

Inhospital transport of critically ill patients using an 840 Ventilator

Case Study
840 Ventilator

Transport

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Profile

A 26-year-old male sustained second- and third-degree burns to 40% of his body, and numerous internal injuries, resulting from a house fire. He was intubated and taken to the hyperbaric chamber. Upon arrival at the

Alaska Native Medical Center's Adult Critical Care Unit (CCU), the patient was placed on a Puritan Bennett® 840™ Ventilator with the following settings:

Initial Ventilator Settings		Other Parameters		ABG	
Mode	A/C Pressure Control	ETCO ₂	37	pH	7.20
PIP	38 cmH ₂ O, V _T 639 mL	CO ₂ elimination	310 cc/min	PaCO ₂	74 mmHg
RR	30 bpm	Alveolar \dot{V}_E	11.9 L/min	PaO ₂	101 mmHg
PEEP	+8 cmH ₂ O	BP	88/44	HCO ₃	27.4
FiO ₂	.95	HR	121 bpm	BE	-0.4
Insp. Time, I:E ratio	0.9 sec, 1:1.2	SpO ₂	99%	SaO ₂	97%
\dot{V}_E	14.2 L/min				
MAP, Compliance	25.3, 23 mL/cmH ₂ O				

Outcomes

On day five of mechanical ventilation, the upper body debridement was scheduled in the OR.

The 840 Ventilator settings at this time were:

Initial Ventilator Settings		Other Parameters		ABG	
Mode	A/C Pressure Control	ETCO ₂	35	pH	7.33
PIP	28 cmH ₂ O, V _T 600 mL	CO ₂ elimination	287 cc/min	PaCO ₂	58 mmHg
RR	28 bpm	Alveolar \dot{V}_E	11.9 L/min	PaO ₂	70 mmHg
PEEP, Total PEEP	+8 cmH ₂ O, +7 cmH ₂ O	BP	112/61	HCO ₃	29
FiO ₂	.90	HR	139 bpm	BE	3.0
Insp. Time, I:E ratio	0.9 sec, 1:1.4	SpO ₂	92%	SaO ₂	93%
\dot{V}_E	17.1 L/min				
MAP, Compliance	21.8, 21 mL/cmH ₂ O				

After evaluating the situation, it was decided that the patient would be transported and ventilated in the OR with the 840 Ventilator. Transport to OR was accomplished using the 840 Ventilator's internal battery, external air and O₂ E-cylinder gas supplies. The 2.5-hour procedure was well-tolerated by the patient and was followed by a trial on the anesthesia ventilator. Anesthesia ventilator settings

included: A/C V_T 600 mL, RR 24 bpm, FiO₂ 1.0 and +8 PEEP. This resulted in increased ETCO₂ and decreased SpO₂. After approximately five minutes, the patient was placed back on the 840 Ventilator at the previous settings. This resulted in decreased ETCO₂ and increased SpO₂.

On day six of mechanical ventilation, a second trip to the OR was scheduled. The patient left the CCU with the following ventilator settings:

Initial Ventilator Settings		Other Parameters		ABG	
Mode	A/C Pressure Control	ETCO ₂	36	pH	7.29
PIP	38 cmH ₂ O, V _T 754 mL	CO ₂ elimination	383 cc/min	PaCO ₂	47 mmHg
RR	30 bpm	Alveolar V̇ _E	14.4 L/min	PaO ₂	102 mmHg
Set PEEP, Total PEEP	+8 cmH ₂ O, +12 cmH ₂ O	BP	85/47	HCO ₃	26
FiO ₂	.80	HR	124 bpm	BE	0
Insp. Time, I:E ratio	0.9 sec, 1:1.2	SpO ₂	95%	SaO ₂	96%
V̇ _E	22.6 L/min				
MAP, Compliance	25, 24 mL/cmH ₂ O				

While in the OR, the patient needed to be prone for wound treatment on his back. The patient began to desaturate and required increased FiO₂ between .90 and 1.0. Additional changes made included RR 26 bpm, insp. time 1.0 sec and PIP 40-42 cmH₂O. The changes were made in an attempt to optimize ventilation while the patient was

prone during the procedure.

The patient remained in critical condition for the next three days. The patient was then transported to Harborview Medical Center for more intensive burn care and continuous hemodialysis.

Indications

This critically ill patient was successfully transported twice within our facility while using the Puritan Bennett 840 Ventilator. The 840 Ventilator met the patient's high-

minute ventilation needs in a pressure-control mode while avoiding additional complications.

Discussion

The patient was extremely fragile. Brief interruptions in ventilatory support resulted in profound drops in SpO₂. It is our medical opinion that this patient's biggest asset was the portability of the 840 Ventilator. The patient was transported on required FiO₂ while making a seamless

transition from wall gases to portable tanks. The portability of the 840 Ventilator helped prevent deterioration of the monitored parameters: SpO₂, CO₂ elimination and alveolar minute ventilation.