

THE UTILIZATION OF HIGH FREQUENCY PERCUSSIVE VENTILATION TO REDUCE EXTRACORPOREAL OXYGENATION MEMBRANE SUPPORT.

Kenneth Miller MEd, RRT-NPS
Lehigh Valley Health Network, Kenneth.Miller@lvhn.org

Lisa Lindauer MD
Lehigh Valley Health Network, Lisa_R.Lindauer@lvhn.org

James K. Wu MD
Lehigh Valley Health Network, james.wu@lvhn.org

Dave Marth RRT
Lehigh Valley Health Network, David.Marth@lvhn.org

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USING PROPORTIONAL ASSIST VENTILATION TO WEAN ADULT DIFFICULT-TO-WEAN PROLONGED MECHANICALLY VENTILATED PATIENTS.

Hassan A. Al Gazwi¹, Malak H. Al-Basha¹, Leila H. Al Jarodi²; ¹Respiratory Care Department, Dammam Medical Complex, Dammam, Saudi Arabia; ²Critical Care Department, Dammam Medical Complex, Dammam, Saudi Arabia

Background: Weaning is the process of liberating patients from mechanical ventilation (MV). 6% of ventilated patients are prolonged mechanically ventilated (PMV) and 20% to 30% are difficult-to-wean. The respiratory muscle function is an important determinant of success or failure of the weaning process. Proportional assist ventilation (PAV+) is a novel mode of MV that is designed to keep up the changing patient's breathing demand and lung mechanics, and unload respiratory muscles. **Objectives:** This study was designed to determine the effect of PAV+ on adult difficult-to-wean PMV patients. **Methods:** After multiple conventional weaning attempts of PSV had failed for eight adults, PMV patients who spent more than three weeks but less than three months on MV and were difficult-to-wean /failed SBT trials with PSV more than five times. We switched them to PAV+ mode using predetermined PAV+. Negative Inspiratory Force (NIF and Airway Occlusion Pressure (P 0.1) were measured throughout PAV+ trials. **Results:** Fourteen adult patients were included in this study. All patients were on tracheostomy tube. Ten of the patients with mean duration of MV was 53.2 days prior to PAV+ trial. On PAV+, NIF and P 0.1 measurements improved by 87% and 79% respectively from the baseline (Figure.1). They were successfully weaned off MV with an average weaning time of 5.8 days. **Conclusion:** PAV+ can be used safely and efficiently to wean adult difficult-to-wean PMV patients. PAV+ provides opportunity for a respiratory muscle to recover and strengthen, increasing the likelihood of weaning success.

Sponsored Research - None

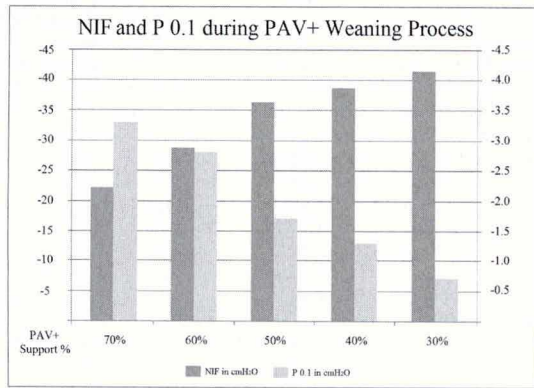


Figure.1: NIF and P 0.1 measurements throughout PAV+ trails.

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THE UTILIZATION OF HIGH FREQUENCY PERCUSSIVE VENTILATION TO REDUCE EXTRACORPOREAL OXYGENATION MEMBRANE SUPPORT.

Kenneth Miller, Lisa R. Lindauer, James Wu, David Marth; LVHN, Allentown, PA

To minimize the chance of ventilator induced lung injury (VILI), in patients who develop adult respiratory distress syndrome (ARDS), Extracorporeal Oxygenation Membrane (ECMO) is a common clinical intervention. The goal of venous-venous ECMO is to provide stable gas exchange, while the goal of the ventilator is to preserve the patient's pulmonary mechanics and minimize VILI. When ECMO parameters are maximized and gas exchange is marginal, often then the ventilator is called upon to help improve or maintain gas exchange often requiring high pressures and oxygen delivery (FIO2). An alternative strategy to meet this objective is to utilize high frequency percussive ventilation (HFPV) via the VDR-4 (Sandpoint, Idaho). HFPV provides both an endobronchial wedge via the percussive rate and an oscillatory plateau via the connective rate. With this strategy lower pressures and oxygen delivery can be employed and ECMO parameters can be often reduced. From Jan 2015 to Feb 2016 we utilized the VDR on fifteen V-V ECMO patients. Thirteen (86.7%) of fifteen patients both ECMO FIO2 and sweep were reduced with in twenty-four hours. (Table 1) HFPV pressures and FIO2 were maintain lower than 60% and airway pressures <40cmH20. (Table 1) Prior to placing on HFPV a pressure/tool measurement was performed to determine starting airway pressure and PEEP parameters to set on the VDR. Based on the above results, HFPV can help ECMO maintain gas exchange for patients at a lower FIO2 and sweep settings.

