

Normal CT Scan in a Patient with Pneumonia: a Case Report

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Introduction

Pneumonia is a common lung infection that mainly affects the alveoli [1-3]. Overall approximately 450 million people are infected with pneumonia each year worldwide and results in the death for about four million people [4, 5]. It occurs in all age groups but mortality rates are high among children particularly in the newborn period and in the elderly over 75 years of age [4]. In the United States each year 5.6 million people are infected with community-acquired pneumonia [6]. Its symptoms can be expressed in different ways and includes cough, chest pain, fever and difficulty breathing [1]. Although most of the people regain their health between one to three weeks, pneumonia can be a serious threat to all lives [5]. It is usually caused by viral, bacterial infections or other microorganisms such as fungi, certain drugs and autoimmune diseases [1, 7]. Most of community-acquired pneumonia is caused by the gram-positive bacterium *Streptococcus pneumoniae* or pneumococcus (20%-60%) [1, 5]. This bacterium is the most common cause of pneumonia in adults [4, 5].

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ABSTRACT

A 68-year-old female was hospitalized with a primary complaint of dyspnea in Ziaecian Hospital affiliated to Tehran University of Medical Sciences in April 2014. She had malaise and non-productive cough along with a loss of appetite during the last two days. She was also suffering slight tachypnea. The patient had normal chest x-ray and Computed Tomography (CT) scan on the admission time. Initially there was no response to the first empiric treatment, the scan was repeated after 2 days and subsequently we observed abnormal signs in the scan suggestive to pneumonia.

KEY WORDS:

**Pneumonia
Diagnosis
Chest X-Ray
CT scan
Treatment**

Macrolids and antibiotics known as Beta-lactam such as penicillins are used for the treatment of pneumonia [2, 5]. The second common agent of community-acquired pneumonia is *Haemophilus influenzae* that generally occurs in patient with chronic lung disease, elderly people and those with alcoholism [2, 5]. On the other hand, atypical pneumonia is caused by *Mycoplasma pneumoniae*, *Chlamydia pneumoniae*, and *Legionella pneumophila* [3, 5]. A number of viruses cause pneumonia including Influenza virus, Respiratory Syndrome Virus (RSV), Severe Acute Respiratory Syndrome (SARS), Parainfluenzae virus, Adenovirus, and Herpes virus [1, 3, 5]. Based on patient characteristics and disease severity according to the kind of acquired pneumonia and etiologic agents are usually applied to a choice of diagnostic methods [8]. For diagnosis the types of pneumonia, physical exam, radiographic imaging and laboratory studies are used [1, 2]. Pneumonia can be diagnosed by Chest X-Ray (CXR), Computed Tomography (CT) scan, culture of the sputum and blood, gram stain sputum, and serology. Urinary antigen is alternative

or complementary method to detect *S. pneumoniae* and *Legionella*. Polymerase chain reaction (PCR), enzyme immunoassay (EIA), and immunofluorescence are rapid tests for identifying *Chlamydomphila pneumoniae*, *Mycoplasma pneumoniae* and some other respiratory tract viruses [9-12]. We report a patient with pneumonia who had normal CXR and CT scan on the admission time. In the second CT scan, abnormal signs suggestive for pneumonia were appeared.

Case Report

A 68-year-old female referred to Ziaiean Hospital affiliated to Tehran University of Medical Sciences with malaise and non-productive cough along with loss of appetite during the last two days. She had no fever and in the physical examination showed general illness with mild tachypnea. The vital signs included heart rate: 80bpm/min, blood pressure: 120/80 mmHg, respiratory rate: 32 / min and oxygen saturation 92% on room air. Mild coarse crackles were heard especially in the base of both lungs. The cardiac examination revealed no murmur or any tachycardia.

Laboratory studies showed Complete Blood Count (CBC), Erythrocyte Sedimentation Rate (ESR), electrolytes, Blood Urea Nitrogen (BUN), Creatinine and Arterial Blood Gas (ABG) in normal limits but hemoglobin revealed mild anemia and C - reactive protein (CRP) was positive. In the CXR and CT scan no sign of pneumonia was shown on admission (Figure 1). Echocardiography was performed for the patient and did not show any cardiac problems.

Empiric treatment was initiated with Oseltamvir, Ceftriaxon and Azithromycin. Forty eight hours after the treatment, the symptoms of the patient such as productive cough and dyspnea were exacerbated and subsequently the CXR and CT scan were repeated. In the new CXR revealed blunted right costo-phrenic angle and base her right lung showed opacity. Also in the new CT scan, pleural effusion was seen with air space consolidation (air bronchogram view) in the mid and lower lobe of the right lung that was compatible with pneumonia (Figure 2). Bronchoscopy and Bronchoalveolar lavage (BAL) were performed that showed pus in the right bronchus and culture of the secretion showed normal flora. In addition, culture was negative for fungi, tuberculosis and influenza. Also, cytology of secretion was negative for malignancy.

The treatment was changed to Meropenem, Vancomycin and Ciprofloxacin. The general condition of the patient became better within 72 hours after changing of the antibiotics. The antibiotics continued for two weeks and finally the patient discharged in good condition.

Figure 1. The first CT scan showed no sign of pneumonia on the admission time.



Figure 2. The second CT scan showed air space consolidation in the mid and lower lobe of the right lung.



Discussion

CXR can be used to confirm pneumonia in patients with suspected pneumonia. In the past, chest-x rays were the golden standard for pneumonia but now, there is significant evidence that pneumonia can be identified using CT scans [13]. In fact, CXR has less sensitivity for detecting pneumonia at initial presentation e.g. in a study conducted by Brandon C and colleagues found infiltrates consistent with pneumonia in cases who had negative CXR. Consequently, it can be said that CT scan may be premier for diagnosis patient with pneumonia especially in ICU or the emergency department [13]. In a rare report; we diagnosed a patient with pneumonia in which her CT scan was nor-

mal on admission. Due to no response to the first treatment, the scan was repeated after two days and we observed abnormal signs suggestive to pneumonia.

Although many antibiotics are available for treating pneumonia, it is occasionally difficult to choose the most suitable drug [1, 3-5]. Treatment depends on the cause of pneumonia, symptoms, age and total health of the patient [5]. Patients suffering from pneumonia need an antibiotic that is effective against the cause of disease [1, 3, 4]. In some cases the cause of pneumonia is unknown, so "empiric therapy" is used; antibiotics were chosen by the physician based on factors such as age, health and severity of the disease [3, 5]. In order to choose the appropriate antibiotic, the physician should first know how severe the pneumonia is and if the cause is known or not [1, 2, 5]. Subsequently, the physician should prescribe appropriate antibiotics according to the type of acquired pneumonia [2, 5]; however, individuals have different responses depending on age, health and other factors. Antibiotic therapy is continued for at least five days and if a patient has fever or other symptoms, the duration of treatment will be become longer [2, 5]. At present, for *S. pneumoniae* exact duration of treatment is 7 to 10 days and for *Mycoplasma pneumoniae*, and *Chlamydia pneumoniae* between 10 and 14 days is recommended [2, 3, 5]. Oseltamivir (Tamiflu) and Zanamivir (Relenza) are used for influenza A and B that during the primary 48 hours of the onset of symptoms may be effective to reduce disease severity and its duration [3, 5].

We reported the patient with pneumonia who had normal CT scan on the initial evaluation. Treatment was begun with Oseltamivir, Ceftriaxon and Azithromycin. Despite taking the antiviral and antibiotic, the symptoms of the patient were exacerbated. By changing the regimen, the symptoms were improved.

Conflict of Interest

We declare that we have no conflict of interest.

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