

Health care-associated pneumonia (HCAP) in internal medicine departments (IMDs): frequency and risk factors for difficult-to-treat (DTT) microorganisms

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INTRODUCTION AND PURPOSE

- ❖ Pneumonia generates a considerable workload for IMDs, and HCAP represents one-third of cases of pneumonia attended by internists.
- ❖ The prevalence of DTT microorganisms among HCAP patients treated in IMDs has been shown to be high. However, the definition of HCAP comprises very heterogeneous conditions, not all of which are equivalent in predicting pneumonia caused by DTT microorganisms.
- ❖ The mortality rate of HCAP patients is higher than that of patients with community-acquired pneumonia. It is unknown whether the excess mortality of HCAP is related to generally inadequate empirical treatment or to underlying conditions.
- ❖ We assessed risk factors for DTT microorganisms and for mortality in patients with HCAP treated in IMDs.

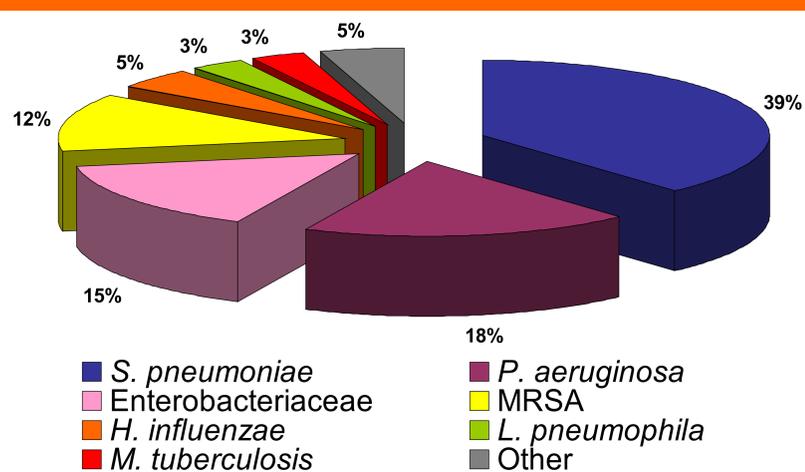
METHODS

- ❖ **Design:** multicenter prospective observational study with the collaboration of the Spanish Society of Internal Medicine (SEMI). Protocols were completed electronically on the study web site (<http://enemi2010.com>).
- ❖ **Setting and period:** 72 IMDs reported all patients with pneumonia attended in their department during 1 week in January 2010 and 1 week in June 2010.
- ❖ Of the 1,002 patient records collected, 307 (30.7%) fulfilled the criteria for HCAP (see Table 1).
- ❖ **Definition:** DTT microorganisms were *Pseudomonas aeruginosa*, Enterobacteriaceae, and methicillin-resistant *Staphylococcus aureus* (MRSA).

RESULTS

	N=307 (%)
Age (median, IQR) (years)	83, 76 – 89
Male sex	177 (57)
Inclusion criteria for the HCAP group	
Hospitalization or surgery in the previous 180 days	170 (55.4)
Residence in a nursing home or long-term care facility	169 (55)
Attending hospital regularly because of chronic underlying disease	169 (55)
Wound care or specialized nursing care in the past 30 days	49 (16)
Home infusion therapy, including antibiotics, in the past 30 days	45 (14.7)
Undergoing hemodialysis	0
Number of HCAP criteria (median, IQR)	2, 1 – 3
Diagnostic testing for aetiological diagnosis	221 (72)
Aetiological diagnosis	65/221 (29.4)
DTT microorganisms	30/65 (46.1)
ATS-concordant therapy	70 (22.8)
Mortality	58 (18.9)

Table 1 Characteristics of HCAP patients



MRSA, methicillin-resistant *S. aureus*; **Other**, includes two cases of pneumonia caused by MRSA and *Chlamydomphila pneumoniae*, and one case of pulmonary empyema due to *Bacteroides fragilis*.

