Can Procalcitonin and Chest Echography Be Used to Diagnose Ventilator-Associated Pneumonia?

To the Editor:

We read with great interest the article by Zagli et al1 in a recent issue of CHEST (December 2014). The authors reported that the Chest Echography and Procalcitonin Pulmonary Infection Score (CEPPIS) had an acceptable and promising level of prediction effectiveness in diagnosing ventilator-associated pneumonia (VAP). Although we strongly agree that ultrasonography is very helpful and a readily available tool with acceptable sensitivity and specificity to detect pneumonia, we have some concerns.

First, the incidence of VAP varies widely depending on the criteria used to diagnose VAP. Ego et al2 compared the incidence of VAP diagnosed based on six different sets of criteria and reported it to range from 4% to 42%; the range was 0% to 44% when using 89 different combinations of criteria. These findings are no fluke; other studies have come to similar conclusions.2 Even studies using microbiologic criteria to diagnose VAP have shown different incidences of VAP because the technique used to collect samples was different between studies.2 Therefore, we wonder how the authors chose their diagnostic criteria and evaluated their effectiveness.

Second, chest radiography was replaced by chest echography in Zagli et al.1 However, the training required for detecting the sonographic features of VAP is extensive, just as the training required for detecting the sonographic features of pneumothorax, localized atelectasis, and pulmonary fibrosis probably requires at least level 2 Royal College of Radiology training in chest ultrasonography in the United Kingdom.3 In addition, identification and interpretation of ultrasound images is not so easy and notoriously operator dependent. Therefore, we wonder who performed the chest ultrasound in the present study. If it was performed by an intensivist, then he or she must be competent in chest ultrasonography. However, very few intensivists have definitive skill in chest ultrasonography, not only in North America but also in Europe and the Asia-Pacific region.4

Third, we are interested in why the authors used plasma procalcitonin concentration not soluble triggering receptor expressed on myeloid cells-1 in BAL fluid or other indicators to replace leukocyte count. As we all know, procalcitonin has a limited predictive value in the diagnosis of VAP; in addition, some noninfective factors, such as severe trauma, invasive surgical procedure, and critical burn injuries, could increase procalcitonin levels and result in false-positive results.5 In the Zagli et al1 study, trauma patients were predominant in the VAP group, and this would confound the results.

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References


Response

To the Editor:

I thank Drs Feng and Zhang for their interest and comments on our recent CHEST study.1 I agree with them about the challenges in ventilator-associated pneumonia (VAP) diagnosis. In our study population, at the time of diagnosis, VAP was defined in cases of new infiltrates on the chest radiograph, leukocytosis, purulent secretions, and/or fever, following guidelines.2
Because our data collection was retrospective, to limit false positives, we decided to restrict the population to patients with VAP diagnosis in which the tracheal aspirate culture resulted positive (count > $10^4$ colony-forming units/mL).

Chest ultrasound examinations were performed by intensivists skilled in chest ultrasonography. The ICU of the ED of Careggi University Hospital started to routinely use chest ultrasonography in 2008. The competence acquired permitted a reduction in chest radiographs and CT scans, the ability to monitor evolution of pulmonary diseases in extracorporeal membrane oxygenation patients, and the ability to organize training events.

Dosage of soluble triggering receptor expressed on myeloid cells-1 in BAL fluid is not available in our center. We decided to use plasmatic concentration of procalcitonin as a sepsis indicator instead of leukocyte count. The observation of our colleagues is correct and confirmed in our study, in which procalcitonin became predictive in VAP diagnosis only when associated with pulmonary infiltrates at chest echography (Tables 5 and 6 in our study).

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References