



Original Article

Improved Management of Community-Acquired Pneumonia in the Emergency Department[☆]

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ABSTRACT

Objectives: To determine the impact of implementing clinical practice guidelines (CPGs) in the treatment of community-acquired pneumonia (CAP) in the emergency department (ED) by analyzing case management decisions (admission or discharge, appropriateness and timeliness of antibiotic therapy, complementary tests) and the consequent results (clinical stabilization time, length of hospital stay, re-admission to ED and mortality).

Methods: A prospective, observational, descriptive, comparative study carried out from 1st January 2008 to 1st August 2009 in two phases: before and after the implementation of the "Management of CAP in ED" SEMES-SEPAR (Spanish Society of Emergency Medicine – Spanish Society of Pneumology and Thoracic Surgery) clinical practice guidelines from 2008. Two hundred adult patients treated in the ED with a diagnosis of CAP were included in the study, both in the pre-intervention and post-intervention groups. **Results:** The application of the guidelines increased the administration of early and appropriate antibiotic therapy ($P<.001$) and shortened both the total antibiotic therapy ($P<.001$) and the intravenous antibiotic therapy ($P=.042$) times. Time to clinical stabilization ($P=.027$), length of hospital stay (1.14 days, $P=.01$), intra-hospital mortality ($P=.004$) and total 30-day mortality ($P=.044$) were all reduced. Assessment with the Pneumonia Severity Index (PSI) and biomarkers aided in appropriate decision-making concerning admission/discharge ($P<.001$).

Conclusions: The implementation of the SEMES-SEPAR 2008 guidelines, along with the use of PSI and biomarkers, significantly improved the entire treatment process of CAP. This benefitted both patients and the system by reducing mortality and improving the results of other patient management factors.

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Mejora del manejo de la neumonía adquirida en la comunidad en el servicio de urgencias

RESUMEN

Objetivos: Determinar el impacto de la implementación de una guía de práctica clínica (GPC) en el proceso asistencial de la neumonía adquirida en la comunidad (NAC) en un servicio de urgencias (SU), analizando los indicadores de manejo (decisión de alta o ingreso, adecuación y precocidad de la antibioterapia, solitud de estudios complementarios) y de resultados (tiempo de estabilización clínica, tiempo de estancia hospitalaria, reconsultas en el SU y mortalidad).

Métodos: Estudio prospectivo, observacional, descriptivo y comparativo realizado desde el 1 enero de 2008 al 1 agosto de 2009 en 2 fases, antes y después de la implantación de la GPC «Manejo de la NAC en los SU» SEMES-SEPAR 2008. Se incluyó a 200 pacientes adultos atendidos en el SU con el diagnóstico de NAC tanto en el grupo preintervención como en el postintervención.

Resultados: El uso de la GPC consiguió aumentar la administración precoz adecuada del antibiótico ($p<0,001$) y disminuir el tiempo de tratamiento antibiótico total ($p<0,001$) e intravenoso ($p=0,042$),

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así como reducir el tiempo hasta la estabilización clínica ($p=0,027$), la estancia hospitalaria (1,14 días, $p=0,01$) y la mortalidad intrahospitalaria ($p=0,004$) y global a los 30 días ($p=0,044$). El uso del *Pneumonia Severity Index* (PSI) y los biomarcadores ayudaron a mejorar la adecuación de la decisión: alta o ingreso ($p<0,001$).

Conclusiones: La implementación de la GPC SEMES-SEPAR 2008 con el uso del PSI y los biomarcadores mejoró de forma significativa todo el proceso asistencial de la NAC, siendo beneficiosa para los enfermos y para el sistema al lograr disminuir la mortalidad y el resto de indicadores de resultados y de manejo.

