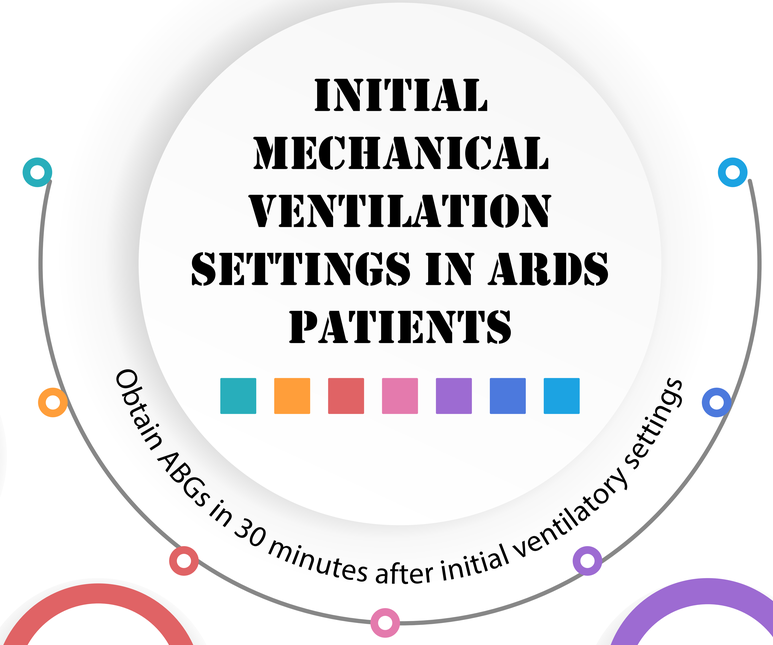
BEST PRACTICES

INITIAL MECHANICAL VENTILATION SETTINGS IN ARDS PATIENTS



PATHOPHYSIOLOGY

High A-a gradient and shunting process as the pathophysiology of hypoxemia..

Usually high rate of metabolic demand of the body due to pneumonia, sepsis, or shock.

Low compliance, normal resistance, and low expiratory time constant (RC_{exp}).

OXYGENATION

FiO_2: Start at 100% then decrease as appropriate targeting SPO_2 >90%.

PEEP: Start at 10-12 cm H_2O and adjust as per FiO_2 /PEEP and clinical response.
Increase PEEP for lung recruitment and target driving pressure of ≤15 cm H_2O.

I:E RATIO

Usually high I:E ratio (1:2 or 1:1) with prolonged inspiratory time for better oxygenation.

Expiratory time should be at least 2-3X time constant to ensure full expiration and avoid auto-PEEP. Ensure that expiratory flow returns to zero prior to the next breath.

CONTROL VARIABLE

Determine the ventilator control as the independent variable: volume vs pressure and apply the equation of motion:

$\Delta P = R \times F + V/C$

R: resistance
F: flow
V: volume
C: compliance

As you set the independent variable (V or P), the other variable (P or V) will be dependent on R and C of the respiratory system, and on the inspiratory efforts of the patient (Pmus)

Dual mode (PRVC) is preferred with a targeted tidal volume and pressure regulation.

MINUTE VENTILATION

Determine the dose of minute ventilation (V_E) based on the estimated metabolic rate.

Normal V_E is 100 mL/kg of IBW,. Patients with higher metabolic rate (i.e. sepsis or shock) may need 1.25-2X normal V_E.

TIDAL VOLUME

Determine the dose of VT based on IBW (Ideal Body Weight):

Target VT 4-6 mL/kg of IBW.

In CMV, start at 6 mL/kg of IBW and decrease gradually to keep Pplateau <30 cm H_2O and driving pressure ≤ 15 cm H_2O.

In PCV, set pressure at <30 cm H_2O and target VT of 4-6 mL/kg of IBW and driving pressure ≤15 cm H_2O.

RESPIRATORY RATE

Determine the respiratory rate by dividing the minute ventilation over the tidal volume:

RR= V_E/VT

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