Mechanical Ventilator Waveform Analysis

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Objectives

- Identify early changes in patient pathophysiology
- Recognize changes in compliance
- Recognize changes in resistance
MEANWHILE AT WAVEFORM CLASS...

NOW WHAT DO YOU SEE WITH THE FOLLOWING FLOW VOLUME LOOPS?

A DUCKY!
A HORSIE!
NO A DOGGIE!

SIGH
MY MOM-IN-LAW SENDING OVER!
Any difference between $P_{PLATEAU}$ and PEEP is due to the volume of gas forced into the lung ($V_T$) and the lung compliance ($C_{LT}$)

\[ P_{PLATEAU} - PEEP = P_{STATIC} \quad \text{ (Ventilating Pressure)} \]

Since $C_{LT} = \frac{\Delta V}{\Delta P}$, then this formula can be rewritten so that:

\[ C_{LT} = \frac{V_T}{P_{PLATEAU} - PEEP} \]

\[ \{ = \Delta P_{ST} (2^\circ \text{ to } V_T \& C_{LT}) \]
Any difference between $P_{\text{PLATEAU}}$ and PIP is due to flow and resistance to flow.

$$\text{PIP} - P_{\text{PLATEAU}} = P_{\text{DYN}}$$

Since $\dot{V} = \frac{\Delta P}{R_{\text{AW}}}$, then this formula can be rewritten so that:

$$R_{\text{AW}} = \frac{P_{\text{DYN}}}{\dot{V}}$$

$$= \Delta P_{\text{DYN}} \text{ (2° to flow & } R_{\text{AW}})$$
Resistance Problems

- Secretions
- Bronchospasm

Compliance Issues

- Restrictive Lung Diseases
- Atelectasis
- Pneumonia
- ARDS
Take Home Points

- Greater the variance between PIP and $P_{PLAT}$ (increase $P_{DYN}$) indicates an increase in resistance

- A compliance issue is indicative of a decrease $P_{DYN}$ (less variance of PIP and $P_{PLAT}$)
Questions??