

Epidemiologic study of community-acquired pneumonia treated at a tertiary-care hospital: Does Fine's pneumonia severity index influence decision-making in the emergency department?

PERE LLORENS, JOSÉ MURCIA, FADOUA LAGHZAOU, ELENA MARTÍNEZ-BELOQUI, ROGELIO PASTOR, VÍCTOR MARQUINA, SERGIO RAMOS, INMACULADA JIMÉNEZ, ISABEL LANDETE, FRANCISCO ROMÁN, ALEJANDRO ALBERT-JIMÉNEZ

Servicio de Urgencias, Unidad de Corta Estancia y Unidad de Hospital a Domicilio. Hospital General Universitario de Alicante, Spain.

CORRESPONDENCE:

Pere Llorens Soriano
Servicio de Urgencias
Unidad de Corta Estancia y UHD
Hospital General Universitario
de Alicante
Calle Pintor Baeza nº 12
03010 Alicante, Spain
E-mail: llorens_ped@gva.es

RECEIVED:

5-11-2008

ACCEPTED:

17-12-2008

CONFLICT OF INTEREST:

None

Objectives: To determine the incidence of community-acquired pneumonia and describe its characteristics. To assess differences influenced by Fine's pneumonia severity index.

Methods: Prospective, descriptive study of patients with community-acquired pneumonia treated over a period of 1 year in the emergency department of Hospital General Universitario in Alicante, Spain. Social, demographic and clinical variables (including laboratory, radiologic, and microbiologic data) were collected. Destination on discharge from the emergency department and patient status at 30 days were recorded. The pneumonia severity index was determined according to Fine's prediction rule, and patients were then classified as being at low (\leq III) or high ($>$ III) risk. Differences between the 2 risk classes and the distribution of admissions according to risk were analyzed.

Results: Five hundred fifty patients with community-acquired pneumonia were included. The cumulative incidence was 2.2 cases per 1000 patient-years. Patients with community-acquired pneumonia at high risk had more comorbidity and functional decline, a higher incidence of respiratory failure, and infiltrates in multiple lobes. An etiologic diagnosis was established for 209 patients (38%). The most common microorganism isolated was *Streptococcus pneumoniae* in all risk classes. The admission rate was 77.2% (high-risk classes, 99.5%; low-risk, 65.1%). The patients were admitted to the respiratory medicine department, the short-stay unit, and the internal medicine department. Risk class influenced patient destination on discharge from the emergency department.

Conclusions: Patients with community-acquired pneumonia classified as being at high risk (older patients, with functional decline, comorbidity, multilobar infiltrates, sensory abnormalities, and elevated lactate levels) are most often admitted to the short-stay unit and internal medicine department. A large percentage of community-acquired pneumonia patients in low-risk classes are admitted to hospital. [Emergencias 2009;21:247-254]

Key words: Community-acquired pneumonia. Clinical characteristics. Fine's pneumonia severity index. Emergency health services. Short-stay unit.

Introduction

Community-acquired pneumonia (CAP) is a major cause of morbidity and mortality, and in industrialized countries it is the leading infectious

cause of death. In addition, its relatively high frequency, ranging from 5-11 cases per 1000 people per year in Europe (and rising to 25-35 cases per 1000 people older than 75 years)¹, means that the cost of CAP-related healthcare is consid-

erable, estimated at over 4,000 million U.S. dollars per year in USA. In the context of Emergency Department(ED) services, CAP is one of the leading causes of hospital admission for infectious diseases, together with urinary tract infection². The percentage of patients with CAP requiring hospitalization varies greatly according to the series (12-66%)^{3,4}, which is why a large number of studies on this disease are aimed at the development of prognostic scales to aid decision-making on hospital admission⁵⁻⁷ of these patients, as well as strategies to reduce hospital stay^{8,9}. One of the most widely accepted indexes used for CAP prognosis is the Pneumonia Severity Index (PSI) or Fine's index (FI)⁶. This index classifies patients with CAP into 5 classes of risk or severity by scores based on 19 prognostic factors (age, chronic diseases, clinical findings and analytical alterations).

Apart from its use to predict 30-day CAP-related mortality, the PSI has been used to assess the need for hospital admission, level of care or choice of antibiotic treatment.

In recent decades, we have witnessed demographic changes in our population; patients are increasingly elderly and there is increased prevalence of chronic diseases and patients with multiple diseases, which may modify the clinical and microbiological pattern of CAP presentation¹⁰⁻¹². The appearance of new microbiological techniques and the availability of new antibiotic treatments mean that epidemiological studies are important to inform us of the current situation in our area and work center.

The ED plays a vital role in attending patients with this disease; it is here where the diagnosis of CAP and its prognosis is established, where antibiotic treatment is initiated, where samples are collected for laboratory tests and where the decision on hospital admission is taken. All this helps improve the efficiency of our clinical practice.

