The Utilization of High Flow Oxygen to Administer Inhaled Pulmonary Vasodilators in Post-Operative Left Ventricular Assist Patient Population to Facilitate Extubation

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Introduction

• Left ventricular assist device (LVAD) is an implanted mechanical circulatory support device utilized in patients with heart failure to enhance left ventricular function.
• Epoprostenol is a potent pulmonary vasodilator when delivered in inhaled form.
• High Flow Nasal Cannula can provide effective delivery of Epoprostenol.

Cardiac Function and LVAD

• With successful implantation of the LVAD, the right ventricle must increase work to match the left ventricular function.
• The utilization of Epoprostenol in the post LVAD patient has been beneficial in reducing right ventricular afterload by dilating the pulmonary vasculature.¹

Methods

• Historically, LVAD patients required mechanical ventilation in order to administer nebulized Epoprostenol for twelve to twenty hours post surgery.
• Often patients required unnecessary sedation and other interventions to maintain ventilation despite stable gas exchange and pulmonary mechanics.
• To address the issue of prolonged ventilation, patients who have stable gas exchange, hemodynamic status, and pulmonary mechanics were extubated and placed on high flow oxygen (HFO) * to complete the remaining administration of nebulized Epoprostenol.
• Nebulization was provided by the Aerogen®** placed prior to the humidifier (FP 850) via the Optiflow."³

Table 1

<table>
<thead>
<tr>
<th>Ventricular Duration Mean</th>
<th>Re-intubation</th>
<th>Age Range</th>
<th>Epoprostenol Hours</th>
<th>High Flow Oxygen Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-HFO (n=10)</td>
<td>16.4 hours</td>
<td>1/10</td>
<td>72-75 years</td>
<td>24 hours</td>
</tr>
<tr>
<td>Post-HFO (n=9)</td>
<td>6.3 hours*</td>
<td>0/9</td>
<td>67-73 years</td>
<td>24 hours</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>28 hours</td>
</tr>
</tbody>
</table>

* p<.05

Results

Compared to historical data the ventilatory duration of the LVAD patients was reduced by 9.7 hours without any noted complications. (Table 1)

Discussion

• Epoprostenol is utilized as a prophylactic therapy post LVAD procedure.
• High Flow Oxygen appears to provide a safe alternative delivery method for Epoprostenol administration and facilitates ventilatory liberation.
• More research needs to be conducted to determine true cause and effect of this intervention.

Conclusion

• Based on our clinical data high flow oxygen is a feasible option for providing the administration of an inhaled pulmonary vasodilator in order to facilitate ventilatory liberation.
• It is a safe and effective means for providing administration of nebulized pulmonary vasodilators.
• More research needs to be conducted in this method of aerosol therapy delivery.

References:


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