Risk Factors for Development of Acute Lung Injury, Physicians' Decision-Making Roles in Critical Illness, and Prevalence of Interstitial Lung Abnormalities in Lung Cancer Screening Populations

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Recommended Reading from the Northwestern University Pulmonary and Critical Care Fellowship Program; Keenan A. Hawkins, M.D., Associate Program Director

Kojicic M, et al. Risk Factors for the Development of Acute Lung Injury in Patients with Infectious Pneumonia. *Crit Care* (1)

Reviewed by Raj D. Shah

Acute lung injury (ALI) is a common syndrome and, despite advances such as improved supportive care and low tidal volume ventilation, the mortality remains high. In a recent paper in *Critical Care* (1), Kojicic and colleagues attempt to better characterize patients with infectious pneumonia who develop ALI during their hospitalization. The authors used a stringent definition of pneumonia based on radiographic and clinical findings along with a microbiologic diagnosis based on positive culture, serology, urinary antigen, or polymerase chain reaction. The authors then identified patients who developed ALI using an electronic search. Of the 596 patients who fit the definition of pneumonia, 171 were diagnosed with ALI. These patients were then matched based on causative organism, age, and sex with patients who did not develop ALI as a result of pneumonia. The authors found that the average time to development of ALI was 2 days. Although *Streptococcus pneumoniae* was the most frequent infectious organisms in patients who developed ALI, patients with viral, fungal, or mixed isolate pneumonia were the most likely to develop ALI. Specifically, pneumonia respiratory syncytial virus, blastomycosis, and *Pneumocystis jiroveci* conferred the highest risk for ALI. In a conditional logistic regression analysis, the risk factors for development of ALI identified in this study were inappropriate antibiotics (odds ratio [OR], 3.2), presence of shock (OR, 8.9), and blood product transfusions (OR, 4.8).

This paper adds to the growing literature that development of ALI is a multifactorial process, which may have preventable components if clinicians focus on improved supportive care, appropriate antibiotic therapy, and limiting blood product transfusions (2). Although these investigators found a higher incidence of ALI in patients with viral and fungal pneumonia,

more research is needed to ascertain if this is due to a delay in antimicrobial therapy or if these specific microorganisms independently increase the risk of developing ALI. Although specific types of immunosuppression were not defined, this study did not provide support for the hypothesis that ALI is more common in immunosuppressed patients with pneumonia, as suggested by other investigators (3). The main limitations of this study are the retrospective design and the limited study population, which included only patients with microbiologically proven pneumonia. This methodology biases the sample to include subjects with more infrequent causes of pneumonia, those with respiratory infections for which there are readily available confirmatory tests, and patients with a higher acuity of illness who require an invasive test such as bronchoscopy for diagnosis. ■

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Uy J, et al. Physicians' Decision-Making Roles for an Acutely Unstable Critically and Terminally Ill Patient. *Crit Care Med* (4)

Reviewed by Paul J. Hutchison

The role of physicians in end-of-life decision making has been the subject of considerable study, with recent empirical evidence suggesting four distinct roles assumed by physicians when

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communicating with surrogates (5). Although these roles appear valid during surrogate discussions in the intensive care unit (ICU), communication methods used in time-pressured situations are not well characterized. To better understand the context-dependent nature of physicians' roles, Uy and colleagues performed a qualitative analysis of transcriptions from 98 simulated encounters between physicians and an unstable, terminally ill standardized patient with metastatic gastric cancer and acutely worsening respiratory distress for whom there are limited therapeutic options.