Therefore, our objective was to perform an epidemiological study of patients with CAP attended at our ED during a one year period to reflect the clinical and microbiological features, and the need for hospital admission and location, based on the application of Fine's prognostic index.

Method

We performed a one-year prospective study, between 1 January and 31 December 2006, in

the ED of the *Hospital General Universitario de Alicante* (HGUA), a tertiary care 800-bed hospital serving a population of 300,000 people, with a Short Stay Unit (STU) attached to the ED.

The study included all ED adults diagnosed with CAP according to the following criteria: presence of previously non-existent infiltrate on chest X-ray, associated with respiratory symptoms and infectious syndrome in the absence of an alternative diagnosis. Pneumonia was considered as segmental when only one lung segment was involved, lobar when more than one segment of the same lobe was involved and multilobar when more than one lobe was affected. We also recorded the presence of pleural effusion on chest X-ray.

Once the diagnosis of CAP was established, the ED physician responsible for care of the patient entered the following variables on a standardized data base: age, sex, usual residence, as well as contact with animals (pets at home, work with animals, type of animal), recent trips (to other countries, destination specified), physical activity according to the functional Barthel index¹³, associated comorbidities, including chronic obstructive pulmonary disease (COPD), heart failure (HF), diabetes mellitus (DM), infection with human immunodeficiency virus (HIV), associated neoplasm, treatment with oral corticosteroids in the last month, renal failure, active smoking, regular intake of alcohol, use of intravenous drugs, correct vaccination against *Influenzae* virus or *Streptococcus pneumoniae*, as well as laboratory variables [temperature, heart rate, systolic and diastolic blood pressure, baseline oxygen saturation determined by capillary oximetry, total leucocytes, polymorphonuclear neutrophils, haematocrit, glucose, urea, creatinine, natremia, C-reactive protein (CRP), lactate, pH, pO₂ and pCO₂]. Patient inclusion and data collection was conducted consistently over the entire study period.

FI score was calculated in the ED and patients with scores of I,II and III were classified as low-risk CAP, while those with FI scores of IV and V were classified as high-risk CAP. We also calculated the CURB-65 index, using 5 variables: urea >7 mmol/l, respiratory rate >30 bpm, arterial systolic pressure >90 or diastolic pressure <60 mmHg and age over 65 years. Scores on this index are calculated by adding one point for each variable present, and therefore may range from 0 to 5. Scores of 0 and 1 point are considered low-risk CAP.

The attending physician was responsible for the choice of antibiotic treatment, sampling for the etiologic study of CAP and deciding on the

Table 1. Protocol for care of patients with community-acquired pneumonia (CAP) in the emergency department

Prognostic Scale	Microbiological study	Antibiotic treatment	Destination
- Fine: I-II - CURB65: 0-1	- Sputum culture - Antigenuria <i>Legionella</i> and urinary pneumococcus - Consider microbiology blood test blood	- Levofloxacin 500 mg / day (7 to 10 days) - Moxifloxacin 400 mg / day (7-10 days) - Amoxicillin 1 g/8 hours + (azithromycin 500 mg/day or clarithromycin 500 mg/12 hours) (7-10 days)	- Discharge and follow-up day hospital of the unit infectious diseases in (IDU)
- Fine: III - CURB65: 2	All the previous plus: - Seried blood tests	- Monotherapy: levofloxacin - Combination therapy 3 rd generation cephalosporin or amoxicillin-clavulanate + macrolides (azithromycin or clarithromycin)	- Conventional hospitalization - Consider SSU*
- Fine: IV - CURB65: 3	All the previous plus	- Combination therapy: Cephalosporins 3 rd + macrolide or levofloxacin - Suspected aspiration: Amoxicillin-clavulanate (2 g/8 h) or ertapenem - Suspected <i>Pseudomona</i> : Cefepime or carbapenem or piperacillin-tazobactam + quinolone (ciprofloxacin or levofloxacin) or aminoglycoside	- Conventional hospitalization - Consider SSU**
- Fine: V - CURB65: 4-5	All the previous plus: - Consider bronchoscopy	Same as previous	- Conventional hospitalization - Intensive Care Unit - Consider SSU**

*Patients with Fine Index III and good general state with prognosis of rapid recovery, consider admission to the Short Stay Unit or Discharge plus Home Hospitalization Unit control.

**In patients with functional decline and clinical fragility where hospitalization is expected to have a negative impact, consider follow-up with the Home Hospitalization Unit.

destination of patients at discharge from the ED, in accordance with the ED's protocol (Table 1).

All patients were contacted (face-to-face interview or by telephone 30 days after diagnosis to record their current situation: recovery or improvement, re-admission or death.

Quantitative variables are expressed as mean and standard deviation. For the comparison between groups, we used Student t or Mann-Whitney U test, as appropriate.

To compare three or more groups we used ANOVA or Kruskal-Wallis test, as appropriate. For the study of association between quantitative variables, we used the Spearman or Pearson's correlation coefficient, as appropriate. For the association of qualitative variables, we used Chi² test or Fisher's exact test when necessary. A p level of <0.05 was considered statistically significant. The statistical program used was the SPSS V.10.0.

