Alveolar Pressure ("Plateau Pressure") and the Inspiratory Hold Manoeuvre

Most ventilators have a "inspiratory breath hold" button where you can stop the cycling of the ventilator and observe what happens to the pressure as the breath is held.

As soon as the flow stops, airway resistance falls and the pressure – formerly required to push air through the airway- drops to a plateau. Difference between this plateau and the peak pressure therefore must be the AIRWAY RESISTANCE, or "Ohmic resistance", or "flow-dependent resistance". It varies depending on airway diameter and the degree of bronchospasm.

**What the hell are we measuring?**

This is very similar to measuring intrinsic PEEP with an expiratory breath hold. Once again, airway pressure has 2 components: (the resistance of the airways and the pressure in the alveoli)

**It is the alveolar pressure you are interested in.** This is what determines your oxygenation. However, youre never measuring that directly, because the pressure gauge is deep inside the ventilator. Youre measuring the pressure in the circuit, that is to say, the airway.

- **Airway pressure = (resistance of airways) + (alveolar pressure)**
  - Resistance of airways = flow x resistance
  - Alveolar pressure = (volume over compliance) + PEEP

If airway pressure = flow x resistance + (volume over compliance) + PEEP,
... and you take away flow (by stopping the inspiration), and you ignore (or subtract) PEEP

- **Airway pressure = (0 x resistance) + (volume over compliance)**

Thus, in absence of flow,

- **Airway pressure = alveolar pressure**

The alveolar pressure should not get above 30 cmH₂O.

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With "Basic Assessment and Support in Intensive Care" by Gomersall et al as a foundation, I built using the humongous and canonical "Principles and Practice of Mechanical Ventilation" by Tobins et al – the 1442 page 2nd edition.