

COMPENSATED TIDAL VOLUMES ON PHILIPS® TRILOGY EV300: A BENCH ANALYSIS

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Disclosures: Ms. Burr has a relationship with Hill-Rom, as a patient contract trainer, no other authors have relationships to report

Original Abstract

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Background: The Philips® Trilogy 202 ventilator is often used as a home ventilator for ventilator dependent patients. In preparation for its' discontinuation, we evaluated the Trilogy EV300 (EV300) as its manufacturer replacement. The EV300 is equipped with permanent tubing compliance (TC) which results in higher volumes delivered than with the 202 and restricts use to larger pediatric patients. We aimed to determine if the humidification feature on the EV300 had an affect on volumes delivered in consistent and reproducible way that could expand use in smaller patients who require tidal volumes below the minimum 50mL.

Method: A Philips EV300 equipped with a F&P® 114 circuit and MR850 heater with a Philips® Respironics whisper swivel valve was interfaced with a Philips® NM3 (pediatric adapter) and connected to a Michigan® Test Lung (TL). TL compliance (CL) was set at 0.005 & 0.002L/cmH₂O in two models to simulate CL of a normal infant and decreased CL. The EV300 settings included: Pediatric category, Adult Circuit (20-22mm), AC/VC, RR 15, Ti 0.6s, PEEP 5. At each CL, 6 trials were performed with 3 VTs (50mL, 100mL, 150mL) with the humidification feature either ON or OFF. After stabilization, pressure and volumes were recorded as displayed from the EV300 and NM3 three times 1-minute apart and then reported as averages.

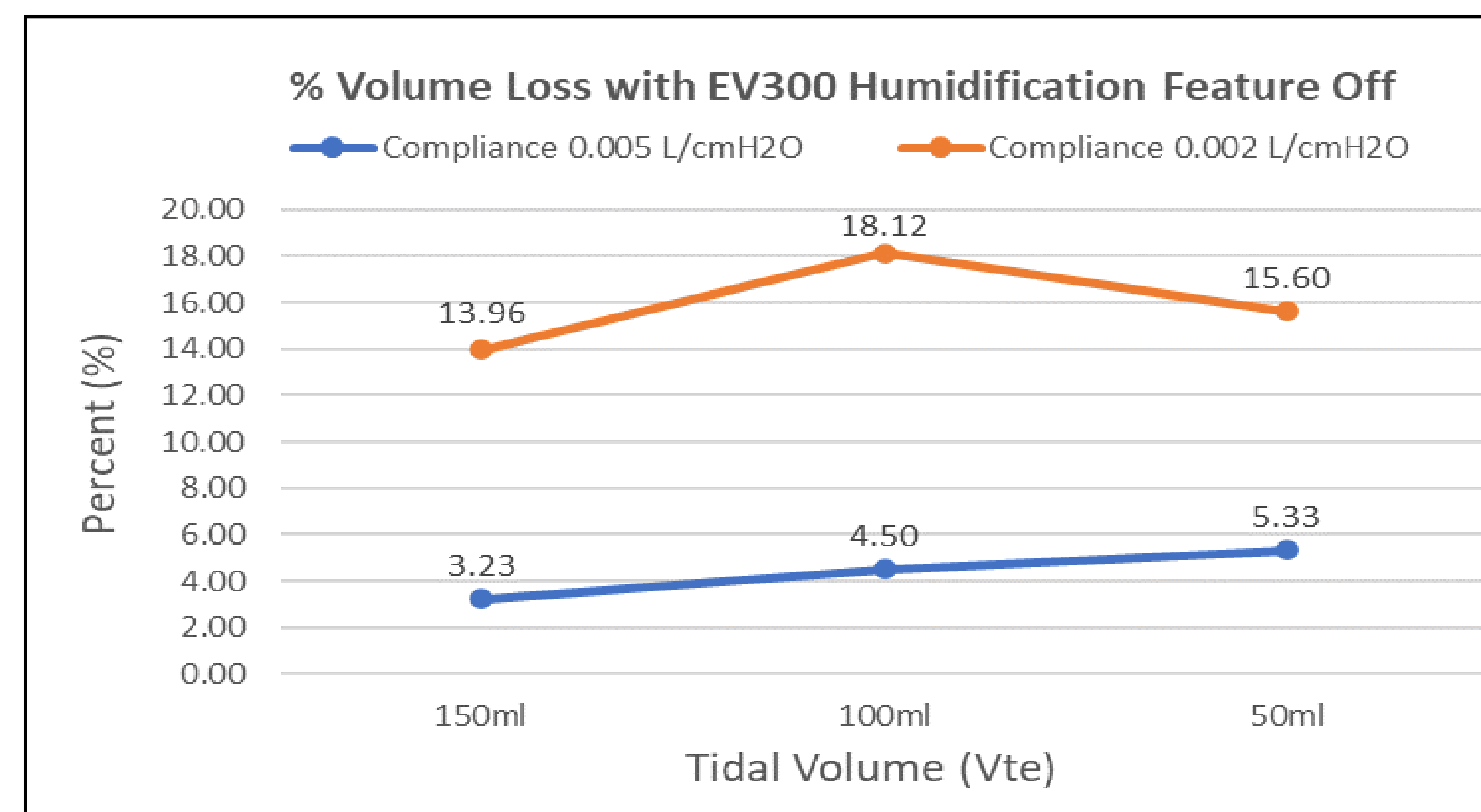
Results: With the humidification feature OFF volumes delivered by the EV300 were decreased by an average of 10% from set VT (Figure 1 and Table 1). This phenomenon is enhanced (up to 18% difference) in the decreased CL model. Differences in volume loss with the humidification feature ON and OFF is not consistent between models and is dependent on a variety of other factors such as: set volume, ΔP, and patient lung compliance and resistance.