Results

During the study period we recorded 623 patients with CAP in our ED. Information obtained from the 30-day follow-up allowed us to exclude the diagnosis of CAP for 73 patients (46 with respiratory infection without pulmonary infiltrates on X-ray, 15 with bronchiectasis, 10 with heart failure, and 2 with lung cancer). Monthly distribution of patients is shown in Figure 1. The cumulative

incidence of CAP for the one-year study period was 2.2 cases per 1000 inhabitants.

The distribution of CAP according to the Fine Index and CURB-65 index is shown in Table 2. The CURB-65 score was not calculated for 21 patients. Sixty two percent (343 patients) on the Fine Index and 73% (343 patients) according to the CURB-65 index were classified as low-risk. The overall percentage of hospital admissions was 77% (424 patients).

In the comparative analysis, we excluded 3 patients with low-risk CAP due to missing data (explanatory variables).

Table 3 shows the clinical and laboratory variables of CAP patients attended at our ED the differences according to FI scores. We detected 29 significant variables, most notably functional deterioration, increased lactate and multilobar infiltrate in high-risk CAP patients, and in the low-risk CAP patients we observed increased frequency of HIV infection, alcohol consumption, tobacco and intravenous drug injection.

Table 4 shows the distribution of hospitalized CAP patients and department assignment according to FI scores. As can be seen, the distribution was not uniform and there were statistically significant differences (p < 0.001).

Etiological diagnosis was obtained in 209 patients (38%); the distribution of the pathogen involved is shown in Table 5. *Streptococcus pneumoniae* was the main pathogen involved, regardless

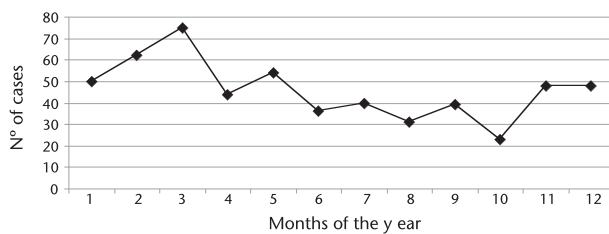


Figure 1. Monthly distribution from January to December (1-12) of the 550 patients diagnosed with community-acquired pneumonia in the emergency department of the Hospital General Universitario de Alicante.

of the severity of pneumonia. In patients with high-risk pneumonia there was a low prevalence of atypical micro-organisms (*Mycoplasma*, *Legionella* and *Chlamydia*) and increased prevalence of *Haemophilus influenzae* and the enterobacterias (*E. coli*, *Klebsiella pneumoniae* and *Enterobacter*

Table 2. Distribution of patients with community-acquired pneumonia according to the Fine and CURB-65 prognostic indexes

Fine index n = 500	n (%)	CURB-65 n = 529	n (%)
I-II	208 (37.8)	0-1	402 (73.1)
III	136 (24.7)	2	101 (18.3)
IV	159 (28.9)	≥3	26 (4.7)
V	47 (8.5)		

mainly). There were significant differences ($p < 0.001$) in the overall distribution of cases.

Table 6 shows the microbiological tests performed and the resulting diagnoses. Of the 550 patients with a final diagnosis of CAP, follow up at 30 days was performed in 518 patients. Mean Hospital stay was 8 ± 7 days. There was a clinical cure in 468 patients (90%) and 44 patients died (8.4%). Six patients were readmitted (1.1%) dur-

Table 3. Analytical and clinical characteristics of patients with community-acquired pneumonia (CAP) and differences between the low-risk and high-risk patients

