Better Characterization of Acute Lung Injury/ARDS Using Lung Water

To the Editor:

We read with interest the study by Sakka et al (December 2002)1 demonstrating the prognostic value of extravascular lung water (EVLW) in critically ill patients, and we would like to emphasize another potential clinical value of this parameter. In patients with pulmonary edema (defined as EVLW > 7 mL/kg), fluid restriction/depletion has been shown to improve outcome.2 However, in patients with acute lung injury (ALI)/ARDS, the effectiveness of such a fluid-conservative approach remains a subject of ongoing controversy.3

The radiographic criterion used in the American-European definition of ALI/ARDS showed high interobserver variability,4 and arterial hypoxemia can be due to other disease processes than pulmonary edema. Therefore, we postulated that ALI/ARDS criteria could be inaccurate to identify patients with pulmonary edema, ie, patients who may benefit from fluid restriction/depletion.

Seventy-five chest radiographs, blood gas measurements, and EVLW measurements done simultaneously in 37 patients receiving mechanical ventilation without evidence for left heart failure have been analyzed. The EVLW was evaluated by transpulmonary thermodilution, a technique validated against the double-indicator (thermo-dye) and the gravimetric methods.5 Chest radiographs were analyzed independently by each author. When discrepancies were observed (21 of 75 [28%]) between individual analysis, radiographs were reanalyzed for a consensual decision.

Bilateral pulmonary infiltrates were observed in 51 instances. The PaO2/fraction of inspired oxygen (FiO2) ratio was < 300 or 200 mm Hg in 60 instances and 44 instances, respectively. A negative and weak ($\rho = 0.27$, p < 0.001) relationship was observed between PaO2/FiO2 ratio and EVLW. The ALI/ARDS criteria were fulfilled in 46 of 75 instances (61%). The EVLW was higher (11.3 ± 5.4 mL/kg vs 8.6 ± 5.2 mL/kg, p < 0.05) in the cases of ALI/ARDS (mean ± SD). However, ALI/ARDS criteria (ALI, n = 7; ARDS, n = 9) were associated with an EVLW value $\leq 7$ mL/kg in 16 of 46 instances (35%) [Fig 1].

These findings suggest that a substantial number (approxi-

mately one third) of patients with ALI/ARDS criteria have no significant pulmonary edema. In this regard, EVLW measurement should be helpful to identify patients with ALI/ARDS who might benefit from fluid restriction/depletion. Clinical studies are required to confirm the value of EVLW in the decision-making process concerning fluid restriction/depletion in patients with ALI/ARDS.

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REFERENCES