Abstract 6658

Improved 6MWT distance with a highly portable non-invasive ventilator

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Rationale: Patients with chronic lung disease frequently exhibit dramatically reduced capacity for exertion. Although exercise tolerance can be improved with positive pressure ventilation (e.g., Bilevel mask based ventilation), poor portability and cumbersome patient interfaces have limited the adoption of ambulatory non-invasive ventilatory support in chronic lung disease beyond the research setting. Therefore, a truly portable ventilatory support system with a comfortable, unobtrusive patient interface could play a valuable role as an adjunct therapy for chronic lung disease by improving exercise tolerance.

Methods: A portable ventilator weighing less than one pound was used in combination with a low profile, non-invasive, nasal patient interface and a compressed oxygen gas source. This is an investigational device developed by Breathe Technologies that is not commercially available. Pulmonary rehabilitation patients were enrolled in a prospective trial designed to test whether patients were comfortable and could speak during a one hour exposure to therapy with this ventilator system at rest, whether patients could ambulate with the ventilator triggering effectively, and how the patients tolerated the therapy during a six minute walk test (6MWT) in comparison to nasal cannula oxygen. Dyspnea was measured using the Borg dyspnea scale and comfort was assessed with a visual analog scale. Triggering was assessed using continuous recording software. There was a 40 minute rest between the control and experimental walks. Overall oxygen flow rate in the control (via nasal cannula) and experimental walks was matched as closely as possible.

Results: Six patients with oxygen dependent lung disease were exposed to 1 hour of therapy with the ventilator and subsequently performed 6MWTs both on and off the ventilator. All 6 patients tolerated one hour of use with the ventilator with no complaints, and with stable dyspnea and comfort scores. 5 of the 6 patients had improved 6MWT distance when using the ventilator. The mean improvement was 57 meters with a standard deviation of 54 meters.

Conclusion: The experimental portable ventilator and low profile non-invasive interface can be used comfortably by patients at rest and during exertion. There is a trend toward a significant improvement in 6MWT distance with this ventilator system. Additional studies are needed to fully establish that the ventilator improves exercise tolerance in patients with chronic lung disease. Further research is also needed to determine whether the lightweight design and low profile interface will facilitate patient adoption in the ambulatory setting.