	Total CAP N = 547	Low-risk CAP N = 341	High-risk CAP N = 206	P
Age (years), mean ± SD	60.3 (20.8)	50.7 ± 18.8	76.6 ± 12.2	< 0.001
Male sex; n (%)	360 (65.5)	215 (62.8)	145 (70.4)	0.07
Recent travels; n (%)	17 (3.1)	14 (4.1)	3 (1.5)	0.08
Rural habitat; n (%)	43 (7.8)	30 (8.8)	13 (6.3)	NS
Close to animals; n (%)	84 (15.3)	67 (19.6)	17 (8.3)	< 0.001
Physical dependence (Barthel Index < 80); n (%)	146 (26.5)	27 (7.9)	119 (57.8)	< 0.001
COPD; n (%)	124 (22.5)	57 (16.7)	67 (32.5)	< 0.001
Heart failure; n (%)	108 (19.6)	39 (11.4)	69 (33.5)	< 0.001
Diabetes mellitus; n (%)	125 (22.7)	51 (14.9)	74 (35.9)	< 0.001
HIV; n (%)	28 (5.1)	24 (7)	4 (1.9)	< 0.01
Neoplasm; n (%)	53 (9.6)	17 (5)	36 (17.5)	< 0.001
Renal failure; n (%)	53 (9.6)	12 (3.5)	41 (19.9)	< 0.001
Corticosteroid therapy; n (%)	38 (6.9)	17 (5)	21 (10.2)	< 0.05
Alcohol consumption; n (%)	74 (13.5)	57 (16.7)	17 (8.3)	< 0.01
Tobacco consumption; n (%)	193 (35.1)	149 (43.6)	43 (20.9)	< 0.001
IDUs; n (%)	15 (2.7)	12 (3.5)	3 (1.5)	NS
Influenza vaccine; n (%)	195 (35.5)	79 (23.1)	116 (56.3)	< 0.001
Pneumococcal vaccine; n (%)	126 (22.9)	47 (13.7)	79 (38.3)	< 0.001
Temperature (°C), mean ± SD	37.6 ± 1.01	37.6 ± 0.9	37.7 ± 1.0	NS
Heart rate (l/m), mean ± SD	96.1 ± 19	92.8 ± 17.1	101 ± 21.1	< 0.001
Respiratory rate (bpm), mean ± SD	21 ± 6.5	18.9 ± 5.0	24.4 ± 7.2	< 0.001
Systolic blood pressure (mmHg), mean ± SD	126 ± 25.2	126 ± 20.2	126 ± 32.0	NS
Diastolic blood pressure (mmHg), mean ± SD	71 ± 13.5	73.2 ± 12.2	69.1 ± 15.1	< 0.05
Basal oxygen saturation (%) mean ± SD	92.1 ± 6.2	94.0 ± 5.0	88.9 ± 6.8	< 0.001
Altered mental status (%) mean ± SD	67 (12.2)	3 (0.9)	64 (31.1)	< 0.001
Total WBC (mm ³), mean ± SD	13.342 ± 7.906	12.641 ± 7.974	14.525 ± 7.688	< 0.05
% Pmn neutrophils, mean ± SD	77.7 ± 11.2	76.2 ± 10.5	80.2 ± 11.9	< 0.001
Hematocrit (%) mean ± SD	38.8 ± 5.3	39.5 ± 4.9	37.7 ± 5.7	< 0.001
Glucose (mg/dL), mean ± SD	138 ± 85	128 ± 90.7	155 ± 72.1	< 0.001
Urea (mg/dL), mean ± SD	49 ± 35.3	37.2 ± 26.2	69.2 ± 39.4	< 0.001
Creatinine (mg/dl), mean ± SD	1.2 ± 1	0.9 ± 0.7	1.6 ± 1.3	< 0.001
Sodium (mEq/l), mean ± SD	138 ± 5.3	138 ± 4.2	137 ± 6.8	NS
CRP (mg/dl), mean ± SD	14.3 ± 12.1	13.3 ± 11.7	15.7 ± 12.5	NS
Lactate (mmol/L), mean ± SD	1.86 ± 1.7	1.3 ± 0.9	2.3 ± 2.2	< 0.01
pH, mean ± SD	7.42 ± 0.06	7.44 ± 0.05	7.40 ± 0.08	< 0.001
PO ₂ (mmHg), mean ± SD	69 ± 18.1	73.6 ± 17.7	63.2 ± 17	< 0.001
PCO ₂ (mmHg); mean ± SD	39.5 ± 10.5	38.7 ± 9.4	40.5 ± 11.6	0.08
Multilobar infiltrate; n (%)	88 (16)	41 (12)	47 (22.8)	0.001
Pleural effusion; n (%)	79 (14.4)	49 (14.3)	30 (14.6)	NS

COPD: chronic obstructive pulmonary disease. IDU: intravenous drug user. WBC: white blood cells. Pmn: polymorphonuclear CRP: C-reactive protein. SD: Standard deviation.

Table 4. Distribution of hospital admissions according to severity of pneumonia ($p < 0.001$ for the global distribution)

	Total CAP N = 424 N (%)	Low-risk CAP N = 222 N (%)	High-risk CAP N = 202 N (%)
Short Stay Unit	130 (30.6)	50 (22.5)	80 (39)
Respiratory Diseases	154 (36.3)	117 (52.7)	37 (18)
Internal Medicine	62 (14.6)	13 (5.8)	49 (23.4)
Infectious Diseases Unit	36 (8.4)	29 (13)	7 (3.3)
Intensive Care Unit	12 (2.8)	1 (0.4)	11 (5.3)
Other destinations*	30 (7)	12 (5.4)	18 (8.9)

CAP: community acquired pneumonia. *Other destinations: Oncology Hematology, Nephrology, Socio-health hospital.

ing follow-up: 4 patients with a Fine Index score of I-II (2 were discharged from the ED, 1 was admitted to the Respiratory Diseases Department and another to the Short-Stay Unit) and 2 patients with a Fine index score of IV (1 admitted to Internal Medicine and 1 to the Short-Stay Unit). The mortality rate according to Fine Index classification was as follows: I-II 1.9%; III 1.4%; IV: 11.3% and V 44.6%.