Using a modified codebook originally developed to analyze ICU family meetings, the investigators first identified domains of communication used by physicians in the simulations and then characterized each physician's role. Of the 98 physicians studied, the investigators classified 52 (53%) as facilitative, 32 (33%) as collaborative, 12 (12%) as directive, and 1 (1%) as informative. One could not be classified. Seventy-seven simulations (78%) involved a physician making an explicit recommendation for a particular treatment option. Thirteen physicians made recommendations in the absence of such a request by the patient or surrogate. Although the patient in the simulation had an undisclosed preference for no intubation, nine physicians recommended intubation. Four did so even after learning of the patient's preference. Although 88% of physicians probed for patient preferences regarding desired treatments, only 36% attempted to ascertain the patient's values and priorities more broadly.

These results demonstrate variability in the roles assumed by physicians in a time-pressured clinical scenario, especially regarding providing recommendations and eliciting values and priorities. The tendency to focus on specific interventions rather than broader life goals is a common behavior seen in this scenario and in non-time-pressured contexts. Regarding methodology, the four physician roles were derived from a study originally conducted in the ICU (5). By using a previously established framework, the authors did not allow for an alternative framework to emerge from these transcripts. Additionally, physician behaviors during simulation may not truly represent their clinical practice, limiting the conclusions that can be drawn about roles assumed in critical situations for terminally ill patients.

Finally, descriptive accounts of communication methods help to explain the current state of physician behavior but they tell us little about how physicians ought to communicate with patients and their surrogates at the end of life. ■

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Jin GY, et al. Interstitial Lung Abnormalities in a CT Lung Cancer Screening Population: Prevalence and Progression Rate. *Radiology* (6)

Reviewed by Trevor T. Nicholson

Lung cancer screening trials involve performance of chest computed tomography (CT) imaging on current or former smokers who are at

risk for primary lung malignancies. Cigarette smoking is a known risk factor for lung cancer and is also associated with certain interstitial lung diseases, specifically respiratory bronchiolitis–interstitial lung disease, desquamative interstitial pneumonia, and pulmonary Langerhans cell histiocytosis, and is considered a risk factor for development of idiopathic pulmonary fibrosis/usual interstitial pneumonia (7).

This study describes the prevalence of interstitial lung abnormalities (ILA) detected on chest CT imaging performed within a single National Lung Screening Trial study site. Changes were defined as nondependent ground-glass opacification (GGO) affecting greater than 5% of any lung zone, nondependent reticulation, diffuse centrilobular abnormality with GGO, honeycombing, traction bronchiectasis, nonemphysematous cysts, or architectural distortion. Findings equivocal for ILA included focal or unilateral GGO, focal or unilateral reticulation, and patchy GGO (<5% of the lung).

Of 884 patients, 9.7% of chest imaging demonstrated presence of ILA (6), rates similar to previous reports (8). In total, 2.1% demonstrated fibrotic changes, 5.9% nonfibrotic changes, and 1.7% a mixed appearance. A significant proportion (11.5%) demonstrated equivocal features attributed to the absence of high-resolution protocol imaging.

Over a 2-year interval, fibrotic changes progressed in 36.8% and remained unchanged in 63.2%. Specifically, GGO with reticulation progressed in 58% and improved in none, whereas both reticulation and honeycombing progressed in 44%. In contrast, nonfibrotic ILA findings largely demonstrated either stability or improvement, with GGO improving in 41% and remaining unchanged in 28%. Areas of consolidation improved in 22%, and remained unchanged in 78%.

Several important limitations of the study are worth highlighting. First, no clinical or histopathologic data were reported, as the study only addressed radiographic patterns of disease. Such information would provide a better understanding of the clinical and prognostic significance of the findings reported. In addition, it is unclear if initiation of treatment or modification of risk factors associated with ILA occurred. Last, as the chest CT scans obtained were not high-resolution images, it is possible that over detection, under detection, or misclassification of abnormalities may have occurred.

This study highlights the important role that lung cancer screening may have in the detection of findings other than those related to malignancy (6). Further studies incorporating clinical and pathological data will provide greater insight into the early clinical course of disease and also provide a better understanding of the clinical significance of these findings. ■

Author disclosures are available with the text of this article at www.atsjournals.org.

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