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Comparison of Static Compliance on Six Ventilators

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Introduction: The purpose of this study was to test the accuracy of static compliance (Cstat) measurements compared to a control value from a Michigan Test Lung. The ventilators tested for Cstat accuracy were the Maquet Servo i, Drager Evita XL, Drager E4, Viasys Avea, Puritan Bennett 840, and the Puritan Bennett 7200.

Methods: We compared Cstat by connecting the different types of ventilators with the same ventilator circuit and no humidifier to the Michigan Test Lung Model 560li. The Michigan Test Lung was set to compliance values of 10, 50, 80, and 100 cmH₂O. Volume controlled ventilation with a set tidal volume of 600ml, f 12 breaths per minute, and flow rate of 45 l/m was set on each ventilator.

Results: With zero PEEP, the ventilators ranked in the following order from most accurate to least accurate (overall average percent differences from the control value are in parenthesis): PB 7200 (1.25%), Maquet Servo i (4.2%), Viasys Avea (4.6%), PB 840 (10%), Drager E4 (22.5%), and Drager XL (26.7%). When five cmH₂O PEEP was applied to the circuit, the ranking from most accurate to least accurate was: Viasys Avea (5%), Maquet Servo i (7.1%), PB 7200 (11.25%), PB 840 (16.25%), Drager E4 (25.4%), and Drager XL (29.6%).

TABLE 1.

PB 7200	Set Cstat	Meas. Cstat	% Diff. between set and meas.	Plat Set PEEP	PB 840 Set Cstat	Meas. Cstat	% Diff. between set and meas.	Plat Set PEEP
	100	100	0	6 0	100	111	11	6 0
	100	115	15	10 5	100	117	17	10 5
	80	79	1	8 0	80	88	10	8 0
	80	87	9	12 5	80	93	16	12 5
	50	49	2	13 0	50	54	10	12 0
	50	54	8	16 5	50	58	16	16