A-13 PATIENT-VENTILATOR SYNCHRONY ACCOMPLISHED BY SERVO 900C, SERVO 300, PURITAN-BENNETT 7200 AND BIPAP VENTILATORS DURING PRESSURE SUPPORT VENTILATION IN THE PRESENCE OF PEEP

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The effect of PEEP on patient-ventilator synchrony was investigated during pressure support ventilation (PSV) using ventilators with different sensing systems and termination criteria. Servo 900C, Servo 300 (Siemens-Elema, Sweden), Puritan-Bennett 7200a, BiPAP (Respironics, USA) were connected to a two bellows lung model with various impedance. Lung compliance (C_L) was set as 0.062 and 0.030 L/cmH_2O; airway resistance varied as 5 or 20 cmH_2O/L/sec. Respiratory rate was 30 and 40 breath/min. Inspiratory/expiratory ratio was 1:1. PS level was changed from 5 to 18 cmH_2O to attain similar tidal volume at each lung impedance settings at 0 cmH_2O PEEP. Patient-ventilator synchrony was evaluated in terms of triggering time and expiratory cycling at PEEP levels of 0, 5 and 10 cmH_2O. Servo 300 was examined with pressure and flow sensing. For pressure sensing sensitivity was set as -2cmH_2O.

An application of PEEP had a variety of effects on trigger sensitivity that varied among the ventilators. Regardless of lung mechanics, RR or PS level, an application of PEEP resulted in a decrease in triggering time in PB 7200a and BiPAP ventilators (Table). This PEEP effect on triggering time was more significant at low R_{aw} in Puritan-Bennett 7200a, but in BiPAP PEEP effect on triggering time remained same at both low and high R_{aw}. Conversely, triggering time increased in the presence of PEEP in Servo 300. This effect was more significant with pressure sensing mechanism. PEEP did not significantly affect expiratory cycling. In Servo-900C PSV was prematurely terminated in most cases. Tidal volume (V_T) did not change when PEEP was applied in Servo 300, but it increased with PB 7200a. Effects of PEEP on V_T in Servo 900C depended on lung impedance. A higher PSV level was required in BiPAP to attain V_T equaled to that without PEEP.

C_L 0.03L/cmH_2; R=20 cmH_2O/L/sec.; RR30b/min; V_T=400ml(without PEEP); PS level- 10cmH_2O

PEEP level(cmH_2O)	0	5	10
	triggering time(msec)		
Servo 900C	240	160	150
Servo 300 (pressure sensing)	100	120	120
Servo 300 (flow sensing)	80	100	110
PB7200a	140	100	100
BiPAP	100	50	40

It is concluded that PEEP effect on triggering time depended on sensing mechanisms used to trigger the ventilator. Pressure sensing used in Servo-300, Servo-900C, puritan-Bennett 7200 was more affected by PEEP. The factors such as sensing systems, background continuous flow affected the patient-ventilator synchrony in the presence of PEEP. termination criteria with currently used lung mechanics did not significantly affect the patient-ventilator synchrony.