs and chest wall determine:
 - 1- the flow rate;
 - 2- airway pressure produced by ventilator.



- **Inspiratory time** is decreased by increasing the pressure & flow rate of the ventilator.
- The **tidal volume** by a ventilator depends on
 - 1- Lungs compliance & resistance;
 - 2- Magnitude & duration of the applied pressure.



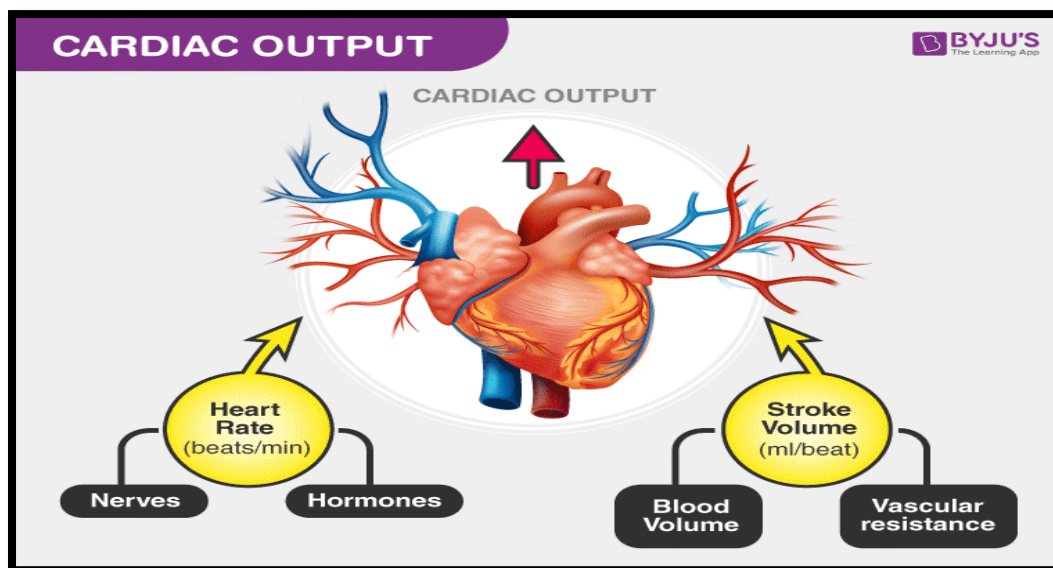
GAS EXCHANGE

- Abnormalities of gas exchange are attributed to mismatching of ventilation and perfusion within the lung.
- IPPV decreases the efficiency of gas exchange by altering the
 - ❖ Distribution of ventilation
 - ❖ Affect alveolar perfusion.
- IPPV may lead to
 - Alveolar hypoperfusion
 - An increase in alveolar dead space



CARDIO-VASCULAR FUNCTION

- 1- Cardiac output decreases with the application of IPPV due to decreased venous return



- 2- **Haemodynamic effect** of IPPV is the decrease in right and left ventricular performance.
- 3- **Increase in left ventricular stroke volume** during early inspiration due to ventricular compression by the rise in intra-thoracic pressure.
- 4- Decreased left ventricular after load due to an increase in pressure gradient