Editorial

Extravascular Lung Water Measurements: Don't Jump Off the Bandwagon Yet!

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Determining the volume status in critically ill patients is sometimes challenging. This is particularly difficult among those patients with a pre-existing history of congestive heart failure (CHF) and a new systemic and catastrophic illness (i.e., severe sepsis). In critically ill patients, interstitial lung edema is the hallmark of acute lung injury (ALI) and acute respiratory distress syndrome (ARDS) [1]. A quantitative measurement of lung edema in these patients could provide a useful marker of disease severity and progression.

Techniques aimed at determining extravascular lung water (EVLW) may be derived from a variety of methods such as blood ultrasound velocity changes following injections of 0.9% and 5% saline [2]. Bioimpedance spectroscopy can measure total body water (TBW) and its intracellular fluid (ICF) and extracellular fluid (ECF) compartments. The indicator dilution methods and quantitative computed tomography (CT), however, are among the most commonly used techniques, both clinically and experimentally to quantify lung edema.

In this issue of *Current Respiratory Medicine Reviews*, Sakka presents a comprehensive review on the techniques and utility of measurement of EVLW in critically ill patients. This review provides readers with general principles of the techniques utilized and, in particular, the usefulness of the single transpulmonary thermodilution technique [3]. This method has gained popularity over the past decade. As indicated by Sakka, the assessment of EVLW using other methods such as chest radiography and arterial blood gases is very imprecise [3]. In addition, these methods prove difficult to quantify the extent of clinically relevant pulmonary edema [4]. The single transpulmonary thermal indicator technique appears to have multiple potential advantages, including detection of incipient pulmonary edema and monitor response to management.

The bigger question remains: Is there any clinical utility of the EVLW measurements? Some studies have demonstrated a direct correlation between the level of EVLW and mortality [5]. Moreover, EVLW measurement could potentially help the clinician characterize better patients with ARDS. Guiding fluid therapy in these patients is commonly quite difficult. Therefore, techniques such as thermo dilution methods and treatment algorithms for fluid replacement would decrease the duration of mechanical ventilation and length of stay in the intensive care unit in patients with ALI and ARDS [2].

The reader, however, must be careful when evaluating EVLW measurements in daily clinical practice. Scientists propose theories and assess those theories in the light of observational and experimental evidence; what distinguishes science from voodoo is the careful and systematic way in which hypothesis are critically evaluated based on the available evidence. Until recently, it was considered sufficient to understand disease processes in order to prescribe a drug or other form of treatment. However, when these treatment modalities were subjected to randomized, controlled clinical trials (RCTs) examining clinical outcomes and not physiological processes, the outcome was not always favorable. The RCT has become the reference in medicine by which to judge the effect of an intervention on patient outcome, because it provides the greatest justification for conclusion of causality is subject to the least bias, and provides the most valid data on which to base all measures of the benefits and risk of particular therapies.

For EVLW measurements to "take off" in clinical critical care medicine, a large RCT with thousands of patients must be conducted and prove that not only these measurements provide useful information, but that also allow the clinician to tailor the management of these critically ill patients to improve survival and length of stay.

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