Conclusion: Volume reduction from the humidification feature ON/OFF on the EV300 are present but not independently predicable. The changes in functionality between the 202 and EV300 impact the use and flexibility within pediatrics. Further studies must be performed to access outcomes in pediatrics related to transitions from critical care ventilator to EV300. Data with other CL and/or resistance models would be beneficial to reveal possible patterned correlations.

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Graph 1



Graph 1: Displays the percent of volume loss with the EV300 humidification feature off at compliances of 0.002 and 0.005 ml/cmH₂O

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Table 1

Michigan Test Lung: INFANT (compliance 0.005 ml/cmH ₂ O) Passive/Adult Circuit (20-22mm)				
Set VT		150	100	50
Vte NM3	Humid On	144.33	96.33	50.00
	Humid Off	139.67	92.00	47.33
Difference (ml)		4.67	4.33	2.67
% Decrease		3.23	4.50	5.33
PIP on NM3	Humid On	33.67	24.00	15.00
	Humid Off	33.00	23.00	15.00
Difference (cmH₂O)		0.67	1.00	0.00
% Decrease		1.98	4.17	0.00

Michigan Test Lung: INFANT (compliance 0.002 ml/cmH ₂ O) Passive/Adult Circuit (20-22mm)				
Set VT		150	100	50
Vte NM3	Humid On	148.00	95.67	47.00
	Humid Off	127.33	78.33	39.67
Difference (ml)		20.67	17.33	7.33
% Decrease		13.96	18.12	15.60
PIP on NM3	Humid On	78.33	52.33	29.00
	Humid Off	67.33	44.00	25.67
Difference (cmH₂O)		11.00	8.33	3.33
% Decrease		14.04	15.92	11.49

Table 1: Data showing the difference (ml) and percent volume decrease with the EV300 humidification feature on versus off, at 3 VTs (50mL, 100mL, 150mL, and compliances of 0.002 and 0.005 ml/cmH₂O

Conclusion: Volume reduction from the humidification feature ON/OFF on the EV300 are present but not independently predicable. The changes in functionality between the 202 and EV300 impact the use and flexibility within pediatrics. Further studies must be performed to access outcomes in pediatrics related to transitions from critical care ventilator to EV300. Data with other CL and/or resistance models would be beneficial to reveal possible patterned correlations.