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COMPARISON OF DELIVERED FIO2 AT TWO DIFFERENT FLOWRATES USING THE PULMANEX® HI-OX 80® OXYGEN MASK

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Background: The Pulmanex Hi-Ox 80 Oxygen Mask (Summit Technologies, Canada) is a disposable mask with low resistance valves and reservoir bag. According to the manufacturer's website, it is capable of producing an FIO2 of >80% at 8 L/m and >99% at 15 L/m of oxygen flow. A previous study performed at our institution found that the Hi-Ox 80 mask at 8 L/m produced a mean FIO2 of 72% (SD 11%). In this study, we sought to determine the mean FIO2 at 15 L/m and compare it to the previous study. Methodology: After obtaining IRB approval from our institution, we recruited 15 healthy adults with a mean age of 23.8 years into our study. All participants were required to be less than 35 years of age, have a DLCO value of 90% of predicted or greater, be a non-smoker, and have no history of lung disease. Individuals meeting these criteria were then seated, placed on a tight-fitting Hi-Ox 80 mask at 15 L/m, and were instructed to relax, breathe normally, and not talk for a period of 15 minutes. During the testing period, all subjects were observed to perform quiet, restful breathing. At the end of the fifteen minute period, we performed a radial artery blood gas and measured pH, PaCO2, and PaO2 using a GEM 3000 blood gas analyzer. No air bubbles were observed in any of the syringes and all samples were analyzed within five minutes. Assuming that our young, healthy subjects had normal cardiopulmonary anatomy and physiology, we estimated PAO2 by dividing PaO2 by a normal a/A ratio of 0.9 to reflect a ten percent higher partial pressure of oxygen in the alveoli than in arterial blood. Knowing approximate PAO2, we then calculated FIO2 by the following formula: FIO2 = [(PaO2 ÷ 0.9) + (PaCO2 x 1.20)] ÷ (PB - 47). Results: The mean PaO2 produced by the Hi-Ox 80 mask at 15 L/m was 458 mmHg. This resulted in a mean calculated FIO2 of 80.7%. Results from the previous 8 L/m study and the current study were tested for normal distribution and then a paired t-test was performed. The test showed that there was a statistical difference in delivered FiO2 between the two flowrates with a p value of 0.048. When subjects from the 15 L/m group with PaCO2 values < 35 mmHg were removed (n=9), the mean FiO2 increased to 86%. Conclusion: Although the mean FIO2 at 15 L/m did not reach 99% as suggested by the manufacturer, it did

effectively increase FIO2 to a high level. Increasing the flowrate from 8 to 15 L/m produced a statistically significant increase in delivered FiO2. Sponsored Research - None