

## **VAPOTHERM: A NOVEL HIGH-FLOW OXYGEN DELIVERY SYSTEM**

Melanie L. Guerrero, MD\*; Brian M. Cuneo, MD; Oleh W. Hnatiuk, MD; Andy Shorr, MD. Walter Reed Army Medical Center, Washington, DC

**PURPOSE:** Vapotherm is a novel oxygen delivery system capable of flow rates of 40 l/min. Unlike non-rebreather (NRB) systems, Vapotherm uses a nasal canula, allowing patients to talk and eat while receiving high-flow oxygen. We sought to compare the efficacy of NRB masks and Vapotherm at increasing arterial oxygen levels.

**METHODS:** We conducted a prospective, randomized trial comparing Vapotherm to NRB masks in patients with advanced lung disease. All patients were clinically stable at time of enrollment. After obtaining a baseline, room air blood gas (ABG) subjects were randomly assigned to receive oxygen with either Vapotherm or through a NRB mask. The Vapotherm was set to 40 l/min for oxygen delivery while the NRB was calibrated to deliver 100% oxygen. After 60 minutes of the first intervention a second ABG was obtained. Prior to crossing over to the alternative system, patients breathed room air for an additional 60 minutes. An ABG was obtained after this washout period to document return to baseline values. The primary study endpoint was the arterial oxygen tension with each intervention.

**RESULTS:** The study cohort included 14 male patients (mean age  $60 \pm 5.2$  years, 12 with COPD and 2 with idiopathic pulmonary fibrosis). The mean baseline room air oxygen tension was  $68.9 \pm 6.6$  mmHg. With the NRB the mean arterial oxygen level increased to  $389.1 \pm 82.9$  mmHg ( $p < 0.0001$  vs. baseline) and with Vapotherm the level measured  $375.1 \pm 69.4$  mmHg ( $p < 0.0001$  vs. baseline). The difference between oxygen levels while breathing through the NRB mask and the Vapotherm device were not statistically significant ( $p = 0.62$ ). Neither the  $p\text{CO}_2$  nor the arterial pH appeared altered by either delivery mechanism.

**CONCLUSIONS:** Vapotherm is as effective as a NRB mask at delivering high-flow oxygen.

**CLINICAL IMPLICATIONS:** Since Vapotherm appears to provide oxygen as efficaciously as a NRB mask and better tolerated than a NRB mask, broader use of Vapotherm is warranted.

**DISCLOSURE:** M.L. Guerrero, None.