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شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

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التوثيق الالكتروني والميكروفيلم

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بالرسالة صفحات

لم ترد بالاصل

Echocardiographic Assessment of Cardiac Dysfunction during discontinuation of Mechanical Ventilation in Medical Intensive Care Unit Patients

Thesis

Submitted for Partial Fulfillment of

Master Degree in Critical Care

Investigator

Wael Mohammed Hassan,

MB.B.CH

Supervisors

Khaled Hussein MD.

Assistant Professor of Critical Care

Critical care department,

Cairo University

Akram M. Abd El-Bary MD.

Lecturer of Critical Care,

Critical Care Department,

Cairo University

Yasser Nassar MD.

Lecturer of Critical Care,

Critical Care Department,

Cairo University

Cairo University

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Abstract

Can we predict left ventricular dysfunction-induced weaning failure? Invasive and echocardiographic evaluation

Introduction: The aim was to study the relation of weaning failure to development of diastolic dysfunction using echocardiography and PA catheter.

Methods: Thirty invasively mechanically ventilated patients fulfilling criteria of weaning from mechanical ventilation were shifted to SBT (using low PSV (8 cmH2O)) for 30 minutes. Two sets of variables were measured at the beginning and end of the SBT. Weaning failure was defined as: failed SBT, reintubation and/or ventilation or death within 48 hours following extubation. A Swan–Ganz catheter was used to obtain the right atrial (RAP), pulmonary artery (PAP), pulmonary artery occlusion (PAOP) pressures, and cardiac index (CI). Echocardiography: the LV internal diameter at end diastole (LVIDd) and end systole (LVIDs), ejection fraction (LVEF), E/A ratio, deceleration time (DT) (ms), Isovolumetric relaxation time (IVRT), and E/E' ratio.

Results: Mean age was 56.6 ± 15.9 years, 53% were males. The outcome of weaning was successful in 76.6% of patients. The patients were subdivided into two groups according to weaning outcome: Group I, 23 patients (successful weaning); Group II, seven patients (failed weaning). RAP, PAOP and SVO2 were similar at the start of SBT (6.3 ± 1.9 vs. 7.6 ± 2.3, $P = 0.1$; 12 ± 3.7 vs. 14.6 ± 3, $P = 0.4$; 72 ± 2.4 vs. 71 ± 3.1, $P = 0.1$) between Groups I and II yet significantly different at the end (6.2 ± 2.4 vs.10 ± 3.5, $P = 0.01$; 12.8 ± 3.5 vs.19 ± 5.4, $P = 0.004$; 73 ± 2.8 vs. 66.6 ± 7, $P = 0.009$), respectively. CI was similar between Groups I and II at both ends of the SBT, $P = 0.5$ and $P = 0.9$. Groups I and II had similar LVIDs and EF at the beginning of SBT (3 ± 0.7 vs. 3.3 ± 0.5, $P = 0.2$; 68 ± 8 vs. 62 ± 6, $P = 0.08$) yet different at the end (3 ± 0.6 vs.

3.5 ± 0.5, $P = 0.048$; 66 ± 8 vs. 58 ± 7, $P = 0.03$), respectively. There was no significant differences in E/A, IVRT, DT yet a significant difference in E/E' between Group I and Group II at both ends of the trial (1.04 ± 0.4 vs. 0.97 ± 0.3, $P = 0.78$; 1.02 ± 0.4 vs. 1.07 ± 0.4, $P = 0.78$; 94 ± 26 vs. 99.6 ± 18, $P = 0.52$; 97 ± 22 vs. 91 ± 24, $P = 0.57$; 194 ± 31 vs. 196 ± 30, $P = 0.98$; 197 ± 27 vs. 189 ± 33, $P = 0.6$; 8.9 ± 2 vs. 12.2 ± 4, $P = 0.02$; 9.4 ± 2.3 vs. 13 ± 5, $P = 0.02$), respectively.

Conclusions: LV dysfunction may have an impact on weaning outcome.

Invasive monitoring as well as echocardiography and tissue Doppler indices may be reliable in monitoring and detection of LV dysfunction, and subsequently may be possibly useful in improving weaning outcome. RAP may be a particularly reliable and easy method to monitor during the period of weaning.

Key words: mechanical ventilation, echocardiography, weaning

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Wael Mohammad Hassan
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Contents

List of Abbreviations

AMI	Acute myocardial infarction
ARDS	Acute respiratory distress syndrome
ARF	Acute respiratory failure, Acute renal failure
ASV	Adaptive support ventilation
ATC	Automatic tube compensation
BNP	B-type natriuretic peptide
CaO_2	arterial O_2 content
CcO_2	content of oxygen of the pulmonary end-capillary
C_{eff}	static compliance
CI	Cardiac index
CINMA	Critical illness neuromuscular abnormalities
cmH_2O	Centimeter water
CMV	Controlled mandatory ventilation
CO	Cardiac output
CO_2	Carbon dioxide
COPD	Chronic obstructive pulmonary disease
CPAP	Continuous positive airway pressure
CRF	Chronic renal failure
CROP	compliance, respiratory rate, oxygenation and inspiratory pressure
CvO_2	mixed venous oxygen content
DO_2	Oxygen delivery
DT	Deceleration time
DTI	Doppler tissue imaging
E/A	Ratio of mitral E wave velocity to mitral A wave velocity
E/E'	Ratio of mitral E wave velocity to mitral annular velocity (E')
ECG	Electrocardiogram
EDD	End diastolic diameter

EDP	End diastolic pressure
EF	Ejection fraction
ESD	End systolic diameter
ET	Endotracheal tube
F	Respiratory frequency
f/V_T	Respiratory frequency to tidal volume ratio (rapid shallow breathing index)
FIO_2	Inspiratory oxygen fraction
FRC	Functional residual capacity
FS	Fractional shortening
GBS	Guillain barre syndrome
h	Hour
H_2O	Water
HCO_3	Bicarbonate concentration
HR	Heart rate
IBW	ideal body weight
ICU	Intensive care unit
ITP	Intrathoracic pressure
IVC	Inferior vena cava
IVRT	Isovolumetric relaxation time
kg	Kilogram
L/min	Liter per minute
LV	Left ventricle
LVEF	Left ventricular ejection fraction
m	Meter
MIP	Maximal inspiratory pressure=P_{Imax}=NIF
mmHg	Millimeter mercury
MSFP	Mean systemic filling pressure
MV	Mechanical ventilation