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Clinical presentations and outcome of severe community-acquired pneumonia

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KEYWORDS

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Abstract *Background:* Severe community-acquired pneumonia (SCAP) represents a frequent and potentially life-threatening condition. About 10% of all hospitalized patients with CAP require admission to the intensive care unit (ICU), and the mortality of these patients reaches 20–50%.

Objective: To evaluate the clinical presentation, bacteriological profile and outcome of severe community-acquired pneumonia (SCAP).

Patients and methods: 54 patients presented by symptoms and sign of severe community acquired pneumonia who were admitted to respiratory care unit of Alhussein, Al-Azhar University Hospital from August 2015 to March 2016 were subjected to full clinical examination, chest X ray, complete blood picture, sputum and blood culture, PCR for suspected cases of Influenza H1N1 and MERS-COV, treatment, follow up, data collections and statistical analysis.

Results: The present study included 54 patients 26 males and 28 females with SCAP who were admitted to respiratory care unit of Alhussein, Al-Azhar University Hospital. The most common comorbidities were diabetes mellitus and hypertension. The most common presentations were fever, cough, dyspnea and hypoxemia. Two patients developed renal failure and 4 patients developed septic shock. The most common isolated organism was *Streptococcus pneumoniae*, Influenza H1N1, and *Staphylococcus aureus*. Mortality was 24% and it was common in patients with comorbidity than in patients without comorbidities.

Conclusion: SCAP occurs more frequently in those with comorbidities. The most frequent isolated causative organism of SCAP is *S. pneumoniae*, Influenza H1N1 and *S. aureus*. SCAP is associated with significant mortality, early recognition and prompt treatment may improve outcome.

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Introduction

Community-acquired pneumonia (CAP) is defined as an infection of the lung parenchyma that is not acquired in a hospital, long-term care facility, or other contact with the health care system [1]. CAP continues to be a major cause of morbidity and mortality. Despite the availability of adequate anti biological agents to treat this illness, it has remained the fourth most common cause of death in Japan since 1975 [2]. Common causative agents of pneumonia in ambulatory patients are *Streptococcus pneumoniae*, *Mycoplasma pneumoniae*, *Haemophilus influenzae*, *Chlamydia pneumoniae* and respiratory viruses (influenza A and B, adenovirus, respiratory syncytial virus and parainfluenza) [3,4]. Mortality was the highest for *Staphylococcus aureus* (50%), and the lowest for *Chlamydia pneumoniae* (4.5%). Mortality was not seen with *M. pneumoniae*. Pneumonia due to aerobic Gram negative organisms was uncommon, even though empirical therapy with a combination of broad-spectrum antibiotics was often used in this subgroup [5]. Severe community-acquired pneumonia (SCAP) represents a frequent and potentially life-threatening condition. About 10% of all hospitalized patients with CAP require admission to the intensive care unit (ICU), and the mortality of these patients reaches 20–50% [6]. Severe CAP has been defined as those cases that require admission to the ICU. Direct admission to an ICU is required for patients with septic shock or acute respiratory failure requiring invasive mechanical ventilation, which are defined as major severity criteria in the modified score of the American Thoracic Society (ATS) guidelines that are used to define severe CAP [7].

Aim of the work

To evaluate the clinical presentation, bacteriological profile and outcome of severe community acquired pneumonia.

Study design

Prospective study.

Patients and methods

After the approval of local ethics committee 54 patients (26 males and 28 females) presented by symptoms and sign of severe community acquired pneumonia who were admitted to respiratory care unit of Alhussein, Al-Azhar University Hospital from August 2015 to March 2016 were subjected to the following:

(1) **History taking:** Fever, cough, pleuritic chest pain, dyspnea, mental confusion and comorbidities.
(2) **Clinical examination:** Both general and local examination of the chest.
(3) **Plain chest X-ray (CXR):** A chest radiograph was done for all patients who were likely to have pneumonia to establish the diagnosis, and follow up when needed.
(4) **Chest computed tomography (CT)** was done when indicated.
(5) **Laboratory Investigations:** It was done in clinical pathology department of Alhussien University Hospital, Central laboratories of ministry of health and private laboratories.
   - **Complete blood picture:** Total leukocyte count, (TLC), hemoglobin concentration. Blood film to demonstrate differential white blood cell count (WBCs) and morphology of red blood cells (RBCs), erythrocyte sedimentation rate (ESR) using Western Green method. Liver function test (alanine transaminase (ALT), aspartate transaminase (AST), alkaline phosphatase (ALP)-total and direct bilirubin-total proteins, and albumin. Kidney function test (creatinine and urea) Fasting blood sugar, and Post prandial (2 h) blood sugar.The diagnosis of severe community acquired pneumonia (SCAP) was done according to the Infectious Diseases Society of America/American Thoracic Society.

(6) **Microbiological evaluation:** Sputum, blood culture (2 samples from 2 different sites after complete aseptic condition to avoid contamination), pleural fluid, transthoracic needle aspiration, tracheobronchial aspirate, and bronchoalveolar lavage (BAL) fluid in selected cases (BALF). Samples were plated on the following media: blood agar, MacConkey agar, chocolate agar and Sabouraud agar. Staining of selected samples was done by gram stain. Urine was tested for the presence of *S. pneumoniae* and Legionella antigen. Identification of microorganisms and susceptibility testing was performed according to standard methods [8].

Quantitative sputum culture (QSC)

Sputum obtained from adults having clinically and/or radiologically diagnosed CAP. All of the samples contained $>=25$ polymorphonuclear leukocytes (PNL), and <10 epithelial cells per low-power field (LPF) under light microscopy. Quantitative cultures were performed. Blood and chocolate and MacConkey agar plates were used for culture and standard microbiological methods were used for bacterial identification. 24 and 48 h later both direct plates and quantitative cultures were observed. Cut off point $>=10^5$ CFU/ml was determined to be positive for the QSC [9].

Quantitative cultures of bronchoalveolar lavage (BAL) fluid, a colony count of $\geqslant 10^4$ CFU/ml represents a bacterial load which is indicative of bacterial pneumonia. A BAL fluid colony count below the 10^4 CFU/ml threshold points to oropharyngeal contamination. Quantitative cultures of transthoracic needle aspiration, tracheobronchial aspirate, a colony count of $\geqslant 10^3$ CFU/ml represents a bacterial load which is indicative of bacterial pneumonia. A BAL fluid colony count below the 10^3 CFU/ml threshold points to contamination [10].

Quantitative culture of the blood

A single bacterial count >100 CFU/ml in the quantitative culture of the blood specimen in the presence of a positive qualitative peripheral blood culture of the same organism is an indication of sepsis [11].

Ziehl Neelsen stain: Direct smear stained with Gram stain and Ziehl Neelsen stain (to detect acid fast bacilli).