Risk Stratification of Elderly Community-acquired Pneumonia by Adding Computed Tomography

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The clinical importance for evaluating community-acquired pneumonia (CAP) by adding computed tomography (CT) to chest radiography (CR) has been described in the Japanese Respiratory Society (JRS) CAP guidelines published since March 2000. There are, however, relatively few and only small sample-sized reports that demonstrate the diagnostic superiority of CT in comparison to CR for CAP (1-3). According to the guidelines of the Infectious Diseases Society of America and the American Thoracic Society, CT scans may be more sensitive, however, the clinical significance of these findings when the CR findings are negative is unclear (4). Elderly CAP patients may also be a different population than younger CAP patients (5). Some elderly CAP patients have many complications and poor pneumonia-related symptoms. There is a possibility that the CT findings could lead to an early diagnosis and effective treatment of elderly CAP patients.

In this issue of the Internal Medicine (6), Fukuoka et al. assessed the diagnostic utility of CT compared with CR and the prognostic factors related to mortality in elderly (≥65 years of age) CAP-suspected inpatients. Although the investigation had been conducted at a single institution, 142 patients were recruited. Approximately 10% of CT-based pneumonic infiltration was overlooked by a CR-based diagnosis. Oxygen desaturation, comorbid neoplastic disease, blood urea nitrogen (BUN) ≥21 mg/dL, male gender, and bilateral pneumonic infiltration diagnosed by CT were shown to be prognostic factors. Bilateral pneumonic infiltration diagnosed by CT was presented as a new prognostic factor. Fukuoka et al. concluded that CT was superior to CR for diagnosing and evaluating the severity of elderly CAP patients.

This study and the presented results have raised several very important issues that must be elucidated. First, large-scale prospective research trials to evaluate risk stratification by adding CT are necessary in elderly CAP patients. In Japan, the A-DROP system (Age: male ≥70 years and female ≥75 years, Dehydration: BUN ≥21 mg/dL, Respiration: SpO2 ≤90% or PaO2 ≤60 Torr, Orientation: disturbance of consciousness, and Pressure: systolic ≥90 mmHg) has been used for scoring the disease severity and site-of-care decisions. Several retrospective Japanese studies have demonstrated the usefulness of the A-DROP system, while a large-scale prospective study is lacking. As scoring systems of global standards, the Pneumonia Severity Index (PSI) (7) and the CURB-65 score have been used. The PSI is derived from the data collected from 14,199 adult inpatients with CAP and validated with data from 38,039 inpatients and 2,287 inpatients and outpatients; the validation of the CURB-65 score by international prospective CAP studies conducted in the United Kingdom, New Zealand and the Netherlands was also previously reported (8). Although these global scoring systems have proved to be excellent, a new scoring system for elderly CAP patients is necessary. Developing a new system by adding CT to the conventional factors may have a potentially significant impact for successful treatment.

Second, a large-scale survey of the exact proportions of pathogens according to age in the present Japanese medical environment is needed because the isolated microorganism profiles of the elderly in the study by Fukuoka et al. clearly differed from those for all ages in the previously reported JRS CAP guideline published in January 2007. The percentage of *Streptococcus pneumoniae* was only 4.6% in the survivors and 0% in the non-survivors, while that of Gram-negative rod bacteria (*Klebsiella pneumonia*, *Pseudomonas aeruginosa*, *Haemophilus influenza* and *Escherichia coli*) was 49.1% in the survivors and 42.2% in the non-survivors. These rates are critical for the consideration of empiric antibiotic therapy, and the results of future surveys may change the treatment paradigm of elderly CAP patients. The frequency of *Streptococcus pneumoniae* has declined to 10-15% of all inpatients in the United States (9). The widespread use
of pneumococcal polysaccharide vaccines and decreased rates of cigarette smoking are recognized to be contributing factors to this decline (9).

Finally, it may be necessary to construct an internet-based simple CAP surveillance system across Japan with the collaboration of various Japanese medical organizations. Open-access and real-time information of the surveillance results may be very useful for the treatment decision of elderly CAP patients. This surveillance system may also make it possible to reveal many unclarified issues related to pneumonia, and potentially expand future epidemiological studies.

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References