



Mechanical Ventilation and Patient Safety

Donn SM*

Department of Neonatal-Perinatal Medicine, University of Michigan, USA

Editorial

Few clinicians would argue that mechanical ventilation is the mainstay of treatment for respiratory failure. In my clinical arena, the neonatal intensive care unit, thousands of newborns each year are successfully treated for respiratory failure secondary to respiratory distress syndrome, pneumonia, meconium aspiration syndrome, persistent pulmonary hypertension of the newborn, and other breathing disorders. I have been very fortunate, in that over the course of my career, I have witnessed the “technological evolution” of mechanical ventilation from the rudimentary time-cycled, pressure limited ventilator to the sophisticated microprocessor-based ventilator of today.

The advances in the technology have not come without a cost. The clinician is faced with a myriad of choices to provide disease-specific strategies which maximize benefit and minimize risk. While our knowledge and experience in treating complex diseases have improved, the problems which have not resolved are the inconsistencies that exist among the device manufacturers.

Marketing is certainly a key to successful sales. Each manufacturer strives to find something that is unique to its own device, often leading to a plethora of confusing and sometimes inaccurate terminology. This is especially concerning among inexperienced clinicians, who struggle to learn one system and may be confronted with another that is not exactly the same. I have often said to my fellows and residents that my fondest wish is to lock representatives from each company in a conference room and not let them out until they can agree on a standardized nomenclature. To this end, I whole heartedly endorse the system proposed by Chatburn et al. [1] for a mode of taxonomy for mechanical ventilation, in which modes of ventilation are specified according to the control variable, breath sequence, and targeting scheme. What one device refers to as volume targeting, using an accelerating-decelerating flow waveform [2] is different than what another device calls volume targeting using a continuous flow square waveform [3].

Similarly, graphic displays of pulmonary data, such as flow-volume loops, are drawn differently, and because interpretation of pulmonary graphics depends on pattern recognition, it is not surprising that it may take time for users to orient themselves to different displays when switching from one device to another. In neonatal applications another glaring inconsistency occurs if auto-scaling of axes is not available. Our patient population ranges from preterm infants weighing less than 500 g, to term or post-term infants who may weigh ten times as much. One size does not fit all. Manual scaling of axes takes experience and an understanding of fundamentals. Improper scaling can make “bad” graphics look good, or “good” graphics look bad. Proper scaling is imperative to the proper assessment of the wealth of information that graphics can provide. Some devices distinguish mechanical from spontaneous breaths, others do not. Some are enabled to collect trend data for longer than 24 h, some do not.

Lost in all of this inconsistency is the potential impact it has on the safety of our patients, who are dependent on life support. These patients are often moved, not only from one institution to another, but also from one device to another within the same institution. Shifting terminology, inconsistent data analysis, and varying displays may place patients at risk for ventilator-induced lung injury.

It is time that the industry comes together and develops standards for both nomenclature and displays. Maybe the locked conference room isn't such a bad idea after all.

References

1. Chatburn RL, El-Khatib M, Mireles-Cabodevila E. A taxonomy for mechanical ventilation: 10 fundamental maxims. *Respir Care*. 2014;59(11):1747-63.
2. Abubakar K, Keszler M. Effect of volume guarantee combined with assist/control vs. synchronized intermittent mandatory ventilation. *J Perinatol*. 2005;25:638-42.
3. Sinha SK, Donn SM. Volume controlled ventilator modes for the newborn: variations on a theme. *Clin Perinatol*. 2001;8:547-60.

OPEN ACCESS

*Correspondence:

Donn SM, Department of Neonatal-Perinatal Medicine, University of Michigan, C.S. Mott Children's Hospital, Michigan Medicine, Ann Arbor, Michigan, USA,
E-mail: smdonnm@med.umich.edu

Received Date: 25 Mar 2017

Accepted Date: 04 May 2017

Published Date: 12 May 2017

Citation:

Donn SM. Mechanical Ventilation and Patient Safety. *J Respir Med Lung Dis*. 2017; 2(2): 1014.

Copyright © 2017 Donn SM. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.