Figure 1 Aetiological distribution of HCAP episodes

	DTT N=30 (%)	Non-DTT N=35 (%)	p
Age (median, IQR) (years)	77, 74-84	80, 73-85	0.68
Male sex	20 (66.7)	23 (65.7)	1
COPD	21 (70)	15 (42.9)	0.04
RF for aspiration pneumonia	8 (26.8)	17 (48.6)	0.08
Charlson's score (median, IQR)	7.5, 5.7-11	6, 5-9	0.39
Barthel's index (median, IQR)	67.5, 10-100	30, 10-80	0.52
Inclusion criteria for the HCAP group			
Hospitalization or surgery in the previous 180 days	17 (56.7)	17 (48.6)	0.62
Residence in a nursing home or long-term care facility	14 (46.7)	24 (68.6)	0.08
Attending hospital regularly because of chronic disease	22 (73.3)	14 (40)	0.01
Wound care or specialized nursing care in the past 30 days	6 (20)	4 (11.4)	0.49
Home infusion therapy, including antibiotics, in the last 30 d	11 (36.7)	4 (11.4)	0.02
Number of HCAP criteria (median, IQR)	2, 1.7-3	2, 1-2	0.04
PORT Severity Index (median, IQR)	IV, III-IV	IV, III-IV	0.45
CURB-65 (median, IQR)	2, 2-3.2	2, 2-3	0.74

Table 2 Comparison of HCAP patients by DTT and non-DTT microorganisms

	Survivors N=249 (%)	Non-survivors N= 58 (%)	p	OR (95%CI)	p
Age (median, IQR) (years)	82, 75-88.5	85, 88-89	0.32		
Male sex	110 (44.2)	20 (34.5)	0.188		
COPD	109 (43.8)	16 (27.6)	0.02		
RF for aspiration pneumonia	112 (45)	42 (72.4)	<0.001		
Charlson's score	7, 6-10	8, 7-11	0.008		
Barthel's index	35, 5-90	5, 0-50	<0.001		
Port Severity Index class	IV, III-IV	IV, IV-IV	<0.001		
CURB-65	2, 2-3	4, 3-4	<0.001	2.68 (1.89-3.79)	<0.001
Multilobar infiltrates	57 (22.9)	28 (48.3)	<0.001	2.85 (1.46-5.56)	0.002
Diagnostic testing	188 (75.5)	33 (56.9)	0.006	0.45 (0.23-0.90)	0.02
DTT microorganism	25/56 (44.6)	5/9 (55.6)	0.72		
ATS-concordant therapy	59 (23.7)	11 (19)	0.49		

Table 3 Risk factors for mortality in HCAP patients treated by IMDs

CONCLUSIONS

- ❖ DTT microorganisms accounted for up to 46% of HCAP episodes treated in IMDs. The independent associated factors were attending hospital regularly and home infusion, including antibiotics, in the last 30 days.
- ❖ In our study, adherence to the therapeutic recommendations of the ATS was low and was not associated with lower mortality.

- ❖ An aetiological diagnosis was obtained in 65 of the 221 HCAP patients tested (Table 1).
- ❖ *S. pneumoniae* was the main pathogen, but *P. aeruginosa*, Enterobacteriaceae, and MRSA accounted for 46% of the episodes (Figure 1).
- ❖ Univariate analysis of risk factors for DTT microorganisms is shown in Table 2.
- ❖ Multivariate analysis showed the independent risk factors for pneumonia due to DTT microorganisms to be **attending hospital regularly because of chronic disease** (OR 3.42; 95%CI, 1.11-10.51; p=0.03) and **home infusion therapy, including antibiotics, in the past 30 days** (OR 4.15; 95%CI, 1.06-16.25; p=0.04).
- ❖ Overall, 18.9% of patients with HCAP died. Univariate and multivariate analysis of risk factors for mortality are shown in Table 3.
- ❖ The independent risk factors for mortality were high CURB-65 score and multilobar infiltrates, while diagnostic testing for aetiological diagnosis proved to be a protective factor.
- ❖ Adherence to the therapeutic recommendations of the ATS was low. We were unable to show a favourable impact on outcome of ATS-concordant empirical treatment.