OUTCOMES OF INITIAL TIDAL VOLUME IN INTUBATED PATIENTS ON MECHANICAL VENTILATION IN THE EMERGENCY DEPARTMENT

ABSTRACT

While mechanical ventilation often serves as a life-saving intervention for patients with compromised respiratory capability, this critical intervention has also been highly associated with lung injury, adult respiratory distress syndrome (ARDS), and ultimately patient death. In this study, we correlated various ventilator settings with their associated patient outcomes, with the ultimate goal of preventing adverse consequences in patients on mechanical ventilation.

RESULTS

Table 1

<table>
<thead>
<tr>
<th>Total Volume (Average)</th>
<th>Emergency Department</th>
<th>Intensive Care Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.96 cc/kg IBW</td>
<td>6.92 cc/kg IBW</td>
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</table>

Table 2

<table>
<thead>
<tr>
<th>Total Volume</th>
<th>Survival to Hospital Discharge</th>
<th>Survival at 30 Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-8 cc/kg IBW</td>
<td>71.40% (20/28)</td>
<td>67.90%</td>
</tr>
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</table>

Figure 1: Tidal Volume Versus Survivability

The results demonstrate TV initiated in the ICU (6.92 cc/kg) did not differ greatly from that which was started in the ED (6.96 cc/kg), and provided a null hypothesis likely complicated by the fact few ARDS cases were reported. Only 15% of the patients were compliant with the settings standardized by the ARDSNet trial to prevent ARDS. The cause of respiratory failure had no statistical difference in survival to discharge, however when looking at survival to 30 days, infection portended an increased risk in comparison to obstructive, encephalopathic, and toxic causes. These results, though small in number, complicate the prior studies showing early initiation of low TV has improved outcomes and decreases risk of ARDS. Timing of TV initiation should be studied further as well as further delineation of tidal volume as potentially higher settings such as 6-7 cc/kg IBW may have similar outcomes to < 6 cc/kg IBW and may allow for more liberal ventilation strategies.

REFERENCES


ACKNOWLEDGEMENTS

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INTRODUCTION

Over the past 20 years there have been multiple advancements in mechanical ventilation support with a focus on low tidal volume strategies. Low tidal volume strategies (LTVS) have been shown to decrease ventilator-induced lung injury and prevent development and/or progression of Adult Respiratory Distress Syndrome (ARDS). However, the exact tidal volume and timing of low tidal volume strategies has not been clearly defined for patient outcomes. In this retrospective study, we investigated the initial tidal volume settings that were used for patients intubated in the Vidant Medical Center Emergency Department (ED) and placed on mechanical ventilation. These findings were subsequently used for patients intubated in the Vidant Medical Center Emergency Department and placed on mechanical ventilation strategies.

MATERIALS & METHODS

We performed a retrospective chart review on 184 patients during which we compared the initial tidal volume (TV) settings from intubations performed in the ED with primary patient outcomes, which included hospital survivability, 30-day mortality, and development of ARDS. Additionally, our findings were used to compare the mortality rates associated with common causes of respiratory failure and to evaluate whether TV settings were changed upon transfer to an intensive care unit (ICU). Our exclusion criteria omitted intubations performed outside of the ED.

DISCUSSION

While mechanical ventilation often serves as a life-saving intervention for patients with compromised respiratory capability, this critical intervention has also been highly associated with lung injury, adult respiratory distress syndrome (ARDS), and ultimately patient death. In this study, we correlated various ventilator settings with their associated patient outcomes, with the ultimate goal of preventing adverse consequences in patients on mechanical ventilation.

CAUSE OF RESPIRATORY FAILURE

Respiratory Failure Of Obstructive, Encephalopathic, Or Toxicogenic Origin Had Better 30-Day Survival Than Infective

We performed a retrospective chart review on 184 patients during which we compared the initial tidal volume (TV) settings from intubations performed in the ED with primary patient outcomes, which included hospital survivability, 30-day mortality, and development of ARDS. Additionally, our findings were used to compare the mortality rates associated with common causes of respiratory failure and to evaluate whether TV settings were changed upon transfer to an intensive care unit (ICU). Our exclusion criteria omitted intubations performed outside of the ED.