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Pneumonia Patients at Risk for in-Hospital Cardiac Arrest

Hospital patients with pneumonia may be at risk of experiencing sudden cardiac arrest, often with few or no warning signs, according to research from the University of Chicago Medical Center under the auspices of the American Heart Association's Get with the Guidelines project.

The results of the study were presented at the American Thoracic Society's 2011 International Conference in Denver.

"We found a compelling signal that some patients with pneumonia may develop cardiac arrest outside of the ICU, without apparent shock or respiratory failure," said lead investigator Gordon Carr, MD, pulmonary and critical Care fellow, at the University of Chicago Medical Center. "If this is true, then we need to improve how we assess risk in pneumonia."Dr. Carr and colleagues used a large registry of in-hospital cardiac arrest (IHCA) from the American Heart Association's Get with the Guidelines database to examine the characteristics of early cardiac arrest in patients with pre-existing pneumonia. Of 44,416 cardiopulmonary arrest events that occurred within 72 hours of hospital admission that had complete data, 5,367 (12.1 percent) occurred in patients with pre-existing pneumonia. Among those patients with pneumonia, almost 40 percent of cardiac arrests occurred outside of an intensive care unit. Furthermore, at the time of cardiac arrest, only 40 percent of patients with preexisting pneumonia were receiving mechanical ventilation, and 36.3 percent were receiving infusions of vasoactive medications. The distribution of patients with early IHCA was similar in the ICU and in the general ward. Survival was poor for all groups with early in hospital cardiac arrest.

"While our study design precluded definitive analyses of incidence or cause and effect, our main finding was that some patients with pneumonia and cardiac arrest did not appear to experience a premonitory period of overt critical illness," said Dr. Carr. "There appears to be an important group of patients with pneumonia who develop cardiac arrest without respiratory failure or shock."This is the first large study to report the characteristics of in-hospital cardiopulmonary arrest among patients with pneumonia. The finding that many of these patients are not receiving intensive care or interventions suggests that patients with pneumonia are either more vulnerable than previously thought to abrupt deterioration or that the triage methods used to determine whether a patient is in need of intensive care may be inadequate for patients with pneumonia.

"Decisions about ICU admission may need to be more proactive rather than reactive," Dr. Carr noted. "If we focus our intensive care resources on patients with obvious shock and respiratory failure, we may miss opportunities to intervene on other patients who are at high risk for abrupt deterioration."Future studies should investigate the incidence and causes of sudden, early cardiovascular collapse in patients with pneumonia and other forms of sepsis, and address ways to measure and mitigate this risk," he continued. "In the meantime, physicians need to be alert to the possibility of abrupt transitions in these patients."

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Finally, Dr. Carr suggested that these findings indicate a need for more research on the different phenotypes of sepsis, of which pneumonia is a major cause. "In recent years we have been lumping these patients into one big group, to facilitate research and the dissemination of care 'bundles'," he said. "In clinical reality, pneumonia and sepsis may be very heterogeneous, and patients who die from these diseases may follow different trajectories. Accordingly, we may need different risk assessment and therapeutic tools for different subgroups."

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