Discussion

The incidence of CAP in our study was 2.2 cases per 1000 inhabitants and year. There is wide variability in the incidence of CAP in Western countries, ranging from 1 to 15 cases per thousand inhabitants per year, which could be explained by differing diagnostic criteria, seasonal variations, or the study setting¹⁴. Thus, in European studies, the incidence of CAP has been reported as 5 cases per 1000 inhabitants per year in 15-79 year-olds in England¹⁵ and 9 cases per 1000 inhabitants per year in Finland¹⁶. In Spain, Almirall et al¹⁷ reported an incidence of CAP in a Mediterranean area (Maresme) among patients >13 years of 2.6 cases per 1000 inhabitants per year, which is similar to the findings of our study.

Our work is the first epidemiological study on CAP in an ED setting. While this approach may underestimate the incidence of CAP, since it ex-

Table 6. Microbiological studies

	Requested [n (% total)]	Positive Results [n (% of requests)]
Sputum culture	313 (56.9)	85 (27.1)
Pneumococcal antigen in urine	436 (79.3)	90 (20.6)
<i>Legionella</i> urinary antigen	434 (78.9)	13 (3)
Blood cultures	350 (63.6)	25 (7.1)
Serology	195 (35.5)	47 (24.1)

Table 5. Etiologic diagnosis of patients with community acquired pneumonia ($p < 0.001$ for the global distribution)

	Total CAP N = 209 N (%)	Low-risk CAP N = 138 N (%)	High-risk CAP N = 71 N (%)
<i>Streptococcus pneumoniae</i>	101 (48.3)	69 (50)	32 (45)
<i>Mycoplasma pneumoniae</i>	26 (12.4)	26 (18.8)	0 (0)
<i>Legionella pneumophila</i>	11 (5.2)	8 (5.7)	3 (4.2)
Other atypical*	13 (6.2)	11 (7.9)	2 (2.8)
<i>Haemophilus influenzae</i>	20 (9.5)	9 (6.5)	11 (15.4)
Enterobacteria**	16 (7.6)	3 (2.1)	13 (18.3)
<i>Pseudomona aeruginosa</i>	5 (2.3)	1 (0.7)	4 (5.6)
Other	17 (8.1)	11 (7.9)	6 (8.4)

*Other atypical: *Chlamydia pneumoniae*, *Chlamydia psittaci*, *Coxiella Burnetti*. **Enterobacteriaceae: *Escherichia coli*, *Klebsiella pneumoniae*, *Enterobacter spp.*

cludes cases diagnosed and treated on a primary care outpatient basis, it has the advantage of reflecting the reality of hospital management of CAP, regardless of final destination.

The average age of our patients was 60 years, higher than that reported in previous studies performed in similar geographic areas^{1,12}. This difference could be explained by the progressive ageing of the general population since the two cited studies were performed, the large number of elderly people in our health area, and probably because the primary care health centres filter out many younger people with less morbidity, so a smaller proportion of younger people visit the ED of our hospital.

With regard to clinical features, we observed a lower prevalence of pleural effusion (14%) compared to other series which have described rates of 20 to 40% in patients with neumonía¹⁸. This might be explained by the fact that these series included patients that were hospitalized with CAP, where pleural effusion is more frequently found.

The incidence of multilobar infiltration, a known risk factor for mortality^{6,19-21}, was higher in high-risk patients.

In high-risk patients, lactate levels were also higher than in those at low risk of death due to CAP (2.3 ± 2.2 versus 1.3 ± 0.9 , $p < 0.01$), a finding which is consistent with the literature that defines lactate level as a marker of high risk, with independent predictive value and as an indicator of the need to carry out intensive therapeutic care and Intensive Care Unit admission²².

Both groups of patients displayed elevated levels of C-reactive protein, indicative of systemic infection, severe and / or bacterial rather than viral or inflammatory and non-infectious, and which has been defined as a valuable parameter for care and control during evolution, as well as gaining importance as an independent marker of severity in CAP^{23,24}.

Etiological diagnosis was obtained in 209 (38%) of 550 patients with final diagnoses of CAP, lower than in other series which generally report etiological diagnoses in about half the cases^{1,12}, where blood tests were performed for viral and intracellular agents. *Pneumococcus* was the organism most frequently identified in low-risk patients, coinciding with results of previous studies^{1,8,12} which emphasize the importance of using active antibiotics against this organism. Atypical pathogens, especially *Mycoplasma pneumoniae* and *Legionella spp*, constituted the second most frequent cause of CAP after *pneumococcus*. In our study, *Mycoplasma* was the causative agent in 12.4% of cases and in all low-risk patients. The following most frequent pathogens were *H. influenzae* (10%), enterobacteria (8%), and *Pseudomonas spp* (2%), found mainly in high-risk CAP patients. Thus, as in two European studies^{25,26}, it appears that comorbidity rather than age predisposes the patient to this etiology, mainly in those with lung disease such as COPD (22% in our series).

