

The Importance of Pacing Patient Weaning Trials

Case Study
PAV™+ software
option for the Puritan
Bennett 840™ ventilator

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Profile

This case involves a 69 year-old caucasian male patient with a history of metastatic sarcoma to his left femur. The primary origin of the cancer is unknown. He has been on a Puritan Bennett 840™ ventilator for

12 days post resection and femoral replacement. The patient has a history of COPD. He was a single pack smoker for more than 40 years but stopped tobacco use six years ago.

Clinical Course

The patient started to wean from synchronized intermittent mandatory ventilation (SIMV) to pressure support ventilation (PSV) on Day 3. At the time, the patient was alert, oriented and responding appropriately. After three hours of PSV, the patient would tire. His respiratory rate and blood pressure would increase, and patient was showing obvious signs of respiratory distress, defined at our facility as "increased respiratory rate greater than 10 breaths per minute above the patient's normal rate, along with increased blood pressure or with an increased heart rate greater than 30 beats per minute (bpm) above the patient's normal rate." Due to the respiratory distress, the patient was placed back on SIMV and he rested for the remainder of the day.

PSV trials continued through Days 4 and 5 with the same outcome of respiratory distress after several hours, and a return to SIMV. On Day 6 we initiated proportional assist ventilation using the PAV™+ software option on the Puritan Bennett™ 840 ventilator. The patient was placed on 60% Support (assist) and he went 15 hours with no signs of fatigue. The Work of Breathing (WOB) bar on the software remained between the 0.3 and 0.7 J/L threshold, and the patient was placed back on SIMV for the night.

On Day 7, the patient was placed back on the PAV+ software at 60% Support where he remained for 24 hours without any signs of respiratory distress. Arterial blood gas (ABG) showed pH 7.36, PCO₂ 38 mm Hg, PO₂ 86 mm Hg. On Day 8, the patient progressed down to 40% Support on the PAV+ software without any problem.

Weaning continued on Day 9 with the patient modulating between 30% Support and 40% Support. When the patient's WOB would increase, the degree of assist (%Support) would also be increased to keep the patient within the 0.3 to 0.7 J/L threshold. The patient rested on 50% Support throughout the night without difficulty.

On Days 10 and 11, the patient was weaned from 40% Support to 30% Support with no distress noted. ABG results showed pH 7.35, PCO₂ 44 mm Hg, PO₂ 88 mm Hg.

Finally, on Day 12, the patient was weaned to 20% Support where he remained for four hours. ABG results were pH 7.34, PCO₂ 46 mm Hg, PO₂ 84 mm Hg. The patient was extubated and placed on a nasal cannula at 3 LPM. The patient did well and remained off the ventilator for the remainder of his stay.

Discussion

Given the extensive pulmonary history of this patient, his physicians were not willing to risk fatiguing the patient during the weaning process. By using the PAV+ software option for the Puritan Bennett 840 ventilator, we were able to successfully wean the patient with the approval of his physicians. The patient was able to start breathing on his own and use his respiratory

muscles without becoming fatigued, and we were able to progress with weaning and keep the patient working without distress. In the past, we would have continued weaning to PSV, with the patient likely becoming distressed and then going back to SIMV, thereby increasing the overall weaning time and process.

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