Nutrition & Health 2017: Predictive value of end-tidal CO2, lung mechanics and other standard parameters for weaning neurological patients from mechanical ventilation- Hala A. Mohammad- Chest Department, Minia University, Egypt.

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Abstract:
Most patients are with cerebrovascular events (CVE) do not develop important respiratory problems but when they present, may be a marker of severe neurologic derangement. Among the causes of neurologic dysfunction, hemorrhages, structural causes such as ischemic stroke (intracerebral hemorrhage (ICH) and subarachnoid hemorrhage (SAH)), and traumatic brain injury (TBI) carry the worst prognosis and are the greatest challenge to the critical care authorities based on the interaction among hypoxemia and secondary neurological insults.

The goals of positive pressure ventilation (PPV) in brain injured patients are primarily aimed at to improving oxygenation to provide the vital brain nutrient besides glucose and controlling arterial CO2 tension to the minimize intracranial hypertension. PPV increases to the functional residual capacity (FRC) by improving the alveolar recruitment, thus optimizing oxygenation. On the other hand, Increased intrathoracic pressure (ITP) increases intracranial pressure (ICP) via these mechanisms Direct transmission of ITP to the intracranial cavity via to the neck. Increased ITP reductions venous return to the right atrium, and increases jugular intravenous pressure, thus increasing cerebral blood volume (CBV) and ICP. As EtCO2 reflects to arterial CO2 in patients with the reasonable perfusion, capnography is a valued tool for avoiding inadvertent hyper or hypoventilation. Capnography serves an extra role of allowing providers to control the assisted ventilation. For post detention patients and head injury patients with the suspected increases in the intracranial pressure (ICP), control of ventilation can critically affect to outcomes.

The objective of the present work was to analysis the utility of the different weaning parameters and indices throughout weaning of mechanically ventilated neurological patients with afocus on the most widely used and most correct indices.

Patients and method:
The present study was included 32 patients aged between 26 and 76 years, who remained admitted to the general Intensive Care Unit in El-Minia University Hospital during a period from October 2012 to August 2014 for organization of acute respiratory failure due to the different neurological problems.

The exclusion criteria were the association of the pulmonary fibrosis, hemodynamic instability, pulmonary edema and the presence of intrathoracic drainage. Diagnosis was recognized in all patients by head CT, MRI, DSA (digital subtraction angiography), lumbar puncture or Doppler ultrasound.

Study protocol:
ll patients remained mechanically ventilated using a (Puritan Bennett 840 microprocessor ventilator Germany). Primarily, the patients were placed on volume control continuous flow mode and ventilated with a tidal volume (VT) ranging from 8 to 10 ml/Kg body weight, respiratory rate reaching from 10 to 20/min, initial inspired by fraction (FiO2 ⩽0.6) and using extrinsic best PEEP which is the maximum quantity of PEEP that can be applied without the raising peak airway pressure during the volume preset mechanical drying. All patients were under in cardiac and respiratory monitoring (heart rate, O2 saturation, respiratory rate and ETCO2). When the passive aeration was obtained, when the respiratory muscle activity was resumed, the patient started to trigger the ventilator at his or her normal rate.

Results:
Patient characteristics
The clinical and biochemical parameters of the 32 automatically ventilated neurological patients on the admission are depicted. The age of patients was 47.18 ± 17.72 years. Male signifies 68.75% of all patients comprised in this study. In this study as 62.5% of the patients stood smokers. Neurological insults were severe cerebral stroke in half of the patients (n = 16) and drug over dose and the toxins in 37.5% of patients, and 12.5% of the cases consumed C4 lesions. Mean that GCS score on admission was 6.68 ± 2.32. Amongst 16 patients who are presented with stroke, 10 cases were due to spontaneous haemorrhage though ischemic stroke in 6 cases.

Discussion:
Most of our patients were intubated because of the clinical deterioration and coma, ten cases (31.2%) of hemorrhagic stroke develop in the gsevere brain stem dysfunction, and loss of brain- stem reflexes). About 37.5% of automatically ventilated patients had essential respiratory depression (CRD) due to the drug abuse and the toxin breaths (4 cases of organophosphate poisoning and two cases of zinc sulfate). All kinds of plain damage of the central nervous system, i.e. supra and infra tentorial brain or spinal cord lesions due to the traumatic, infectious/inflammatory, metabolic, vascular and neoplastic, can cause in respiratory failure. This does not necessarily result in the loss of respiratory drive or respiratory beat but might also cause in the loss of protective airway reflexes and airway patency and thus impairs ventilation.

Several other studies, as well as general population based studies of stroke have been also found in older patients with stroke to have a poorer forecast, not only those mechanically ventilated. Hacke et al, reported that GCS scores of <10 had the greatest predictive value and the highest odds ratio. Indeed, loss of awareness is the most recognized prognostic determinant of the death in acute stroke and is directly related to the severity of the neurological damage.
Final considerations

Our study shows that utmost ventilated patients with especially those who had haemorrhagic stroke still die within the 1st few days after admission. Most of the surviving patients (59.5%), though, have only slight or no long term incapacity. We believe that the neurological concentrated care treatment of patients with stroke will help to reduce the fatality rate in the future.

The weaning directories have some of the limitations, related to the study population, the cut-off values used, and it seems to that the greatest of all is the extensive variety of methods for their measurement. This variation can lead to the great differences among the results obtained.

Although few of the weaning indices are accurate with the weaning directories are useful in identifying patients who will probably be an unable to tolerate the weaning from MV. The weaning indices are also useful in the classifying reversible causes of weaning failure, portion as references for subsequent attempts. In our study Glasgow coma scale, , MIP, EtCO2, static and dynamic compliance were more accurate predictors of weaning failure than other standard parameters.