Clinical Update

Use of a critical pathway for the management of community-acquired pneumonia: the CAPITAL study


Background

Many hospitals in Canada and the United States have implemented critical pathways (CPs) to reduce variation and control costs in the management of several common conditions. These pathways combine evidence-based practice parameters with guidelines for the timely completion of specific steps in the process of care. Whether they achieve their goals without compromising quality of care has not been rigorously studied as yet.1,2

Question

Does the use of a CP for the management of community-acquired pneumonia reduce hospital resource consumption without adversely affecting clinical outcomes?

Design

This study randomly allocated 20 Canadian hospitals to the use of either a CP or conventional management for the treatment of community-acquired pneumonia.1 Key components of the pathway included a risk-stratification tool (pneumonia severity index) to guide decision-making about hospital admission, a recommendation to use a single, broad-spectrum antimicrobial agent (levofloxacin, 500 mg once daily) and guidelines for the timing of conversion from intravenous to oral antibiotic therapy and hospital discharge. At the CP hospitals, patients were followed daily by a study nurse, who prompted the health care team about the patient’s progress along the CP by means of a written chart note. Steps were taken to ensure that treating personnel at the hospitals allocated to conventional management had no knowledge of any of the constituent parts of the critical pathway.

The number of bed-days per patient was used as the primary measure of resource consumption. Secondary measures included the proportion of low-risk patients admitted to hospital, the length of stay, the duration of intravenous antibiotic therapy and the proportion of patients receiving a single class of antimicrobial agent. Clinical outcomes included a quality-of-life measure (change, from admission to 6 weeks after completion of treatment, in the physical component summary scale of the Short-Form 36 [SF-36] instrument), as well as rates of pneumonia-related complications, admission to the intensive care unit, hospital readmission and death.

Results

Of the 20 hospitals, 9 treated patients using the CP, 10 used conventional management and 1 withdrew before implementation of the CP. Randomization had been stratified to ensure that each study arm comprised a similar mix of teaching and community hospitals. In total, 1743 eligible patients were enrolled; subjects treated at CP and conventional management hospitals were comparable in age, sex, pneumonia severity index score, baseline SF-36 physical summary scale score, room air oxygen saturation and proportion with chronic lung disease and multilobar pneumonia.

The number of bed-days per patient was significantly lower in the CP group than in the conventional management group (4.4 v. 6.1, \( p = 0.04 \)). Although admission rates among high-risk patients were comparable in the 2 groups, the rate among low-risk patients was significantly lower in the CP group (31% v. 49%, \( p = 0.01 \)). Patients in the CP hospitals also had lower median lengths of stay (5.0 v. 6.7 days, \( p = 0.01 \)), a shorter mean duration of intravenous antibiotic therapy (4.6 v. 6.3 days, \( p = 0.01 \)) and a higher rate of use of a single class of antimicrobial agent (64% v. 27%, \( p < 0.001 \)). The change in SF-36 physical summary scale scores and the rates of secondary clinical outcomes did not differ significantly between the 2 groups.

Commentary

This study’s major strength is its rigorous design. It represents the first large-scale attempt to assess the efficacy of a CP using methodology appropriate to the evaluation of therapeutic interventions (i.e., randomization). The study was not designed to assess the relative contributions of the various constituent parts of the CP or the extent to which success depended on the availability of a designated study nurse to facilitate adherence to the CP.

Implications for practice

The use of a CP for community-acquired pneumonia reduces hospital resource consumption and leads to clinical outcomes comparable to those achieved through conventional management. Further research is needed to determine optimal strategies for implementation of, and adherence to, CPs. — Donald Farquhar

References