

Using the PRVC Mode at Home with the iVent 101



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I have been a homecare respiratory therapist (RT) for 17 years, working mainly with home ventilator patients for the past 11 years. I have worked with many different kinds of patients, but for some reason I have always felt a very special connection to ventilator users and their caregivers. We work well together – from navigating the difficult maze of getting home for the first time after receiving a tracheostomy and being placed on mechanical ventilation to everyday living with equipment, disposable supplies, staffing, training, etc.

Last year one of my young adult patients was no longer tolerating the synchronized intermittent mandatory ventilation (SIMV) mode of ventilation due to high airway pressures (30-50 cmH₂O). The high pressure setting was being reached too often, and this would make the tidal volume too small. The reason for this was that the patient had very stiff lungs (low compliance) due to chronic obstructive pulmonary disease (COPD), although patients' lungs can become stiff for other reasons such as pneumonia.

This patient had been placed on mechanical ventilation in 2004 (for progressive neuromuscular disease with COPD that was causing respiratory failure) but had been trached for a few years before that. The ventilator was set on the SIMV mode at night, and heated aerosol (humidification that goes through a tube and trach mask to the trach tube) was used during the day if possible.

Lung compliance gradually worsened over the years until spring of 2010 when the ventilator began constantly alarming at night from high pressure. This was making the patient too tired to go on the heated aerosol during the day. He was hospitalized and placed on the ICU vent in the pressure-regulated volume control (PRVC) ventilation mode used regularly by our ICU and showed improvement almost immediately.

After about a week on intravenous antibiotics and rest on the PRVC mode ventilator, I was called in to begin the transition to the home ventilator. When I tried placing the patient back on the home vent with the SIMV mode (or any mode), it became obvious that the high pressure alarming was going to continue. This patient's lungs were just not the same anymore; they were going to remain stiff (less elastic).

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Interestingly, as soon as the patient was placed back on the ICU ventilator, he visibly calmed down and became comfortable again. This was going to be a real problem because no home care vent from any company had the PRVC mode available, and this was clearly what this patient needed. So it was time to get creative. We ended up alternating between the SIMV mode for two hours (with a lot of high pressure alarming) and then straight pressure support mode for two hours (to rest from high pressures and anxiety).

The patient was discharged – with some very nervous caregivers – on these settings because the only other option was to stay with the PRVC vent in the ICU, and for this patient and family that was not an option.

The family and I looked online for any new ventilator that could come close to offering the PRVC mode. Instead we found one with PRVC: the VersaMed iVent 101® Expert model from GE Healthcare. www.gehealthcare.com/respiratorycare.

My first step was to explain all of this to my manager to obtain permission to move forward. The next step was to get the information to the patient's doctor and review the ventilator specifications together.

The doctor asked me to bring the vent to him as soon as it arrived. GE flew a clinical specialist out within two days, and after my in-service training, we brought the iVent 101 to the doctor's office where he looked it over and wrote the orders.

The patient was placed on the iVent 101 on the PRVC SIMV mode, and within two or three minutes he looked up and started to smile from ear to ear! Breathing was easy. No more alarms! The clinical specialist and I also shared a knowing smile. It is moment



iVent 101

that I will always remember. That patient's quality of life went from barely tolerable to really living again in less than three minutes.

One very important benefit of the iVent 101 is that it can be used in the earliest stages of neuromuscular disease because it can be used noninvasively as well as invasively so that patients do not need a new machine for every stage of their disease. This means less training for the patient and caregivers.

The iVent 101 provides many modes: CPAP, bilevel with adaptive flow, pressure support, volume control, pressure control, assist control and, last but certainly not least, PRVC. PRVC is not needed for every patient, but for this patient it provided a better quality of life and a way to stay in his own home.

It was helpful that my employer, Mercy Health System, actually lives by its mission statement and gives me the opportunity to work with cutting-edge technology when it is needed. It was easy with this ventilator because the cost involved was also not prohibitive.

Every day I am witness to the hard work and tenacity that living at home with a ventilator requires. I know that I am, indeed, very lucky to be able to work with these individuals and the people who stand by them. ▲

What is PRVC and how does it work?

Pressure Regulated Volume Control ventilation (PRVC) is a dual ventilation mode that combines the best features of pressure control ventilation and volume control ventilation. Breaths are delivered mandatorily to assure target volumes, with an inspiratory pressure continuously adapting to the patient's condition. The breaths can either be ventilator initiated or patient initiated. With this patient, the PRVC mode of ventilation decreased the patient's work of breathing and was a gentler way to ventilate stiff (non-compliant) lungs.