Long term oxygen therapy (LTOT) for patients with hypoxic chronic bronchitis and pulmonary disease? has been shown to positively impact longevity and reduce repeat hospital admission rates from exacerbations. While it cannot prevent deterioration of lung function, when titrated appropriately, oxygen therapy stabilizes arterial blood gases, $PaO_2$. Pulmonary hypertension with resultant right-heart failure is a significant complication of LTOT. Given the impact on at-home care-giving and the lack of literature that is both important and conclusive, a study was conducted to evaluate the accuracy of molecular sieve oxygen concentrators at varying flow rates.

**Abstract**

Evaluation of Molecular Sieve Oxygen Concentrators at Varying Flow Rates

**Introduction:**

Inhalation oxygen therapy is employed to maintain arterial oxygen saturation $\geq 90\%$ and the appropriate response recorded. In patients requiring increased arterial oxygen concentrations, intermittent or nocturnal LTOT is employed. One of the challenges patients face is the variability of oxygen delivery. To the best of our knowledge, a study has not been conducted in the last 19 years in order to achieve desired arterial and pulsatile oxygenation.

**Methods:**

Oxygen concentrators used in this study were: Invacare Perfecto 2, Respironics Everflow, Respironics Millenium, and the Airsep VisionAire. In conjunction, the accuracy of the oxygen concentrator, as compared to the manufacturer's claims, was determined.

**Results:**

The FiO$\_2$ concentrations were sampled every 5 minutes, for 15 hours at each flow rate (2, 3.5, and 5 LPM). Before testing the FiO$\_2$, baseline respiratory values were as follows: respiratory rate 18 breaths/minute, percent inhale 20%, effort slope of 4, and Amplitude 23 cmH$\_2$O. The oxygen concentrators used in this study were: Invacare Perfecto 2, Respironics Everflow, Respironics Millenium, and the Airsep VisionAire. For each concentrator evaluated remained consistent for each flow rates, with the standard deviation for each concentrator ranging from 0.40 to 0.59. Although some minor variation from indicated flow rates, the subsequent repercussions can be mitigated through the use of appropriate devices and protocols.

**Conclusion:**

The accuracy of the oxygen concentrator, as compared to the manufacturer's claims, will be determined. The maximum deviation around the mean output was observed, it was clinically negligible. Measured standard deviations were all less than 0.6%. Although some minor variation from indicated flow rates, the subsequent repercussions can be mitigated through the use of appropriate devices and protocols.

**References:**

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