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# Community-acquired pneumonia (CAP) and positive pneumococcal or *Legionella* urinary antigen test: antibiotic simplification is associated with favorable outcome

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## Introduction

➢ **Positive urinary antigen tests for pneumococcal infection or *Legionella* used in the context of CAP should lead to antibiotic simplification. We report a multicenter audit aimed to quantify antibiotic simplification and to search for a link with the outcome.**

## Method

❖ **Retrospective multicenter audit of patients presenting with CAP and for whom an UAT – *Sreptococcus pneumoniae* or *Legionella* - was positive. Patients admitted from January 2010 to December 2013 in 5 medical centers were included.**

❖ **Co-morbidities were defined by the specific treatment administered before hospital care, or if the diagnosis was newly established during the hospital stay. For diseases without specific treatment, the patient's medical records were used. We used the Pneumonia Severity Index (PSI) to assess disease severity. Antibiotic treatments and the PSI were extracted from patient' charts.**

❖ **Definition of targeted antibiotic therapy: amoxicillin for pneumococcal UAT and a macrolid or a non-pneumococcus fluoroquinolone for *Legionella* UAT. Definition of antibiotic simplification : targeted antibiotic therapy only or by narrowing the spectrum of the initial antibiotic therapy (withdrawal of one molecule or one narrower antibacterial spectrum molecule).**

## Results

### 5 medical centres participating to the study


❑ **A total of 617 patients presenting with CAP and positive UAT were included, of which 499 were pneumococcus infections (81%) and 118 legionellosis (19%).**

❑ **One third of the patients required intensive care unit. The PSI score was available in 496 cases (80%), mean±std deviation = 103±38; 60% of the patients were class 4 or 5 PSI score.**

❑ **A targeted therapy was prescribed in 124 cases (20%) and antibiotic narrowing was performed in 84 cases (14%). Thus, antibiotic simplification = 208 cases (34%).**

**Table 1: Comparability of the study's groups, depending on the simplified antibiotic therapy for CAP with positive urinary antigen test for *S.pneumoniae* or *L. pneumophila*.**

| | Simplified therapy n = 208 (33.7%) | Without simplified therapy n = 409 (66.3%) | p | Multivariate analysis OR (95% CI) |
|---|---|---|---|---|
| Age (years) | 65±18 | 71±19 | < 0.001 | |
| Sex-ratio (M/F) | 1.17 | 1.38 | 0.331 | |
| ICU admissions | 56 (26.5) | 136 (33.5) | 0.076 | |
| **Comorbid conditions** | | | | |
| - cardio-vascular | 93 (44.7) | 224 (54.8) | 0.018 | |
| chronic heart failure | 8 (3.8) | 13 (3.1) | 0.665 | |
| - diabetes | 31 (14.9) | 59 (14.4) | 0.873 | |
| - neurological and/or | 32 (15.4) | 92 (22.5) | 0.037 | |
| psychiatric | 68 (32.7) | 155 (37.9) | 0.203 | |
| - pulmonary | 23 (11.0) | 83 (20.3) | 0.004 | |
| BPCO | 58 (27.9) | 77 (18.9) | 0.010 | 0.47 [0.26 – 0.87] |
| active smoking | 18 (8.6) | 61 (14.9) | 0.027 | |
| - cancers / immunodepression | 20 (9.6) | 14 (3.4) | 0.001 | |
| - HIV-infection | 26 (12.5) | 38 (9.3) | 0.216 | 7.73 [2.40 – 24.82] |
| - alcoholism | 20 (9.6) | 30 (7.3) | 0.326 | |
| - liver diseases | 12 (5.8) | 26 (6.3) | 0.774 | |
| - chronic renal failure | | | | |
| **PSI score (n = 496)** | 91±37 | 109±37 | < 0.001 | 1.99 [1.21 – 3.25] |
| **PSI < 3** | 51(33.3) | 46 (13.4) | < 0.001 | |
| **PSI 3** | 30 (19.6) | 72 (20.9) | 0.736 | |
| **PSI 4** | 49 (32.0) | 133 (38.7) | 0.156 | |
| **PSI 5** | 23 (15.0) | 93 (27.0) | 0.003 | |
| **Microbial data** | | | | |
| **-** *S. pneumoniae* | 166 (79.8) | 333 (81.4) | 0.630 | |
| - *L. pneumophila* | 42 (20.2) | 76 (18.6) | 0.630 | |
| **H-C associated infections** | 8 (3.8) | 26 (6.3) | 0.196 | |
| **Hospital stay (days)** | 9.4±10.9 | 13.0±11.6 | < 0.001 | 0.96 [0.94– 0.98] |
| **Death** | 5 (2.4) | 67 (16.4) | < 0.001 | 0.11 [0.03– 0.39] |