In our study, 8 of 11 cases of infection by *Legionella spp* (6% of the total) were classified as low-risk (2% of the CAP low-risk group) and 3 high-risk (1.5% of the high-risk group). Recent data show that many more cases of *Legionella* infection present as a mild-moderate disease than severe^{27,28}. Viral causes of adult CAP varies between 5-20%²⁹. This information was unavailable in our study since specific viral or blood tests were not performed.

The distribution of CAP according to the prognostic Fine Index was similar to that of other series^{12,14,30,31} since most were in the low-risk group. We found differences in the percentage of low risk patients as defined by the Fine Index or the CURB-65 (62% and 73% respectively). Both scales predict mortality of patients with CAP with the same reliability. The differences are that in the Fine Index *age* has great specific weight and in CURB-65 the most important aspects are those of acute severity. In fact, experts recommend that the two scales be used to determine hospital admission³².

In our study, 77% of patients with CAP were admitted to hospital. Admission rates in Europe vary between 22% reported in a study in England¹⁵ to 61% in Spain¹. In a recent study in Mallorca³, 63% of patients initially attending the ED were admitted compared with 11% of those who initially visited their health centre. However, despite the use of prognostic scales, there is excessive admission of patients with CAP, even when classified as low-risk. The presence of other variables not includ-

ed in the Fine Index (inability to take oral medication, significant vomiting, presence of hypoxemia, or psycho-social problems preventing taking medication, addiction to drugs, alcohol) may justify this high rate of hospital admissions of low-risk CAP patients^{33,34}. Home treatment significantly reduces costs of care³⁵, and achieves faster return-to-activity and greater satisfaction³⁶.

In a recent study using the Fine Index³⁷, 40% of the patients had very low risk scores and showed very low mortality, which indicates that there are other reasons for admitting these patients that are not included in this scale. Currently, the recommendation is to use a combination of these prognostic scales, where low risk patients (Fine Index I, II and III and CURB-65, 0 and 1) should be treated on an outpatient basis in the absence of vital sign changes, associated comorbidities, psycho-social problems or other disease requiring hospitalization. In all cases, the decision on hospital admission should be individualized and in case of doubt, must be based on clinical experience and common sense, taking into consideration the preference of the patient.

We found a widely varied distribution in the destination of our patients with CAP. Of the 424 inpatients, 36% were located in the department of Respiratory Disease, 31% in the Short-Stay Unit and 14% in Internal Medicine. A noteworthy finding was a higher percentage of high-risk CAP patients admitted to the Short-Stay Unit. The SSU is a health care alternative with proven effectiveness in managing different processes, although the model differs widely among the various such units currently in operation. In this sense, the utility of the SSU is particularly evident in the management of elderly CAP patients with chronic decompensated diseases or terminal illness requiring palliative treatment^{38,39}.

The high percentage of low-risk CAP patients admitted to Respiratory Diseases might be partly explained by younger patients with hypoxemia and pleural effusion, or because this subgroup may need special additional diagnostic tests or complex therapy^{40,41}. Similarly, those hospitalized in the department of Infectious Diseases are usually young patients with HIV infection.

From our study, we may conclude that high-risk CAP patients are generally elderly, with functional impairment, comorbidity, respiratory failure, multilobar infiltration, reduced consciousness and increased lactate production.

These patients are more frequently admitted to hospital departments that offer comprehensive care, particularly the SSU and Internal Medicine. A high percentage of low-risk CAP patients are ad-

mitted to hospital, which indicates the need for studies designed to identify the reasons for admission in these patients.

