EVALUATION OF A NOVEL DEVICE TO DETERMINE TRACHEOTOMY TUBE CUFF PRESSURE

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ABSTRACT

Inadequate management of tracheal tube cuff pressures in mechanically ventilated patients can result in significant morbidity. Insufficient pressure allows for potential aspiration of secretions and resultant ventilator asynchrony. Elevated tracheotomy tube cuff pressures can cause long-term tracheal injury. Better control of cuff pressures may prevent morbidity in tracheotomized patients. Despite increased awareness of the dangers of cuff overinflation, this problem continues to occur. Studies have shown that determining appropriate cuff pressure by manual palpation is unreliable. The PressureEasy® Cuff Pressure Controller contains a green indicator to signify a cuff pressure between 20 and 30 cm H2O. The PressureEasy® Cuff Pressure Controller (PEC) was used in a previously established tracheal model. Four PEC devices were tested. Results: When the green indicator line was set at 30 cm H2O on the PEC, the average pressure reading on the SPG was 30.3±1.2 cm H2O (p < 0.05). With the indicator set at 20 cm H2O on the PEC, the SPG average pressure reading was 20.9±0.8 cm H2O (p < 0.05). Once the indicator was set at the midpoint, the average pressure readings (see Table 1) by the SPG at T0 were 27.4±0.8, 27.4±0.7, and 27.7±0.8 cm H2O (27.5±0.7 overall) in the Portex 7.0, 8.0, and 9.0 tracheotomy tubes, respectively. The difference between these readings and the PEC were statistically significant (p < 0.05). At T2, the average readings by the PEC were 24.3±1.2, 23.0±1.6, and 23.8±1.0 cm H2O (23.7±1.3 overall), compared to 25.1±1.8, 23.9±1.8, and 24.6±1.6 cm H2O (24.5±1.7 overall) by the SPG (p < 0.05). One-hundred percent (48/48) of all pressure readings at T0 and T2 were between 20 and 30 cm H2O when the indicator was set at the midpoint. Conclusions: The PressureEasy® Cuff Pressure Controller provides reliable estimates of tracheotomy tube cuff pressures between 20 and 30 cm H2O in the simulated tracheal model.

Table 1. Average tracheotomy tube cuff pressure readings (cm H2O) in three tracheotomy tubes using a standard pressure gauge (SPG) and the PressureEasy® Cuff Pressure Controller (PEC) at Time 0 and 2 minutes (Time 2).

<table>
<thead>
<tr>
<th>Tracheotomy Tube</th>
<th>SPG Time 0</th>
<th>PEC Time 0</th>
<th>SPG Time 2</th>
<th>PEC Time 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portex 7.0</td>
<td>27.4±0.8</td>
<td>25</td>
<td>25.1±1.8</td>
<td>24.3±1.2</td>
</tr>
<tr>
<td>Portex 8.0</td>
<td>27.4±0.7</td>
<td>25</td>
<td>23.9±1.8</td>
<td>23.0±1.6</td>
</tr>
<tr>
<td>Portex 9.0</td>
<td>27.7±0.8</td>
<td>25</td>
<td>24.6±1.6</td>
<td>23.8±1.0</td>
</tr>
</tbody>
</table>

Figure 1. PressureEasy® Cuff Pressure Controller (PEC), Medex, Carlsbad, CA

REFERENCES