COPD and Chronic Respiratory Failure Management: Improving Outcomes and Reducing Readmissions with the Life2000h Ventilator by Combining Ventilation with Ambulation

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Introduction
Chronic Respiratory Failure (CRF) and COPD are major burdens to the US healthcare system, both clinically and economically. COPD is the third leading cause of death in the US, and affects an estimated 24 million Americans, with approximately only half currently diagnosed. Exacerbations and hospital readmissions account for nearly 70% of the $36 billion that is spent treating COPD annually.¹

Increased activity provides clinicians with an opportunity to improve COPD care. Activity outcomes in COPD patients have been studied for over 20 years, and have shown as much as a 40% reduction in hospital admissions and respiratory mortality by increasing patients’ activity an average of 2 hours per week.² While clinically beneficial, sustained activity is often difficult for patients with CRF consequent to COPD to achieve. CRF symptoms such as severe dyspnea, high work of breathing, and oxygen desaturations often prevent patients from realizing functional activity gains.

Patient Background
“Peg” is one such patient, and is the focus of this case study. Peg is a fifty-seven-year-old, Caucasian female diagnosed with CRF consequent to COPD, with a history of hospitalizations and declining lung function dating back to 2011. She was enrolled in the pulmonary rehabilitation program at PeaceHealth United General Hospital in Sedro Wooley, WA in February 2014. She completed the program and could walk 321 meters, while on 3 lpm of oxygen. She continued to practice her pulmonary rehabilitation exercises to the best of her abilities, and utilized oxygen at 2 lpm at rest and 3-4 lpm with exertion.

However, as of December 2015, her PFT results indicated a FEV₁ of 16% and FVC of 36% of predicted. During an exacerbation hospitalization in early 2016, her physician informed Peg that she most likely only had 3-4 months to live. She was discharged home on a Trilogy ventilator with a 4 lpm oxygen bleed-in and instructed to wear the device nocturnally and as needed during the day. Peg wore the ventilator while asleep and nearly continuously during the day, while seated in a chair. While helpful for ventilatory support, the size and weight of the ventilator, mask, and supplemental oxygen source prevented Peg from being able to be active and relegated her to a sedentary lifestyle of either lying in bed or sitting in a chair.

Treatment Recommendation
After two months of inactivity, due to her dependency on her nocturnal ventilator, Peg sought out other treatment options. Her home oxygen and respiratory management provider, Norco Medical, working in conjunction with PeaceHealth’s pulmonary rehab department, recommended incorporating a Breathe NIOV device into her plan of care. Her physician agreed, and Peg was setup with a NIOV™ device for daytime use. She was later upgraded to Breathe’s new Life2000h™ ventilator, which allows for higher volumes, flows and optional PEEP support.

This FDA-cleared, one-pound, palm-sized, wearable, life-support ventilator delivers a high mixture of oxygen and air through an unobtrusive nasal pillows interface, working to support patients that require mechanical ventilation. The open ventilation system unloads respiratory muscles by providing positive pressure and augmenting the patient’s tidal volume.³ Published data that supports the efficacy of Breathe ventilators demonstrates that the devices reduce dyspnea (shortness of breath), increase oxygenation, enhance exercise endurance, and reduce work of breathing. The devices feature three volume settings that allow patients to select different volumes throughout the day as their respiratory needs change—from lower support while relaxing at home to higher levels of support while exercising.

Peg was titrated on the ventilator by Norco Medical’s respiratory therapist, and placed on final prescription volume settings of 180 ml, 200 ml, and 280 ml to meet her ventilation needs at low, medium, and high activity levels, respectively. These volumes helped to maintain her SpO₂ levels between 95%-98% with activity.

Outcomes Following Treatment Change
Peg has completed over six months of therapy on a Breathe ventilator. She sleeps on her Trilogy and immediately switches to her Life2000h once awake. The low profile Breathe Pillows Interface™ prevents the development of mask-related nasal bridge pressure ulcers, despite many hours of continuous daily use, and combined with the open ventilation system, Peg can talk and interact more with friends and family. The ventilator’s small size and wearable form factor have allowed Peg to increase her functional activity levels, including re-engaging in some light gardening, and enabling her to take walks around her rural property. Her Norco Medical and PeaceHealth care teams...
have noticed improvements in her overall skin coloring and a noticeable strengthening in her voice and ability to speak. She has also been able to start driving again, which has increased her feeling of independence. She was recently re-enrolled in United General Hospital’s pulmonary rehabilitation program, and is utilizing her Life2000h ventilator while exercising.

Since beginning therapy, Peg has not experienced an ER visit due to an exacerbation or required a hospital admission. “It is incredible to see a patient this fragile not experience an ER visit or admission, given that she was exacerbating several times per year. It is important for her quality of life as well as the healthcare system to see a meaningful way to reduce the risk of a readmission,” said Kelly Shepard, Peg’s respiratory therapist at PeaceHealth.

When asked how the Life2000h has made a difference in her life, Peg emphatically states, “I honestly believe that I would not still be alive today without the help to breathe that this machine provides to me every day. Since I have started on the Breathe device, it has felt like the difference between living and simply existing.”

References

