Abstract

Background:

Mechanical ventilation induces changes in lung volumes and intrathoracic pressures which are transmitted to the heart, great arteries and veins and therefore independently affect the key determinants of cardiovascular performance and consequently heart rate and myocardial contractility. New ventilatory modes as proportional assist ventilation with more patient synchrony may have better hemodynamic effects.

Aim of the study:

To evaluate the changes in hemodynamics , left ventricular & right ventricular function during different modes of mechanical ventilation.

Patients & Methods:

100 patients who received mechanical ventilation, when they they fulfilled all the criteria for a spontaneous breathing trial (improvement of the underlying cause of acute respiratory failure, body temperature < 39°C, hemoglobin level > 7G/dl, PaO2 > 60 mmHg, FIO2 < 40%, positive end expiratory pressure (PEEP) under or equal to 8 cm H2O, respiratory rate less than 35 breathes/minute, systolic arterial pressure > 90 mmHg and < 160 mmHg without need for vasoactive drugs, no sedation and a stable neurological status) were recruited in the study. Thoracic electrical bioempedance & transthoracic echocardiography were used to assess hemodynamics , LV & RV functions at 4 phases which are PC-ACV just before starting SBT , 2 hours after SBT trial with PS 10 , PEEP 5 , 3rd phase after 2 hours on PAV mode with 20-30% assist, finally during spontaneous breathing after disconnection of mechanical ventilation.

Results:

There was no significant changes in systolic & diastolic blood pressure between the 4 phases. HR & RR were statistically significantly higher during spontaneous breathing. SV , SI , CO & CI were found the highest during PAV mode yet there was no statistical significance. Ejection fraction was statistically significantly the highest during PAV mode(P 0.018). Mitral E/A ratio was lowest during ACV & PAV(0.012). TAPSE was highest during ACV & PAV mode(p 0.004) & tricuspid E/E' was lowest during PAV mode (0.002).

Conclusion:

PAV is a weaning mode that is comparable to PSV in hemodynamic consequences. PAV may have some potential benefits on left ventricular systolic function & right ventricular systolic & diastolic function. Further studies are required to assess changes in stroke index & cardiac index.

key words; CARDIOGRAPHY . TRANSTHORAIC . ECHOCARDIOGRAPHY