Antibiotic guideline adherence in clinical practice in patients visiting emergency room for community acquired pneumonia

Sarah Tubiana, Loic Epelboin, Cécile Ficko, Bérangère Gallet de Saint Aurin, Catherine Leport, Yann-Erick Claessens, Xavier Duval

CONTEXT

Community-acquired pneumonia (CAP): major cause of morbidity and mortality worldwide [1]:
- Incidence: 300 – 500/ 10^5 individuals/ year
- Death: 4%-47%

CAP diagnosis based on **clinical, biological and radiological findings**
- **Low specificity**
- Difficult to establish ➔ **High variability in diagnostic level of certainty**

Prognosis determinants of CAP [2]:
- Patient (Pt) background
- CAP characteristics
- **Delay to initiate/adherence to treatment antibiotic guidelines**

Empiric treatment in the first 48 hours: probabilistic CAP antibiotherapy

Ancillary analysis of PACSCAN study:
- Diagnosis and therapeutic impact of systematic thoracic Computed Tomography scan (CT-scan) on adult pts visiting the emergency rooms (ER) for CAP

OBJECTIVES

1. **To evaluate adherence to treatment antibiotic guidelines before and after CT-scan**
2. **To assess whether ER physician's level of diagnostic certainty was associated with adherence to treatment antibiotic guidelines**
3. **To identify factors associated with adherence to treatment antibiotic guidelines before CT-scan**

METHODS

Design: Prospective multicenter interventional impact study

Setting & Period:
- ER in 4 tertiary care university hospitals in France
- Nov 2011-Jan 2013

Population: Pts > 18 years old with non severe (CRB65 ≤ 3) clinically suspected CAP (1 sign of systemic infection + 1 recently appeared respiratory symptom)

Antibiotic adherence assessment
- **CAP French guidelines reference (SPILF/AFSSAPS/SPLF, 2010)**
- **Adherence/non adherence** to guidelines evaluated according to the situation :
  - Outpatients < 65 years old, without comorbidity
  - Outpatients ≥ 65 years old and/or with ≥ 1 comorbidity
  - Pts hospitalized in general ward
  - Pts hospitalized in ICU

Figure 1: PACSCAN study protocol
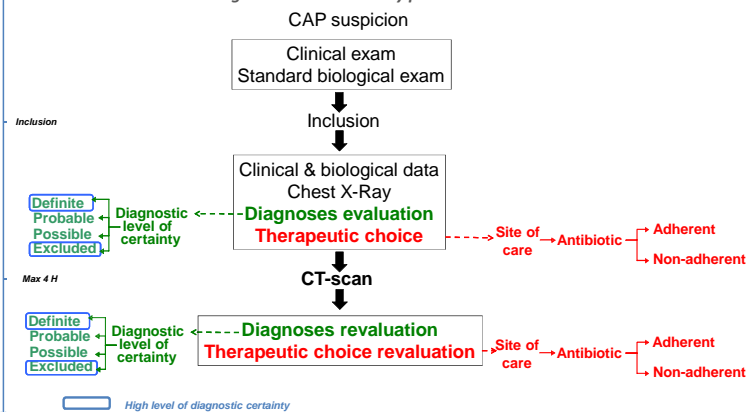
RESULTS

- Pts with clinically suspected CAP admitted to ER for eligibility (N=339)
- Pts included in PACSCAN study (N=333)
- Pts evaluable in PACSCAN analyses (with CT-scan performed) (N=319)

Table 1: Population characteristics, PACSCAN study (N=319 pts)

Characteristics	N (%) or Mean ± SD
Mean age (years)	64.7± 20.0
≥ 65 year old	177 (55.5%)
Male/Female	155 / 164 (48.6%/ 51.4%)
≥1 comorbidity	195 (61.1%)
COPD	63 (19.8%)
Cough	240 (75.7%)
Dyspnea	229 (71.8%)
2nd line antibiotic treatment	111 (34.8%)
Procalcitonin (µg/L)	1.8 ± 5.3
CRP (mg/L)	110.8 ± 107.0
Parenchymal opacity	188 (61.0%)
Unilateral opacity	128 (71.4%)
Pleural effusion	84 (26.4%)
CRB65 = 0 or 1	267 (83.7%)
Physician's emergency experience (years)	6.5 ± 6.3

Pts background characteristics | Pts clinical presentation | Physician characteristics

Table 2: Adherence to treatment antibiotic guidelines before and after CT-scan, (N=319 pts)

Antibiotic treatment adherent to guidelines No/Total (%)	
Before CT-scan	**108/316 (34.2%)**
After CT-scan	**162/316 (51.3%)**

Table 3-4: Adherence to treatment antibiotic guidelines before and after CT-scan according to level of diagnostic certainty, (N=319 pts)

- **Before CT-scan**

CAP diagnostic level of certainty	No	(%)	Antibiotic treatment adherent to guidelines No/Total	(%)
Definite	143	(44.8)	73/142	(51.4)
Probable	118	(37.0)	25/117	(21.4)
Possible	54	(16.9)	8/53	(15.1)
Excluded	4	(1.3)	2/4	(50.0)
			108/316	(34.2)

High level of diagnostic certainty in 147/319 pts (46.1 %) with adherence to antibiotic guidelines in 51.4%

- **After CT-scan**

CAP diagnostic level of certainty	No	(%)	Antibiotic treatment adherent to guidelines No/Total	(%)
Definite	162	(50.8)	79/161	(49.1)
Probable	35	(11.0)	11/35	(31.4)
Possible	30	(9.4)	7/30	(23.3)
Excluded	92	(28.8)	65/92	(70.7)
			162/316	(51.3)

High level of diagnostic certainty in 254/319 pts (79.6 %) with adherence to antibiotic guidelines in 56.9%

Table 5: Factors associated with adherence to antibiotic guidelines before CT-scan

Characteristics	Adherent No (%) or mean ± SD	Non Adherent No (%) or mean ± SD	Multivariate P-value	OR	95% CI
COPD	17 (5.4)	46 (14.6)	0.11		
Neoplasia	7 (2.2)	25 (7.9)	0.22		
Liver disease	2 (0.6)	13 (4.1)	0.07		
Previous antibiotic treatment	23 (7.3)	86 (27.2)	<0.0001	0.34	0.18-0.63
Cough	71 (22.6)	166 (52.9)	0.003	0.39	0.21-0.72
Myalgia	26 (8.3)	32 (10.1)	0.07		
Fever	47 (15.0)	65 (20.7)	0.72		
CRB65 score	31 (9.8)	85 (26.9)	0.34		
White blood cell ($10^3/mm^3$)	12.0 ± 5.6	11.3 ± 5.6	0.85		
Pleural effusion	38 (12.1)	46 (14.6)	0.02	1.99	1.10-3.59
Diagnostic level of certainty (high vs low)	75 (23.7)	71 (22.5)	<0.0001	5.24	2.98-9.20

CONCLUSION

- **First study to assess CAP diagnostic level of certainty and report relationship between diagnostic level of certainty and guideline adherence**
- **Limitations due to theoretical assessment of adherence and no assessment of reasons for non adherence**
- **Low adherence to antibiotic treatment guidelines in current clinical practice**
- **CAP diagnostic level of certainty is a strong determinant of guideline adherence**
- **Therapeutic choice is a complex process with close relationship with diagnostic level of certainty and may be optimized by improving diagnostic level of certainty**