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

Kenneth Miller MEd, RRT-ACCS, AE-C;
Lehigh Valley Health Network, Kenneth.Miller@lvhn.org

Timothy S. Misselbeck
Lehigh Valley Health Network, Timothy.Misselbeck@lvhn.org

Barbara A. Ebert CRNP
Lehigh Valley Health Network, barbara_a.ebert@lvhn.org

Robert Allman RRT
Lehigh Valley Health Network, Robert.Allman_Jr@lvhn.org

Linda Cornman BS, RRT-NPS, RRT-ACCS, AE-C
Lehigh Valley Health Network, Linda.Cornman@lvhn.org

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Kenneth Miller, MEd, RRT-ACCS, AE-C; Timothy Misselbeck, MD; Barbara Ebert, CRNP; Robert Allman, RRT; Linda Cornman, BS, RRT-NPS, RRT-ACCS, AE-C

Lehigh Valley Health Network, Allentown, Pennsylvania

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.

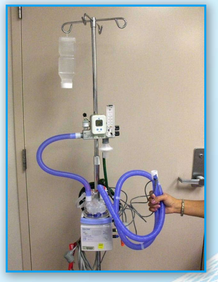
Cardiac Function and LVAD

- 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]

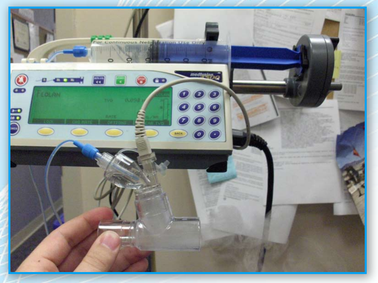
Methods

- 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 Aeroneb** placed prior to the humidifier (FP 850) via the Optiflow.[2,3]

High Flow Nasal Cannula Epoprostenol Administration



*Optiflow
Fisher-Paykel
Auckland, NewZealand



**Aerogen Aeroneb
Galway, Ireland

Results

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

Table 1

	Ventricular Duration Mean	Re-intubation	Age Range	Epoprostenol Hours	High Flow Oxygen Hours
Pre-HFO (n=10)	16.6 hours	1/10	72-75 years	24 hours	0
Post-HFO (n=9)	6.9 hours*	0/9	67-73 years	24 hours	28 hours

* p<.05

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.

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