

High variability among Emergency Departments in 3rd-generation cephalosporins and fluoroquinolones use for community-acquired pneumonia



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OBJECTIVES

To determine if the proportion of patients treated for pneumonia with a 3rd-generation cephalosporin and/or a fluoroquinolone vary among Emergency Departments (EDs), and to estimate the proportion of avoidable prescriptions.

METHODS

Patients

Retrospective study of adult patients treated in 2013 for pneumonia in 8 French EDs, and subsequently hospitalized in non ICU wards. Patients were excluded if any other acute infectious disease was diagnosed or suspected in the ED chart's conclusion.

Avoidable prescriptions of 3rd generation cephalosporins and fluoroquinolones

These are prescriptions that could have been replaced by a penicillin or a macrolide. Third-generation cephalosporins or respiratory fluoroquinolones were presumed unavoidable if they met both criteria : (i) age \geq 65 years or comorbid condition ; and (ii) allergy or intolerance to penicillin, or failure of penicillin, or previous treatment with penicillin, or, for fluoroquinolones only, suspected legionellosis.

RESULTS

832 patients were included.

Table 1. Patients characteristics

Characteristic	Description	Value	
Demographic data	Age (y)	82 (69-88)	
	Male	54% (51%-57%)	
	Nursing home resident	28% (25%-31%)	
	Length of hospital stay (d)	8 (5-12)	
Comorbid conditions	Congestive heart failure	15% (12%-17%)	
	Coronary artery disease	13% (11%-15%)	
	Alcohol abuse	6% (4%-7%)	
	Chronic liver disease	2% (1%-3%)	
	Immunocompromising conditions	11% (9%-13%)	
	Neoplastic disease	16% (14%-19%)	
	Chronic lung disease	24% (21%-27%)	
	Cerebrovascular disease	15% (13%-18%)	
	Other chronic neurologic conditions	25% (22%-28%)	
	Diabetes mellitus	18% (15%-21%)	
	Renal disease	9% (8%-12%)	
Severity	History of multiresistant bacteria	1% (0%-2%)	
	Pneumonia Severity Index class	I	0
		II	17% (14%-19%)
		III	17% (15%-20%)
		IV	42% (39%-46%)
		V	24% (21%-27%)
	REA-ICU Class	I	48% (45%-52%)
		II	40% (37%-44%)
		III	9% (7%-11%)
		IV	2% (1%-3%)
Do not resuscitate order		7% (6%-9%)	
Antibacterial therapy in the ED	In-hospital mortality	10% (8%-12%)	
	Antibacterial agent (patients, %)	Amoxicillin-clavulanate	59% (56%-63%)
		3rd- gen. cephalosporin	31% (28%-34%)
		Macrolide	10% (8%-12%)
		Respiratory fluoroquinolone	7% (5%-9%)
		Amoxicillin	5% (4%-7%)
		Imidazole derivative	3% (2%-4%)
		Aminoglycoside	2% (1%-3%)
		Other antibacterial agent	1% (1%-2%)
		Non respiratory fluoroquinolone	1% (0%-2%)
Pristinamycin		1% (1%-2%)	
3rd-gen. cephalosporin, respiratory fluoroquinolone or both	34% (31%-38%)		

Table 2. Proportions of patients treated in each ED with a 3rd-gen. cephalosporin, a respiratory fluoroquinolone or both

Centre	Patients treated, %		
	3rd-gen. cephalosporin	respiratory fluoroquinolone	3rd-gen. cephalosporin, respiratory fluoroquinolone or both
A	22% (15%-31%)	17% (10%-25%)	29% (21%-39%)
B	14% (8%-22%)	5% (2%-12%)	19% (12%-28%)
C	38% (30%-47%)	15% (10%-23%)	45% (37%-54%)
D	35% (26%-46%)	0% (0%-5%)	35% (26%-46%)
E	26% (17%-36%)	4% (1%-12%)	30% (21%-41%)
F	41% (32%-51%)	6% (3%-13%)	42% (33%-52%)
G	25% (17%-35%)	1% (0%-6%)	26% (18%-36%)
H	42% (31%-53%)	2% (0%-9%)	44% (33%-55%)

Table 3. Predictive factors for treatment in the ED with a 3rd-gen. cephalosporin, a respiratory fluoroquinolone or both : multivariate analysis.

	Variable	adjusted OR	P Value
Comorbid condition and history	Immunocompromising condition	2.54 (1.56-4.14)	< 0.001
	Antibacterial therapy started before ED visit	3.32 (2.30-4.81)	< 0.001
Severity	REA-ICU class III or IV ¹	1.93 (1.15-3.23)	0.013
	Pneumonia Severity Index class V	1.49 (1.00-2.20)	0.048
Centre	Fluid resuscitation in the ED	3.98 (2.49-6.43)	< 0.001
	Non invasive ventilation in the ED	7.18 (1.7-50.1)	0.017
	C or D or F or H ²	2.27 (1.64-3.15)	< 0.001

Avoidable prescriptions

Among 285 patients treated in the ED with a 3rd-gen. cephalosporin, a respiratory fluoroquinolone or both, these antibacterial agents were not avoidable for 93 patients, because of allergy or intolerance to penicillins (n=31), failure of aminopenicillin therapy (n=52), treatment with aminopenicillin in 3 previous months (n=28), or suspected legionellosis (n=3), all in patients aged > 65 y or with any comorbid condition.

Hence, treatment with a 3rd-gen. cephalosporin, a respiratory fluoroquinolone or both was classified as avoidable in 192 among 285 patients (67% [62% – 73%]).

CONCLUSIONS

The use of cephalosporins and fluoroquinolones in pneumonia is highly variable among EDs. The majority of these prescriptions is avoidable. Antibiotic stewardship programs should be implemented to restrict their use in EDs..