The Halo Effect of Adherence to Guidelines Extends to Patients with Severe Community-Acquired Pneumonia Requiring Admission to an Intensive Care Unit

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The community-acquired pneumonia (CAP) guideline writing industry started with a group of physicians who met in Halifax, Nova Scotia, on 22 and 23 November 1991 to write a guideline for the management of CAP. This led to an expanded group of “experts” who met in Boston, Massachusetts, in October 1992 for the same purpose, under the auspices of the American Thoracic Society. These 2 meetings resulted in the Canadian Thoracic Society [1] and American Thoracic Society [2] CAP guidelines. Subsequently, the Infectious Diseases Society of America (IDSA) issued its own guidelines [3], and then these 3 organizations revised or updated their guidelines [3–6]. Along the way, the Centers for Disease Control and Prevention issued guidelines designed to promote optimal use of antibiotics in the management of CAP [7], and guidelines for the management of CAP have been issued by many countries, of which only a couple are cited here [8, 9].

For the most part, these guidelines focus on the choice of empirical antibiotic therapy according to the site of care: home, hospital ward, or intensive care unit (ICU) [1–6]. Advice is also provided for diagnostic evaluation [5, 6], and criteria are given for admission to the hospital [4–6] and to the ICU [5, 6].

There are now a number of studies that have examined the effect of these guidelines on patient care. Institutions have made some modifications of the guidelines and have incorporated several aspects of their recommendations into the treatment of pneumonia, such as use of an admission guide, administration of antibiotic therapy according to the type of health care site, evaluation of time to receipt of antibiotics, and assessment of clinical stability as a guide to discharge into a critical pathway for the treatment of pneumonia.

The design of the studies [10–15] that have examined the effect of these guidelines have differed and include time series [10, 15]; comparisons of conditions before and after institution of the guidelines, with concurrent controls [11, 14]; and cluster randomization [12, 13]. Three studies showed a decreased length of hospital stay following the intervention [10, 13, 14], 1 study [11] showed a decrease in mortality, and 1 study [15] showed no effect on the length of hospital stay, which was the only variable measured in that study. However, 3 more-recent studies suggest that there is an added benefit to following guidelines, which has been called the “halo effect.” In art, a halo is a radiant circle or disk surrounding the head of a holy person, a representation of spiritual character through the symbolism of light. In psychology, the halo effect occurs when a person’s positive or negative traits seem to “spill over” from one area of their personality to another in others’ perceptions of them [16].

Marrie and Wu [17] examined factors responsible for mortality among all patients who were admitted to 6 hospitals in Edmonton, Canada, during a 2-year period in which the cases of patients with CAP were managed according to a critical pathway. The pathway consisted of admission guidelines, preprinted orders with 2 choices for antibiotic therapy, a discharge guideline, a smoking cessation guideline, and an assessment of pneumococcal and influenza vaccination status.

A total of 3043 patients were enrolled in the study; of these, 246 (8.1%) died [16]. Multivariable analysis of factors responsible for early (≤5 days after admission) and late mortality indicated that complete or partial pathway use was associated with a reduction in early mor-
tality but not in late mortality. Other factors associated with early mortality were risk score, age, site of care, functional status, necessity for an infectious diseases or respirology consultation, a lymphocyte count of $< 1 \times 10^3$ cells/L, and a potassium level $> 5$ mmol/L. Despite the fact that antibiotic therapy was acceptable for all patients, there was clearly a benefit to following the pathway either completely or partially.

In this issue of Clinical Infectious Diseases, Bodi et al. [18] report the results of their study, which was designed to examine prognostic factors associated with mortality among patients with severe CAP who were admitted to the ICU. The study was conducted at 33 hospitals in Spain from 1 December 2000 through 28 February 2002. A total of 529 patients were enrolled. The overall mortality rate was 27.9%. Patients with severe chronic illness or disability in whom pneumonia was an expected terminal event were excluded. In addition, patients from a nursing home were excluded. Overall adherence to IDSA guidelines was 57.8%. The mortality rate was lower for those with adherence to the guidelines than for those whose cases were not managed according to the guidelines (24.2% vs. 33.2%). Of note is the fact that 110 patients received monotherapy. It is interesting that, on multivariable analysis, factors associated with death during ICU stay were immunocompromised state, nonadherence to IDSA guidelines, APACHE II score, and age. Fifteen of the 20 patients with pneumonia due to Pseudomonas aeruginosa received inadequate therapy; 8 of these patients were in the IDSA guideline–adherent arm of the study, and 7 were in the nonadherent arm of the study. A conclusion from this study is that there is an effect that results from adhering to guidelines that is probably independent of the antibiotics selected.

In a study by Capelastegui et al. [19], conducted in northern Spain, 1 hospital was the intervention hospital, and 4 other hospitals provided control subjects. Pneumonia care was examined both prior to guideline implementation and during the 19 months after a guideline was implemented. The guideline consisted of admission decision criteria, a series of additional criteria to reduce the percentage of admissions of patients with less-severe CAP, the use of early appropriate antibiotic therapy, the timing of switch from intravenous to oral antibiotics, and criteria for discharge from the hospital.

The intervention cohort consisted of 417 patients, and the preintervention cohort consisted of 377 patients. When a number of processes of care were examined, there was no difference in the mean indicators for the control hospitals during the 2 time periods. In the intervention hospital, reductions were observed in the duration of antibiotic therapy (mean durations, 11.4 days vs. 12.9 days) and the duration of intravenous treatment (mean duration, 3.2 days vs. 4.5 days). There was a lower 30-day mortality rate and a lower in-hospital mortality rate, as well as a mean 1.8-day reduction in length of hospital stay for the intervention cohort. No difference was found among the external control cohorts for the 2 time periods.

Two recently published studies examining care at a large number of US hospitals (>3000) showed that processes of care for 4 conditions, one of which was pneumonia, improved considerably after the Joint Commission on Accreditation of Healthcare Organizations implemented standardized performance measures that were designed to track the performance of accredited hospitals and encourage improvement in the quality of health care [20, 21]. The measures assessed for CAP were oxygenation assessment within 24 h after admission; pneumococcal screening, vaccination, or both by discharge; culture of blood samples collected before initiation of antibiotic therapy; smoking-cessation counseling or advice; mean time from admission to initial antibiotic administration. Over the course of the study, the percentage of patients who had oxygenation assessment done increased from 95% to 99%; the percentage of patients receiving pneumococcal vaccination assessment increased from 28% to 50%; the percentage of patients with culture of blood samples collected before initiation of antibiotic therapy increased from 82% to 83%; the percentage of patients receiving smoking cessation counseling increased from 34% to 67%; the mean time to initiation of antibiotics decreased from 266 min to 227 min. With the exception of the increase in the percentage of patients with culture of blood samples collected before initiation of antibiotic therapy, all of the changes were statistically significant [20]. If there is indeed a “halo effect” (i.e., if by following guidelines there is an overall beneficial effect over and above the effect of the guidelines) as a bonus for obeying the rules, then mortality from pneumonia should be decreasing in the United States, an effect that should be readily measurable using administrative data.

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