

# Community-acquired pneumonia in adults: combination antibiotic therapy or monotherapy? is computed tomography routinely needed?

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## Introduction

Community-acquired pneumonia (CAP) is a common cause of morbidity and mortality and the first cause of death in the low-income countries and the sixth cause of death in the high-income countries in 2012.<sup>1</sup> Chronic comorbidities, medication, and lifestyle factors are related to CAP. Chronic obstructive pulmonary disease, diabetes mellitus, asthma, and heart failure, chronic renal failure, chronic obstructive pulmonary disease, dental hygiene, and certain working and environmental conditions (such as contact with dust and sudden changes of temperature), smoking, and nutritional and dietary habits, oropharyngeal dysphagia in the elderly, an impaired swallow response and delayed airway protection favor tracheobronchial aspirations are risk factors for CAP.<sup>2</sup> *S. pneumoniae* (21-30%) is the most frequent pathogen microorganism in the etiology of CAP, followed by *Haemophilus influenzae* (3-9%), *Legionella species* (3.9-5.3%), *Mycoplasma pneumoniae* (1.6-6.1%), *Coxiella burnetii* (0-8.9%), Influenza A/B virus (1.4-3.4%), *S. aureus* (0.9-3.8%), *Chlamydia species* (0-4.6%), Adenovirus (0.3-0.9%), other bacteria (2.3-6%), other viruses (0-3.6%), unidentified (36.8-44.7%).<sup>3</sup> In fact, unidentified group is the biggest group in the etiology. This suggests that identifying etiological agent microorganism is very hard. However, polymerase chain reaction (PCR) provides to decrease the duration of antibiotic use, the number of antibiotics given, intensify antibiotic use, differentiation of bacteria-virus in the diagnosis, and cost-effectiveness related to rapid diagnosis.<sup>4</sup>

Empirical antibiotic treatment is recommended, but microbiological testing is not recommended for patients with low to moderately severe CAP (pneumonia severity index (PSI) classes 1-4 or CURB-65 score 0-2).<sup>5</sup> Combination of a beta-lactam antibiotic with either a macrolid or a quinolone antibiotic is recommended in case of severe CAP (PSI Class 5 or CURB-65 score >2).<sup>6,7</sup> Amoxicillin with macrolide combination therapy is recommended in case of moderate to severe CAP.<sup>7</sup> Doxycycline and macrolides are not routinely recommended because of the increasing pneumococcal resistance. Broad-spectrum antibiotics such as amoxicillin-clavulanate, cefuroxime, ceftriaxone, or cefotaxime are not recommended, as the expected pathogens are sensitive to the narrow-spectrum antibiotics. If the patient has a history of penicillin-allergy, the best choice is a 2<sup>nd</sup> or 3<sup>rd</sup> generation cephalosporin or a 4<sup>th</sup> generation quinolone (levofloxacin or moxifloxacin). The length of antibiotic treatment is at least 5 days and 10-14 days for atypical pathogens.<sup>6</sup> Nevertheless, it should be kept in mind that duration of antibiotic should be tailored by patient's conditions. Atypical causative agents should be kept in the mind in case of non-respiratory season, age <60 years, male gender, and absence of COPD.<sup>3</sup> Beta-lactam monotherapy has been demonstrated to be non-inferior to beta-lactam/macrolide combination and fluoroquinolone monotherapy. Due to the fact that the lack of superiority and the

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threat of increasing antimicrobial resistance, beta-lactam/macrolide combination therapy and fluoroquinolone monotherapy should not be routinely advised as empirical therapy for CAP patients hospitalized to non-ICU wards.<sup>8</sup> CAP should be treated at least 14 days for *S. aureus*, and 14 days for *M. pneumoniae* or *Chlamydia spp.*<sup>6</sup> Macrolides have immune-modulatory properties, but addition of macrolides into CAP treatment is still debated.<sup>9</sup>

Ages, comorbid cardiac disease, diabetes, increasing levels of blood urea nitrogen and C-reactive protein on admission were reported to be independent risk factors.<sup>10</sup> Computed tomography of thorax, macrolides or quinolone combination are recommended for patients admitted with severe CAP and intensive care unit requirement.<sup>11</sup> The non-susceptibility to penicillin of non-invasive *S. pneumoniae* isolates was reported to be 1.7% in Norway, 83% in Romania.<sup>11</sup> As penicillin and erythromycin susceptibilities of *S. pneumoniae* vary by country, antibiotic should be chosen taking into consideration resistance status of community or country. However, vaccination against pneumococcal disease with the pneumococcal conjugate vaccine (PCV-13) was reported to decrease antibiotic resistance rates of *S. pneumoniae* and to prevent from invasive infections caused by *S. pneumoniae*.<sup>2,12</sup> PCV-13 should be advised elderly and risky patients.

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## Conflict of interest

The author declares no conflict of interest.

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