

Abstract

Weaning Induced alterations In Cardiac function. Invasive and echocardiographic assessment

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Introduction:

Aim: Studying LV dysfunction during weaning from mechanical ventilation (MV).

Methods:

30 invasively MV patients fulfilling criteria of weaning & shifted to SBT (using low PSV (8 cmH₂O)) for 30 minutes. 2 sets of variables were measured at the beginning & end of the SBT; respiratory rate (F), tidal volume (VT), minute ventilation (VE), peak inspiratory pressure (PIP), PaO₂/FIO₂ ratio (P/F ratio) & one reading at the start of the SBT of; Airway resistance (Raw), static respiratory compliance (C_{eff}), maximum negative inspiratory pressure (NIP), (F/VT), Arterial blood gases. Weaning failure was defined as; Failed SBT, Reintubation &/or reventilation or death within 48 hours.

Swan Ganz catheterization was done to get the right atrial (RAP), pulmonary artery (PAP), pulmonary artery occlusion (PAOP) pressures, & cardiac index (CI).

Echocardiography to get LV internal diameter at end diastole (LVIDd) & end systole LVIDs), Ejection fraction (LVEF), E/A ratio, Deceleration time (DT)

(ms) Isovolumetric relaxation time (IVRT), Doppler tissue imaging (DTI) & E/E'.

Results:

Mean age 56.6 ± 15.9y 53% were males. Weaning was successful in 76.6% of patients. There was reduction in VT with increase in f & VE; (0.53 ± 0.06 vs. 0.45 ± 0.1 L, p = 0.0003), (12.5 ± 2 vs. 20.3 ± 7.5, p < 0.0001), (6.6 ± 1.5 vs. 8.8 ± 2.4 L, p < 0.0001) respectively, P/F₁ was higher than P/F₂; (278 ± 86 vs. 252 ± 74, p = 0.005). ABG showed reduction in PaO₂ (126 ± 32 vs. 115 ± 29, p = 0.01) without change in PaCO₂ (37.6 ± 6.4 vs. 36.5 ± 6.2, p = 0.24). There was rise in PAOP with insignificant change in RAP, PAP, & CI (12.6 ± 4.7 vs. 14.2 ± 4.7, p = 0.003), (6.6 ± 2 vs. 7.2 ± 3, p = 0.16), (29.7 ± 7.2 vs. 29.7 ± 7, p = 1), (3.2 ± 0.6 vs. 3.22 ± 0.5, p = 0.4) respectively. There was reduction in LVEF with insignificant LVIDd & LVIDs change (66.4 ± 8.1 vs. 64.5 ± 8.4%, p = 0.01), (4.83 ± 0.68 vs. 4.7 ± 0.7, p = 0.5), (3.1 ± 0.7 vs. 3.12 ± 0.6 cm, p = 0.8) respectively. There was no differences between E/A, IVRT, & DT or E/E' at both ends of the trial (1.02 ± 0.38 vs. 1.04 ± 0.37, p = 0.6), (95.5 ± 24 vs. 95.8 ± 22, p = 0.8), (194.6 ± 30 vs. 195 ± 28 ms, p = 0.8) & (9.7 ± 3.1 vs. 10.3 ± 3.5, P = 0.09) respectively. E' & RAP correlated significantly before & after SBT (r = 0.54, p = 0.002), & (r = 0.79, p < 0.0001) respectively. Despite insignificant correlation between E/E' & PAOP at the beginning of SBT, there was significant correlation between them at the end of SBT (r = 0.6, p = 0.001).

Conclusions:

LV dysfunction during weaning is mainly diastolic. Changes in E/E' & RAP &/or PAOP may be most convenient methods for monitoring diastolic function during weaning from MV.