

**HFNC AS A RESCUE STRATEGY FROM ENDOTRACHEAL MECHANICAL VENTILATION IN A PEDIATRIC PATIENT WITH CARDIOMYOPATHY IN HEMODYNAMIC AND RESPIRATORY FAILURE.**

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**INTRODUCTION:** A seven year old male with a previous diagnosis of cardiomyopathy palliated with orthotopic heart transplantation (OHT) now presenting in hemodynamic and respiratory failure after a three week history of general weakness, abdominal pain, decreased appetite, and SOB during activity. He was admitted for an endocardial biopsy at Children's Healthcare of Atlanta. His initial SpO2 on a 2 LPM NC were 80% and increased to 90% after a Xopenex aerosol. He was placed on a 15 LPM NRM and transferred to the CICU. Upon admittance, he was noted to be tachypneic with a RR of 68 BPM, tachycardic at 135 BPM, and obtunded. Initially the SpO2 on the NRM was 90% and the VBG from a right femoral central line was a pH of 7.32, PvCO2 of 42, PvO2 of 47, a base deficit of -4 with a HCO3 of 21, a calculated SvO2 of 79%, and a H/H of 10.9/32. The CVP was 20 mmHg and systemic blood pressure via cuff was 92/68/72 mmHg. He was on a Milrinone at 0.5 mcg/Kg/min for inotropic support. ECHO and cath data both confirm severe tricuspid valve (TV) insufficiency, decreased right ventricular function, and a severely dilated right ventricle (RV).

**CASE SUMMARY:** The patient was placed on a HFNC via the Vapotherm Nasal Cannula System (Vapotherm, Stevensville MD, USA) at 30 LPM and 100%. IV diuretics were started (lasix and diuril) for enhanced fluid and hemodynamic management. The initial chest radiograph revealed RML and RLL infiltrates. Broad-spectrum antibiotics for both gram negative and positive coverage were initiated.

CICU HR	MODE/ FiO2	HR	RR	CVP (mmHg)	LACTIC ACID (g/dl)	UOP (cc/Kg/Hr)
0	NRM / 100%	135	64	20	27.7	
6	HFNC/100%	119	40	12	15.0	
14	HFNC/100%	122	50	7	10.8	1.3
24	HFNC/100%	110	45	8	12.2	4.7
30	HFNC/100%	109	36	3	9.2	7.0

The chest radiograph at CICU hour # 18 revealed a resolution of the pulmonic process in the RML / RLL and an 8 -10 rib expansion with an enlarged cardiac silhouette.

**DISCUSSION:** The decision to attempt a HFNC strategy before intubation and conventional mechanical ventilation (CMV) proved to be effective in medical management of the patient's impending respiratory and hemodynamic failure. The sequela of endotracheal ventilation, pharmacologic paralysis-sedation-analgesia, and immunosuppression are well-known and documented repeatedly in both literature and in evidence based medicine. Positive pressure without instrumentation is also documented well in literature and in practice with positive outcomes and possible decreased length of ICU stay. Meeting the patient's flow requirements was easily achieved with modest flow through the HFNC device without elaborate head gear needed for bi-level support. This strategy of early and proactive use of a HFNC strategy needs to be studied further as another tool in the critical care's arsenal of interventions.