

COMPARISON OF AEROSOL DELIVERY WITH THREE HIGH FLOW NASAL CANNULA BRANDS AND SIZES.

Darlene Pacocha¹, Tina Thayer¹, Patricia A. Dailey², Greg Gagnon³; ¹Respiratory Care, Baystate Medical Center, Springfield, MA; ²Clinical-Medical affairs, Aerogen Ltd., Galway, Ireland; ³Clinical Engineering, Baystate Medical Center, Springfield, MA

Introduction: The effect of flow on aerosol delivery through high flow nasal cannula (HFNC) has been described in the literature; however a comparison of brands and sizes of adult cannulas has not been reported. We hypothesize that cannula brand and size will affect aerosol delivery during HFNC use. **Method:** A vibrating mesh nebulizer (Aerogen Solo) was placed at the inlet (dry side) of the humidifier (Fisher & Paykel) and attached to a heated wire HFNC circuit with Fisher & Paykel (F&P), Intersurgical with Resmed (IS), and Flexicare (Flx) adult nasal cannulas in small, medium and large sizes. Cannulas were seated in a loose orifice (simulating nares) and attached to an absolute filter positioned above the circuit to collect aerosol and a T-shaped collection trap beneath. This apparatus was connected to a breath simulator (Harvard Apparatus, Holliston, MA) with adult settings (V_T : 500 mL, Respiratory Rate: 12 breaths/min, I:E Ratio: 1:2). Albuterol sulfate (0.083% 2.5 mg/3 mL) was administered via the vibrating mesh nebulizer with each nasal cannula size and type at 10, 30 and 50 L/min flow (n=3). Drug was eluted from filter and assayed (276 nm). One-way ANOVA ($p < .05$). **RESULTS:** Inhaled percent of dose (mean \pm SD) in figure show differences between sizes and brands across the flows. At 30 and 50 L/min Flexicare large cannula delivered more drug than F&P and IS ($p < 0.001$). **Conclusions:** During HFNC, selection of the brand and size adult cannulas can impact aerosol delivery across all flow rates tested. Further studies are needed to assess impact of such aerosol deposition differences on clinical outcomes.

Sponsored Research - Aerogen provided funds for the research

