EVALUATION

Pros

• Results demonstrate that PAV™*+ mode can be an effective weaning mode.

• The approach used to titrate PAV™*+ mode in this study provides an objective method of manipulating %Support, which helps eliminate the subjective nature of setting the percent support and improves ease of use.

Con

• Small sample size

BACKGROUND

Proportional Assist™ Ventilation (PAV™*) is a ventilation mode that provides a level of respiratory support to the patient that is proportional to his/her effort. There is a proportional relationship between airway pressure and patient muscle pressure (Pmus) and, therefore, if the value of one parameter is known the other can be determined. PAV™* is the only mode of ventilation during which the clinician can obtain a noninvasive estimate of Pmus because airway pressure is a reported value from which Pmus can be determined.

RATIONALE

In its original form, PAV™* software required the clinician to calculate both elastance (or compliance) and resistance, and enter these values so appropriate calculations could be made. With the enhanced version, PAV™*+ software, these repeated measurements are made automatically. The clinician is required to set only the percentage of assistance (support) that the ventilator will provide to the patient. However, there remains a certain amount of trial and error on the part of the clinician when deciding on the appropriate level of support, especially for those new to PAV™*+ technology. The investigators for this study sought to eliminate the guesswork by adjusting the percentage support (gain) to target a range of Pmus,Peak values they considered to represent “normal or reasonable” levels of respiratory effort. The aim of this prospective observational study was to determine if such an objective method could be implemented safely and effectively to ventilate patients with PAV™*+ breath mode from the start to the withdrawal of mechanical ventilation.
METHODS

- 53 patients were ventilated with PAV™+ mode in ICUs at five university hospitals
- A simple algorithm was designed to adjust the gain during PAV™+ mode in order to target a reasonable and predefined range of respiratory muscle pressure.
  - An estimate of Pmus,Peak, was calculated based on this equation (Paw,Peak-PEEP) x [(100-%Support)/%Support]
  - Paw,Peak values are obtained from the ventilator
  - Example of the calculation of Target Pressure:
    - Peak Pressure = 20, PEEP 5, %Support = 70
    - Peak Muscle Pressure = (20-5) x ((100-70)/70) = 6.43
  - The gain or percentage support given by PAV™+ mode was adjusted to maintain Pmus,Peak between 5 and 10 cmH₂O
- Patients were assessed every eight hours or more frequently, if needed, to adjust ventilator settings

RESULTS

- 34 patients were ventilated with PAV™+ mode until extubation, which was successful in 32 of the 34
- In 91% of the cases, gain was adjusted just once per day based on the Pmus,Peak value, while in 9% of the cases gain was adjusted due to hypo/hyperventilation
- 18 patients required assist control ventilation (ACV) because of worsening clinical condition and the need for continuous sedation
  - Important to note, these patients had higher acuity scores and had spent more days under ACV when included in the study and, therefore, may not have been appropriate candidates for PAV™+ mode
- Patients spent 79% of their time within the predefined range of PTPmus (muscle pressure time product)

AUTHORS’ CONCLUSION

- This is the first study to examine the feasibility of titrating PAV™+ mode by using a predefined range of patient effort.
- Results indicate that adjusting the level of patient support provided by PAV™+ mode to maintain Pmus,Peak within a certain range is feasible, simple and often sufficient to ventilate patients until extubation.