Sponsored Research - None

Patient	Pre ECMO FIO2%	Pre ECMO LPM	Post ECMO FIO2	Post ECMO LPM	VDR FIO2%	VDR PIP/PEEP cm/h20
1	100%	6lpm	70%	4lpm	40%	40/16
2	100%	7lpm	60%	5lpm	50%	38/20
3	100%	8lpm	80%	6lpm	50%	48/16
4	100%	7lpm	60%	5lpm	50%	38/18
5	100%	7lpm	100%	6lpm	90%	40/22
6	100%	9lpm	60%	6lpm	40%	40/18
7	100%	6lpm	70%	4lpm	40%	34/16
8	100%	6lpm	90%	4lpm	50%	38/18
9	100%	8lpm	60%	7lpm	40%	36/16
10	100%	7lpm	80%	5lpm	50%	40/18
11	100%	8lpm	90%	4lpm	50%	34/16
12	100%	7lpm	80%	5lpm	50%	40/16
13	100%	8lpm	60%	5lpm	40%	40/16
14	100%	8lpm	60%	6lpm	40%	38/14
15	100%	9lpm	100%	8lpm	90%	40/22

2510908

IMPLEMENTING A PHYSICAL THERAPY DRIVEN EARLY MOBILITY PROTOCOL SIGNIFICANTLY DECREASED HOSPITAL LOS OF PATIENTS ON MECHANICAL VENTILATION.

Kenneth Miller, Michael Pechulis, Rita Pechulis, Anne Rabert; LVHN, Allentown, PA

Historically, early mobilization in the ICU was common practice. Recent evidence indicates that reviving principles of early mobility within the intensive care unit (ICU) may decrease both ICU duration and hospital length of stay (LOS). Our goal was to determine if using a physical therapy (PT) driven early mobility protocol, along with early ambulation with mechanical ventilation, and with respiratory therapy assistance, would result in decreased ICU LOS, days on mechanical ventilation (MV) and hospital LOS at a university affiliated ICU. This study was granted IRB approved. Our study included all medical patients admitted to the Medical/Surgical ICU at Lehigh Valley Health Network, Allentown PA (n=1298). Surgical patients (n=101), patients without PT orders (n=478), patients readmitted to the ICU (n=33), patients transferred among multiple ICUs (n=38) and patients whose PT orders were not placed until after leaving the ICU (n=129) were excluded from the study. Patients ambulated with mechanical ventilation or high flow oxygen (n=36). For 10 weeks (intervention period) we increased the PT staffing ratio in the ICU from 0.7FTE/36 patients to 4 FTE/36 patients and compared this to the 10 week period prior to intervention (control group 1) and 10 week period post intervention (control group 2). We evaluated LOS in the hospital, LOS in the ICU and number of days on MV. See Table 1 for results In a post study analysis 23% of mechanically ventilated patients were mobilized on a given day. 86.6% of mechanically ventilated patients who were mobilized did activities in bed or dangled at edge of bed. 48.3% of mechanically ventilated patients who were mobilized did activities in bed. 11.7% of mechanically ventilated patients were ambulated. Physical Therapists are trained to identify somatic disorders and implement a plan of care that progresses a patient from debilitation to independence. Respiratory Therapists are trained to assess a patient's work of breathing and provide clinical interventions to maintain or reduce any increase in work of breathing. In this study of 486 patients, we found implementing a PT driven early mobility protocol significantly decreased hospital LOS. To optimize patient outcomes a multidisciplinary approach to patient mobility should be advocated, even in this era of scarce resources.

Sponsored Research - None

	Control group 1 n=147	Intervention group n=215	Control group 2 n=124
Hospital LOS	14.0 +/-13.1 days	10.6 +/-10.1 days p=0.01	12.0 +/-9.2 days
ICU LOS	6.4 +/-9.1 days	5.0 +/-8.0 days p=0.07	5.1 +/- 5.1 days
MV pts.	62	58	60
MV duration	10.0 +/- 10.6 days	6.9 +/-11.1 days p=0.06	6.4 +/- 5.6 days

53% of physical therapy work load was mechanically ventilated patients

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