References

- Almirall J, Bolibar I, Vidal J, Sauca G, Coll P, Niklason B, et al. Epidemiology of community acquired pneumonia in adults: a population-based study. *Eur Respir J*. 2000;15:757-63.
- Grupo de estudio de las infecciones en urgencias. Estudio epidemiológico de las infecciones en el área de urgencias. *Emergencias*. 2000;12:80-9.
- Santos de Unamuno C, Llorente MA, Carandell E, Gutiérrez M, Riera J, Ramírez A, et al. Lugar de atención, etiología y tratamiento de las neumonías adquiridas en la comunidad de Palma de Mallorca. *Med Clin (Barc)*. 1998;110:290-4.
- Murrie M, Huetto J. Epidemiología de las neumonías adquiridas en la comunidad en el área de Salud I de Navarra. *Med Clin (Barc)*. 1991;97:50-2.
- Fine MJ, Smith MA, Carson CA, Mutha SS, Sankey SS, Weissfeld LA, et al. Prognosis and outcomes of patients with community-acquired pneumonia. A meta-analysis. *JAMA*. 1996;275:134-41.
- Fine MJ, Auble TA, Yealy DM, Hanusa BHA, Weissfeld LA, Singer DE, et al. A prediction rule to identify low-risk patients with community-acquired pneumonia. *N Engl J Med*. 1997;336:243-50.
- Lim WS, Vand der Eerden MM, Laing R, Boersma WG, Karalus N, Town GI, et al. Defining community acquired pneumonia severity on presentation to hospital: an international derivation and validation study. *Thorax*. 2003;58:377-82.
- Mundy LM, Leet TL, Darst K, Schnitzler MA, Dunagan WC. Early mobilization of patients hospitalized with community-acquired pneumonia. *Chest*. 2003;124:883-9.
- Zalacaín R, Talayero N, Achótegui V, Corral J, Barreña I, Sobradillo V. Neumonía adquirida en la comunidad. Fiabilidad de los criterios clínicos para decidir tratamiento ambulatorio. *Arch Bronconeumol*. 1997;33:74-9.
- García-Morillo JS, Bernabeu-Wittel M, Ollero-Baturone M, Aguilar M, Ramírez N, Gonzáles de la Puente MA, et al. Incidencia y características clínicas y comorbilidad de pacientes atendidos en áreas de medicina interna. *Med Clin (Barc)*. 2005;125:5-9.
- Fernández-Sabé N, Carratalá J, Rosón B, Dorca J, Verdaguer R, Manresa F, et al. Community-acquired pneumonia in very elderly patients: causative organisms, clinical, characteristics, and outcomes. *Medicine (Baltimore)*. 2003;82:159-69.
- Gutiérrez F, Masiá M, Rodríguez JC, Mirete C, Soldán B, Padilla S, et al. Epidemiology of community-acquired pneumonia in adult patients at the dawn of the 21st century: a prospective study on the Mediterranean coast of Spain. *Clin Microbiol Infect*. 2005;7:888-900.
- Mahoney FI, Barthel DW. Functional evaluation: the Barthel Index. A simple index of independence useful in scoring improvement in the rehabilitation of the chronically ill. *Md State Med J*. 1965;14:61-5.
- Almirall J. Neumonía extrahospitalaria. *Epidemiología*. En: Morera Prat J, ed. Neumonía extrahospitalaria. Barcelona: Temis Pharma S.L; 2000. p. 13-24.
- MacFarlane J. Community-acquired pneumonia. *Br J Dis Chest*. 1987;81:116-27.
- Jokinen C, Heiskanen L, Juvonen H. Incidence of community-acquired pneumonia in the population of four municipalities in Eastern Finland. *Am J Epidemiol* 1993;137:977-88.
- Almirall J, Morato I, Riera F, Veraguer A, Priu R, Coll P, et al. Incidence of community-acquired pneumonia and Chlamydia pneumoniae infection: a prospective multicentre study. *Eur Resp J*. 1993;6:14-8.
- Light RW. The management of parapneumonic effusions and empyema. *Curr Opin Pulm Med*. 1998;4:227-9.
- Monteresen EM, Coley CM, Singer DE, Marrie TJ, Scout D, Kapoor W, et al. Causes of death for patients with community-acquired pneumonia. *Arch Intern Med*. 2002;162:1059-64.
- Paganin F, Lilienthal F, Bourdin A, Lugagne N, Tixier F, Genin R, et al. Severe community-acquired pneumonia: assessment of microbial aetiology as mortality factor. *Eur Respir J*. 2004;24:779-85.
- Falguera M, Pifarre R, Martín A, Sheikh, Moreno A. Etiology and outcome of community-acquired pneumonia in patients with diabetes mellitus. *Chest*. 2005;128:3233-9.
- Shapiro NI, Howell MD, Talmor D, Nathanson LA, Lisbon A, Wolfe RE, et al. Serum lactate as a predictor of mortality in emergency department patients with infection. *Ann Emerg Med*. 2005;45:524-8.
- León C, García-Castrillo L, Moya MS, Artigas A, Borges M, Candel FJ, et al. Documento de consenso (SEMES-SEMICYUC). Recomendaciones del manejo diagnóstico-terapéutico inicial y multidisciplinario de la sepsis grave en los Servicios de urgencias Hospitalarios. *Emergencias*. 2007;19:260-72.
- Chalmer JD, Singanayagam A, Hill AT. C-reactive protein is an independent predictor of severity in community-acquired pneumonia. *Am J Med*. 2008;121:219-25.
- Venkatesan P, Gladman J, Macfarlane JT. A hospital study of community acquired pneumonia in the elderly. *Thorax*. 1990;45:254-8.
- Riquelme R, Torres A, El-Ebiary M. Community-acquired in the elderly: a multivariate of risk and prognostic factors. *Am J Respir Crit Care Med*. 1996;154:1450-5.
- García A, Navarro C, Fenoll D. Legionnaires' disease outbreak in Murcia, Spain. *Emerg Infect Dis*. 2003;9:915-21.
- Sopena N, Sabria M, Pedro-Botet ML. Comparative study of the clinical presentation of *Legionella* pneumonia and other community-acquired pneumonias. *Chest*. 1998;113:1195-200.
- File TM. Community-acquired pneumonia. *Lancet*. 2003;362:243-50.
- Calbo E, Ochoa A, Rodríguez M, Ferrer C, Garau J. Ingresos, estancia y mortalidad de las neumonías adquiridas en la comunidad en un hospital de agudos. Correlación entre el índice pronóstico de severidad y los criterios tradicionales de valoración de la gravedad. *Enferm Infecc Microbiol Clin*. 2004;22:64-9.
- Menéndez R, Cremades MJ, Martínez E, Soler JJ, Reyes S, Perpiñá M. Duration of length of stay in pneumonia: influence of clinical factors and hospital type. *Eur Respir J*. 2003;22:643-8.
- Niederman MS, Feldman C, Richards GA. Combining information from prognostic scoring tools for CAP: an American view on how to get the best of all worlds. *Eur Respir J*. 2006;27:9-11.
- Aronsky D, Dean NC. How should we make the admission decision in community-acquired pneumonia? *Med Clin North Am*. 2001;85:1397-411.
- Halm EA, Teirstein AS. Management of community-acquired pneumonia. *N Engl J Med*. 2002;347:2039-45.
- Carratalá J. ¿Hospital o domicilio? Una decisión crucial en el tratamiento de la neumonía adquirida en la comunidad. *Enferm Infecc Microbiol Clin*. 2004;22:61-3.
- Dean NC. Use of prognosis scoring and outcome assessment tools in the admission decision for community-acquired pneumonia. *Clin Chest Med*. 1999;20:521-9.
- Querol-Ribelles JM, Tenias JM, Querol-Borras JM, González-Granda D, Hernández M, Fereruela R, et al. Validación del Pneumonia severity Index para decidir la hospitalización de los pacientes con neumonía adquirida en la comunidad. *Med Clin (Barc)*. 2004;122:481-6.
- Villalta J, Siso A, Cereijo AC, Sequeira E, De la Sierra A. Adecuación de la hospitalización en una unidad de estancia corta de un hospital universitario. Estudio controlado. *Med Clin (Barc)*. 2004;122:454-6.
- Muñoz A. Unidad médica de corta estancia. *Ann Med Interna (Madrid)*. 2002;19:219-20.
- Torres A, Menéndez R. Decisión de ingreso hospitalario en la neumonía adquirida en la comunidad. *Med Clin (Barc)*. 2008;131:216-7.
- Zalacaín R. ¿Dónde tratar la neumonía adquirida en la comunidad? *Med Clin (Barc)*. 2004;122:496-8.

