

## **Case Report: Alpha – 1 Antitrypsin Treatment with Vapotherm During Exercise**

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**Introduction:** Alpha 1-antitrypsin (AAT) deficiency is one of the most common inherited disorders among Caucasians. One of the primary manifestations is early-onset panacinar emphysema. AAT leads to poor gas exchange and inadequate SaO<sub>2</sub> levels. Supplemental oxygen is usually required. Pulmonary rehab followed by lung transplant for AAT is the medical regimen for selected patients. We describe a case where supplemental oxygen delivery during rehab was improved with Vapotherm. **Case presentation:** A 50 yr.-old female with AAT was in our rehab program for pre-lung transplant evaluation. During her initial six minute distance walk (6MDW) evaluation she used 6-LPM oxygen via nasal cannula. SpO<sub>2</sub> at rest was 93% and on exertion decreased to 85% in less than 2 minutes at a distance of 160 feet. Using a partial rebreathing mask at 12-LPM her SpO<sub>2</sub> was 92–94% completing 6MDW at 320 feet. Patient had to rest approximately 1 minute for every minute she walked due to dyspnea. Patient stated that the nasal cannula created dryness in her nose and the mask was cumbersome, uncomfortable and limited her activity. She was switched to Vapotherm high flow cannula at 24-LPM, 60% FiO<sub>2</sub>, and 100% relative humidity. Using Vapotherm, patient completed 15-minute treadmill therapy at 0.7 mph maintaining SpO<sub>2</sub> at 91% without a rest period. Subsequently, using Vapotherm, she completed 50 minutes of aerobic exercise: 20 min at 0.9 mph on treadmill, 15 minutes of recumbent bicycling, and 15 minutes of upper body ergometer with SpO<sub>2</sub> at 88 – 91% and heart rate 110 – 120 bpm. **Discussion:** Vapotherm was able to adequately provide supplemental oxygen with a significant increase in comfort. In addition, the patient perceived a decrease in work of breathing and increased exercise tolerance. Pulmonary rehabilitation is a key component for the successful outcome of lung transplantation. The staff was able to demonstrate the ability to increase the workload with Vapotherm. Our rehab team recommends the use of Vapotherm as an adjunct to exercise in the home to maximize function and maintain conditioning in preparation for lung transplant in patients requiring high concentrations of O<sub>2</sub> to maintain gas transfer.