The Utilization of a Mechanical Ventilation Weaning Protocol in the NICU To Reduce Ventilator Duration

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Indications for Mechanical Ventilation In NICU

- Respiratory Distress Syndrome- lack of surfactant production due to immaturity of lungs.
- Pneumonia- Patient develops bacteria filled fluid in their lungs.
- Atelectasis- collapse of a lung secondary to fluid or hypoventilation.
- Pulmonary Edema- Excess fluid in the lungs
- Surgical procedures- effecting the chest wall.
- Meconium Aspiration- Infant's first stool invades airway during birthing that results in massive inflammation.

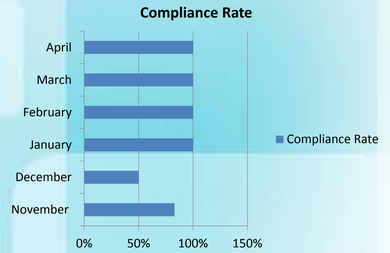
Problems Associated with Prolonged Use of Mechanical Ventilation In NICU

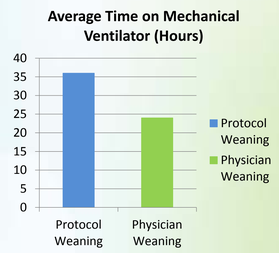
- Barotrauma- lung injury due to high pressures needed to expand the newborns the lungs.
- Volutrauma- Alveoli/bronchioles overinflate due to excessive air volume.
- Oxygen Toxicity- A high concentration of supplemental oxygen leading to inflammatory injury to the lungs.
- Hypotension- Positive pressure ventilation use can lower blood pressure.
- Lung over-inflation- abnormal increase in lung volume that can stretch the lung units.
- Pneumothorax- Liquid or gas that accumulates in the pleural space that collapse the lung units.
- Increased patient and institutional cost.

Methods of Weaning a Patient off a Mechanical Ventilator in NICU

- The weaning of mechanically ventilated patients in the NICU should begin as soon as they are clinically stable.
- Historically, weaning in the NICU has been physician directed.
- Based on current literature, it has been hypothesized that the utilization of a weaning protocol in the NICU will reduce time on ventilator and lower the likelihood of re-intubation.
- To determine the effectiveness and safety, it is important to track the length of time on mechanical ventilation and the number of patients who need to be put back on mechanical ventilation within 72 hours, thus considered to be a weaning failure.
- From November 2015 through April 2016, a mechanical ventilation protocol was utilized to determine if length of time on mechanical ventilation was decreased.
- Gestational age, birth weight, and other physiological cohorts were found to be similar in both test groups in the retrospective study.

Results/Discussion





- Based on the comparison of retrospective physician weaning, there was no significant difference in re-intubation rates in both groups. (n=1)
- Ventilation time was increased during the protocol weaning group (mean=36 hour, 36 minutes), compared to historical physician driven weaning. (mean=24 hours, 12 minutes)
- Protocol weaning pathway compliance was initially less than 100 percent, however the last 4 months we reached 100 percent compliance rate.
- These results may be due to the rigidity of the criteria, the birth weights may have been too low, or to the lack of a control over the conditions of the study.

CONCLUSIONS

1. Current evidence has demonstrated that weaning protocols are more effective than physician mediated weaning.
2. However our research did not result in a short ventilator duration after the implementation of a weaning protocol
3. The current protocol in place should be analyzed and assessed for potential modification
4. Future research should be conducted on the revised protocol to determine its impact on ventilator duration.