Estudio epidemiológico de la neumonía adquirida en la comunidad diagnosticada en un servicio de urgencias: ¿influye el índice de Fine en la toma de decisiones?

Llorens P, Murcia J, Laghzaoui F, Martínez-Beloqui E, Pastor R, Marquina V, Ramos S, Jiménez I, Landete I, Román F, Albert-Jiménez A

Objetivo: Conocer la incidencia y características clínicas de los pacientes con neumonía adquirida en la comunidad (NAC) y reflejar las diferencias en función de la gravedad determinada por el índice de Fine (IF).

Método: Estudio descriptivo y prospectivo de los pacientes con NAC atendidos en el servicio urgencias (SU) del Hospital General Universitario de Alicante durante un año. Se recogieron variables sociodemográficas, clínicas, analíticas, radiológicas, microbiológicas y relacionadas con el destino al alta. Se realizó seguimiento a los 30 días. Se determinó la gravedad de la NAC según el IF, y se clasificó en NAC de bajo riesgo ($IF \leq III$) y alto riesgo ($IF > III$). Se estudiaron las principales diferencias entre las NAC de alto y bajo riesgo y la distribución de los ingresos en función de la gravedad.

Resultados: Se incluyó a 550 pacientes con diagnóstico NAC. La incidencia acumulada fue de 2,2 casos por 1.000 habitantes y año. Los pacientes con NAC de alto riesgo presentaban mayor edad, mayor grado de comorbilidad y deterioro funcional y mayor prevalencia de insuficiencia respiratoria e infiltrado multilobar. Se consiguió el diagnóstico etiológico en 209 pacientes (38%). El microorganismo más frecuente fue *Streptococcus pneumoniae* independientemente de la gravedad de la NAC. El índice de ingreso fue del 77,2% (99,5% en NAC de alto riesgo y 65,1% en NAC bajo riesgo). Los servicios de destino más frecuentes fueron: neumología, unidad de corta estancia (UCE) y medicina interna, si bien existieron diferencias de distribución en función de la gravedad de la NAC.

Conclusiones: Los pacientes con NAC de alto riesgo son de edad avanzada, con deterioro funcional, comorbilidad, insuficiencia respiratoria, infiltrado multilobar, alteración del sensorio y mayor producción de lactato. Estos pacientes ingresan más frecuentemente en UCE y medicina interna. Existe un elevado porcentaje de ingreso de pacientes con NAC de bajo riesgo. [Emergencias 2009;21:247-254]

Palabras clave: Neumonía adquirida en la comunidad. Perfil clínico. Índice pronóstico de Fine. Servicio de urgencias. Unidad de corta estancia.