**Table 2: Risk factors associated with unfavorable outcome. Due to the importance of initial CAP's severity measurement, 120/617 patients for whom Pneumonia Score Index was unknown (19.4) were excluded from analysis.**

| | Favorable outcome 437 (88.0) | Unfavorable outcome 60 (12.0) | p | Multivariate analysis OR (95% CI) |
|---|---|---|---|---|
| Age (years) | 69±18 | 77±12 | < 0.001 | |
| Sex-ratio (H/F) | 1.21 | 1.14 | 0.843 | |
| Intensive care admission | 126 (29.1) | 37 (60) | < 0.001 | 2.35 [1.17 – 4.71] |
| **Comorbid conditions** | | | | |
| - cardio-vascular | 222 (50.8) | 40 (66.7) | 0.021 | |
| chronic heart failure | 12 (2.7) | 2 (3.3) | 0.796 | |
| - diabetes | 64 (14.6) | 7 (11.6) | 0.536 | |
| - neurological and/or psychiatric | 80 (18.3) | 21 (35.0) | 0.002 | 2.25 [1.09 – 4.67] |
| - pulmonary | 157 (35.9) | 22 (36.7) | 0.910 | |
| BPCO | 92 (18.0) | 14 (21.7) | 0.502 | |
| - active smoking | 97 (23.7) | 6 (8.3) | 0.003 | |
| - cancers / immunodepression | 68 (15.6) | 17 (28.3) | 0.013 | |
| - alcoholism | 42 (9.6) | 8 (13.3) | 0.368 | |
| - liver diseases | 25 (5.7) | 6 (10.0) | 0.198 | |
| - chronic renal failure | 25 (5.7) | 7 (11.6) | 0.078 | |
| **PSI** (mean±standard deviation) | 97±35 | 146±28 | < 0.001 | 1.03 [1.02 – 1.04] |
| **PSI < 3** | 97 (22.2) | 0 | < 0.001 | |
| **PSI 3** | 101 (23.1) | 1 (1.7) | < 0.001 | |
| **PSI 4** | 164 (37.5) | 18 (30.0) | 0.256 | |
| **PSI 5** | 75 (17.2) | 41 (68.3) | < 0.001 | |
| **Microbial data** | | | | |
| - blood culture performed | 327 (74.8) | 44 (73.3) | 0.802 | |
| - positive blood culture | 47 (10.8) | 10 (16.7) | 0.177 | |
| **Bacterial pathogens*** | | | | |
| - *Streptococcus pneumoniae* | 355 (81.2) | 54 (90.0) | 0.095 | |
| - *Legionella pneumophila* | 82 (18.8) | 6 (10.0) | 0.076 | |
| - Other bacteria from respiratory samples | 48 (11.0) | 9 (15.0) | 0.360 | |
| **Main Antibiotic therapy** | | | | |
| **One single antibiotic therapy** | 217 (49.7) | 14 (23.3) | < 0.001 | |
| amoxicillin (amox) | 68 (15.6) | 0 | 0.002 | |
| amoxicillin + clavulanic acid (amox+clav ac) | 73 (16.7) | 7 (11.6) | 0.318 | |
| third generation Cephalosporin (Ceph-3)[2] | 23 (5.3) | 3 (5.0) | 0.999 | |
| levofloxacin | 37 (8.5) | 5 (5.0) | 0.354 | |
| **Main unchanged antibiotic combinations** | 53 (12.1) | 15 (25.0) | 0.006 | |
| Ceph-3 + levofloxacin | 15 (3.4) | 4 (6.7) | 0.258 | |
| Ceph-3 + macrolide | 5 (1.1) | 5 (8.3) | 0.002 | |
| **Main antibiotic reassessments** | | | | |
| combination to single antibiotic | 67 (15.3) | 3 (5) | 0.031 | |
| combination to targeted antibiotic therapy | 42 (9.6) | 2 (3.3) | 0.108 | |
| **Antibiotic simplification** | 150 (34.3) | 3 (5) | < 0.001 | 0.12 [0.3 – 0.45] |
| **≥ 3 courses of antibiotics** | 34 (7.8) | 11 (18.3) | 0.007 | |
| **Nosocomial infection** | 21 (4.8) | 3 (5) | 0.947 | |

**Conclusion: In the context of CAP with positive UAT, antibiotic simplification was associated with an increase of patients' survival rate. Before to be systematically recommended, this favorable impact of antibiotic simplification should be confirmed in a prospective study.**