

HIGH FLOW NASAL CANNULA APPLICATION IN TREATMENT OF A SEVERE ASTHMA EXACERBATION

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Introduction: Severe airflow limitation with asthma exacerbations occurs as a result of bronchoconstriction, airway edema and/or mucous plugging leading to dynamic hyperinflation¹. Our goal was to provide a noninvasive approach to reduce the patient's work of breathing (WOB).

Case Summary: A 31 year old asthmatic male presented with increasing cough, wheezing and dyspnea. Initial assessment revealed signs of acute respiratory failure: noticeable use of accessory muscles, RR 30, predominantly silent chest with faint expiratory wheezes and prolonged expiratory phase. Peak flows were 32% of predicted and SpO₂ on 4 lpm N/C was 91%. Five days post admission despite the appropriate use of steroids and frequent bronchodilator therapy via small volume nebulizer SVN, the patient's condition showed no improvement.

He was placed on a Fisher & Paykel Optiflow high flow nasal cannula at 15 lpm. We observed decreased use of accessory muscles, a shortened expiratory phase and RR 20. Although breath sounds were unchanged the patient stated some subjective relief. An 80/20 heliox mixture was added to the HFNC in lieu of oxygen. The patient demonstrated an immediate alteration in vocal sounds, RR 12 and further reduction in accessory muscle use. Auscultation revealed increased aeration/wheezing and additional subjective relief noted by the patient. He was weaned off of the HFNC and heliox within the next 24hrs.

Discussion: The application of HFNC lessened dyspnea in this patient, most likely due to the positive pressure generated by increasing flow

rates.² This phenomenon has been clearly described in pediatrics and more recently demonstrated in adult volunteers.^{3,4} Heliox administration through the HFNC may further reduce WOB by lowering airway resistance as a result of more laminar flows thereby improving ventilation. Other benefits include warmed humidified gas, improved particle distribution afforded by the use of heliox as the carrier gas, and improved aerosol delivery via HFNC with the Aeroneb Solo VM nebulizer.

REFERENCES:

1. Stather DR, et al, Clin Rev: Mech Vent in Severe Asthma: Crit Care 2005 9(6) 581-587
2. Polston, Steve T. RRT, Walsh, D.W., Sikes, K. L, Kim, I, MD,. Back Press Comp in 3 Medical Gas Delivery Syst
3. Byerly FL, et al. Use of HFNC on a Pediatric Burn Patient *½ Burns* 32 2006 121-125
4. Chatila W, et al. Effects of High-Flow vs Low-Flow O₂ on Exercise in Adv Obst Airway Dis. Chest 2004:126;1108-1115