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Introduction

Community-acquired pneumonia (CAP) is the leading cause of death due to infectious disease in the West (from 10% to 14%, depending on age and associated risk factors) and produces a large proportion of the cases of sepsis (S), severe sepsis (SS) and septic shock (SSh) seen in Emergency Departments (EDs).¹ In Spain, it occurs at a rate of about 2–5 cases/1000 inhabitants/year and can rise to 15–35 cases/1000 inhabitants/year at times of viral epidemics, in the over-65s and in patients with chronic disease or toxic habits.² The diagnostic and therapeutic approach and management of CAP patients are known to vary widely between different centers and between clinicians in a single center.^{3–5} This is one of the reasons that explain the very different admission rates, ranging from 22% to 61% depending on the center, different specialists and the time of year. The request for complementary tests, choice of antimicrobials, intensity of the care offered and use of resources vary greatly between centers, and are often determined by the characteristics, resources, location and experience of the physicians working in the EDs.⁶ However, this variability means that the prognosis and disease course of patients with CAP are also different.⁷ It is estimated that 75% of patients with CAP are seen in EDs, revealing the importance of the role of the emergency physician (EP) in the initial management and, consequently, the subsequent progress, morbidity and mortality of the disease.^{1,2,6} Determining the need for admission of the CAP patient (when), the appropriate location (where) and the care required by the patient (how) are the most important decisions that the EP must take, and will impact on the patient's prognosis (morbidity and mortality), requests for laboratory tests and microbiology studies, choice of the initial antimicrobial regimen, intensity of the clinical observation and use of socio-sanitary resources.⁸ All these affect the final cost, which increases 8 to 25-fold if the patient is admitted compared to being treated at home.⁹ Along with the decision regarding where the patient should be treated, early administration of the appropriate antimicrobial regimen and the necessary hemodynamic and respiratory support are the factors that most closely determine the progress and mortality of patients with CAP.¹⁰ For this reason, many authors in recent years have been calling for a "CAP/Pneumonia Code Zero" protocol or clinical practice guideline (CPG),¹⁰ such as those available for acute coronary syndrome or stroke,¹¹ which would allow the immediate prioritization and treatment by objectives of the CAP patient in the ED, particularly those with SS or SSh, which in turn could lead to a reduction in clinical variability and mortality.^{10,12} Many studies have shown the usefulness and efficacy of CPG in CAP,^{13–16} although most were carried out by pneumology specialists and only analyzed hospitalized patients. Recently, however, others have been published which include discharged patients who represent 35%–50% of the CAP patients seen in the ED.^{17,18} Although the efficacy and efficiency of CPGs is recognized, clinicians generally adhere poorly to these guidelines and up to 35%–65% admit to not using them at all.^{4,19,20}

The implementation of a CPG for EDs which has been agreed upon with other specialists and is adapted to the center is probably the best tool for reducing clinical variability and improving case management.^{15–18} In our hospital, during 2008, clinical variability

was wide and adherence to the reference CPG was very poor (less than 40%).²¹ That same year, the document "Management of CAP in the ED"^{1,22} was published by TIR-SEPAR (Tuberculosis and Respiratory Infections Area of the Spanish Society of Pneumology and Thoracic Surgery) and INFURG-SEMES (Infections in Emergency Study Group of the Spanish Society of Emergency Medicine) to serve as an instrument for reducing clinical variability and improving the overall management of CAP in EDs.¹ The aim of our study was to determine the impact of implementing the SEMES-SEPAR 2008 CPG in our ED on the care of CAP, comparing management indicators (discharge or admission, appropriateness and timeliness of antibiotic therapy, complementary tests) and the results (length of hospital stay, clinical stabilization time, re-admission to ED and mortality) before and after implementation of this CPG.

Patients and Methods

Study Site

The study was conducted in the Complejo Hospitalario de Toledo. This is a tertiary level 800-bed hospital belonging to SESCAM (Castilla La Mancha Health Service) with a referral area of 435 000 inhabitants. The ED has an internal medicine area attended by a staff EP and resident physicians from various medical specialties. During 2008 and 2009, an average of 416 and 430 emergencies/day, respectively, were evaluated and the incidence of CAP in patients ≥ 18 years of age was 0.92% and 0.98% of the patients seen in the ED (3.21 and 3.56 cases/1000 inhabitants/year, respectively). Patients with CAP may be discharged from the ED (including those who remain under observation for up to 24 h) or admitted to the intensive care unit (ICU) or to the SSU (short stay unit) of the pneumology, internal medicine or geriatric wards or, to a lesser extent (<3%) may be admitted to other departments with their own 24-h duty specialists (nephrology and hematology). The EP takes the decision regarding admission and the department to which the patient is initially admitted, except in the case of the ICU, where the duty intensive medicine specialist is consulted.

Study Design

This was an observational, single-blind study with prospective follow-up of patients in two phases: before and after intervention consisting of implementation of the "Management of CAP in EDs" (SEMES-SEPAR 2008) CPG^{1,22} along with training sessions for all EPs and residents of the center on the CPG, as described below.

Study Periods and Study Population

Two independent collaborators unknown to the rest of the EPs throughout the study evaluated the initial eligibility of the subjects who attended the ED between 1 January 2008 and 1 August 2009, until 200 patients were consecutively included in the pre-intervention phase (1 January 2008–30 September 2008) and another 200 in the post-intervention phase (4 October 2008–1 August 2009). To be included, patients had to meet the following criteria: adult patients (≥ 18 years of age),

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