

Abstract

Background: Flow triggering was designed to avoid the decrease in airway pressure that occurs with pressure triggering and, therefore, increases the work of breathing. Initial studies comparing flow and pressure-triggering were performed with CPAP mode and showed lower WOB entailed with the former.

Methods: thirty two orotracheally intubated and mechanically ventilated patients recovering from acute respiratory failure for various etiologies and started to be weaned by pressure support mode of ventilation.

We compare between two triggering mechanisms by application of each mechanism to each patient for one hour and in the last five minutes of each hour the following variables were measured or calculated:

- 1) Ventilatory parameters [(Respiratory frequency (f), Tidal volume (V_T), Total minute ventilation (V_E), Rapid shallow breathing index (f/V_T), Inspiratory time and expiratory time, the ratio of inspiratory time over total respiratory cycle time (T_I/T_{TOT}), Peak airway pressure (Peak-Paw), Mean airway pressure (Mean-Paw), Dynamic compliance (C_{dyn}), Delta P (measured Peak-Paw – {CPAP+PS level}), Pressure-Time index (PTI), Ventilatory Efficiency derived from the formula($mean-Paw * V_T / peak-Paw$)].
- 2) Arterial blood gases (PaO_2 , SaO_2 and $PaCO_2$).
- 3) Clinical data (Mean arterial blood pressure (MAP), Heart rate (HR) and Signs of respiratory distress.

Results: Flow triggering was found to produce a significantly *lower* peak airway pressure, delta pressure and a *higher* mean airway pressure than pressure triggering, regardless of the sensitivity level and degree of pressure support. On the other hand, there was no significant difference between flow and pressure triggering regarding the V_T , V_E , f, or f/V_T ($p > 0.05$). The Inspiratory time in flow triggered breaths was slightly longer, with a lower T_I/T_{TOT} value, but these values did not reach significance ($p > 0.05$). The dynamic compliance was significantly higher in flow triggering mode ($p < 0.05$). Regarding the ABG, there was no significant difference between flow and pressure triggering as regards the PCO_2 , nor the SaO_2 , but in flow triggering, PaO_2 was significantly higher than in pressure triggering ($p < 0.05$).

Conclusions: Flow-triggering significantly improved patient ventilator synchrony as it provided favorable results belonging respiratory mechanics (Peak airway pressure, mean airway pressure, dynamic compliance, Δ pressure, pressure time index and ventilatory efficiency) on short term study during weaning from mechanical ventilation on pressure support mode in a group of patients recovering from acute respiratory failure who were mechanically ventilated with Nellcor Puritan Bennett 7200 and 840 and Galileo Gold machines.

Keywords: weaning from mechanical ventilation – pressure support ventilation – flow triggering – pressure triggering.