Reliability and clinical relevance of Driving Pressure and Respiratory System Compliance measurements during Pressure Support Ventilation

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Argomento: Insufficienza respiratoria acuta e ventilazione meccanica

Introduction: Airway Driving Pressure (DP), Plateau Pressure (Pplat) and Respiratory System Compliance (Crs) are known to be correlated to patients outcome during Controlled Mechanical Ventilation (CMV). The reliability and clinical relevance of these measurements during Pressure Support Ventilation (PSV) have not been investigated yet.

Objective: We aimed to understand the feasibility and clinical relevance of respiratory system mechanical properties (DP, Pplat and Crs) measured during PSV.

Methods: We conducted a retrospective study on patients undergoing invasive mechanical ventilation for at least 5 days. We included all subjects who completed 24 hours in CMV followed by at least 24 hours in PSV. Data were collected on the first and last CMV day and as an average of the first three days of PSV. We analyzed a) the correlation between measurements taken during CMV and PSV and b) the association between DP, Pplat and Crs values during PSV and clinical outcomes (mortality in ICU, the necessity to switch back to CMV, PSV duration). Data are expressed as mean±SEM.

Results: We screened 359 patients, 198 of them met the inclusion criteria. Crs measured during CMV and during PSV were correlated (Rsquare=0,58, p<0,0001). MV parameters collected during PSV were significantly different between survivors and non survivors. We stratified survivors in two groups according to PSV duration (more or less than 7days); Pplat, DP and Crs were significantly different in the two groups [Table 1]. Crs during PSV was also significantly different between patients who needed to be switched back to CMV and patients who did not (52.5±1.7 n=127 vs 44.8±2.6 ml/cmH_2O n=53, p=0,015).

Conclusion: The measurement of DP, Crs and Pplat during PSV is feasible and clinically meaningful, since these correlate with same measurements in CMV and with patients outcome. This underlines the importance of respiratory mechanics monitoring during both CMV and PSV.

	SURVIVORS (n=138)	NON SURVIVORS (n=42)	*p* value	PSV <7days (n=56)	PSV >7days (n=82)	*p* value
Pplat (cmH_2O)	21 ±0,4	21,2 ±0,6	***0,819***	19,9 ±0,5	21,8 ±0,5	***0,075***
Crs (ml/cmH_2O)	53 ±1,6	41,3 ±2,7	***0,0006***	57,2 ±2,8	50,1 ±1,9	***0,032***
DP (cmH_2O)	9,2 ±0,2	10,6 ±0,5	***0,0083***	8,5 ±0,4	9,8 ±0,3	***0,0055***