

High-resolution computed tomography findings from adult patients with Influenza A (H1N1) virus-associated pneumonia

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ABSTRACT

Objective: The aim of this study was to assess the high-resolution computed tomography (HRCT) findings at presentation in patients diagnosed with Influenza A (H1N1) virus-associated pneumonia.

Materials and methods: We reviewed the HRCT findings from 20 patients diagnosed with Influenza A (H1N1) and compared their HRCT scans with chest radiographs, obtained on the same day. The imaging studies were obtained 4–9 days after the onset of symptoms. The patients included 11 men and 9 women (ages 24–62 years; mean 42.7 years). All patients had a body temperature greater than 100.4 °F (>38 °C), tachypnea, and cough. Other common symptoms included diarrhea (60%) and sore throat (30%). The radiographs and HRCT scans were reviewed independently by two observers who reached a consensus decision.

Results: The predominant HRCT findings consisted of bilateral ground-glass opacities ($n = 12$), bilateral areas of consolidation ($n = 2$), or a mixed bilateral pattern of ground-glass opacities and areas of consolidation ($n = 6$). The abnormalities were bilateral in all of the 20 patients, had a predominantly sub-pleural distribution in 13 patients, and had a random distribution in the remaining 7 patients. The predominant radiographic findings were consolidations. Normal radiographs were found in 4 out of the 20 patients.

Conclusion: HRCT may reveal parenchymal abnormalities in patients with Influenza A (H1N1) infection who have normal findings on radiographs. The predominant HRCT findings were bilateral, peripheral, ground-glass opacities and/or bilateral areas of consolidation. The patients who presented consolidations had more severe clinical course.

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1. Introduction

Influenza virus types A and B account for the majority of viral pneumonias in immunocompetent adults [1]. In April of 2009, a new strain of human influenza A (H1N1) virus was identified in Mexico and was characterized by a unique combination of gene segments that had not been previously identified among human or swine influenza A viruses [2,3]. As of July 31, 2009, 168 countries and overseas territories/communities have reported at least one laboratory-confirmed case of this infection. All continents are affected by the pandemic [4]. The clinical symptoms, in the greatest number of cases, consist of mild clinical presentations with influenza-like illness. In addition, cases of severe illness, such as acute respiratory distress syndrome and death, have been reported in previously healthy persons [3].

The general radiologic findings in all viral pneumonias are represented by poorly defined nodules, patchy areas of peribronchial ground-glass opacity, and air-space consolidation. Hyperinflation is commonly present because of associated bronchiolitis [1]. The chest radiography is usually the first imaging modality obtained for the evaluation of acute respiratory symptoms. For the majority of patients with pneumonia, the chest radiograph provides adequate imaging information and a computed tomography (CT) scan is not warranted. However, an increasing number of patients undergo CT, particularly high-resolution CT (HRCT), when there is a high clinical suspicion for pneumonia in the presence of normal or questionable radiographic findings. The CT is also helpful in assessing complications or evidence of mixed infections in patients with known pneumonia who are failing to respond to appropriate therapy [5].

Perez-Padilla et al. [3] reported the chest X-ray findings observed in 18 patients with confirmed Influenza A (H1N1) virus-associated pneumonia. To our knowledge, the HRCT findings of this new infection have not been previously described. The aim of our study was to report the HRCT findings for Influenza A (H1N1) virus-associated pneumonia.

2. Materials and methods

The study was approved by the Institutional Review Board of our institution. This study included 20 patients diagnosed with Influenza A and acute respiratory disease. We retrospectively



Fig. 1. 42-year-old male patient with H1N1 pneumonia. Chest radiograph obtained 7 days after the onset of the symptoms reveals asymmetric, bilateral areas of air-space consolidation in the middle and lower lung zones.

reviewed the archives of nine different hospitals in Brazil for patients hospitalized with acute respiratory disease in which the real-time polymerase chain reaction (RT-PCR) were positive for Influenza A (H1N1), who had undergone chest X-ray and HRCT on the same day. Between June and July 2009, 20 patients fulfilled these criteria. The HRCT scans were obtained 4–9 days after the onset of symptoms. The patients included 11 men and 9 women (ages 24–62 years; mean 42.7 years). All patients fulfilled the criteria for a confirmed case of infection with novel Influenza A (H1N1) virus established by the Centers for Disease Control and Prevention. A confirmed case of infection is defined as a person with an influenza-like illness and a laboratory-confirmed novel influenza A (H1N1) virus infection as confirmed by RT-PCR or viral culture [6]. All patients had a body temperature greater than 100.4 °F (>38 °C), tachypnea, and cough. Other common symptoms included diar-

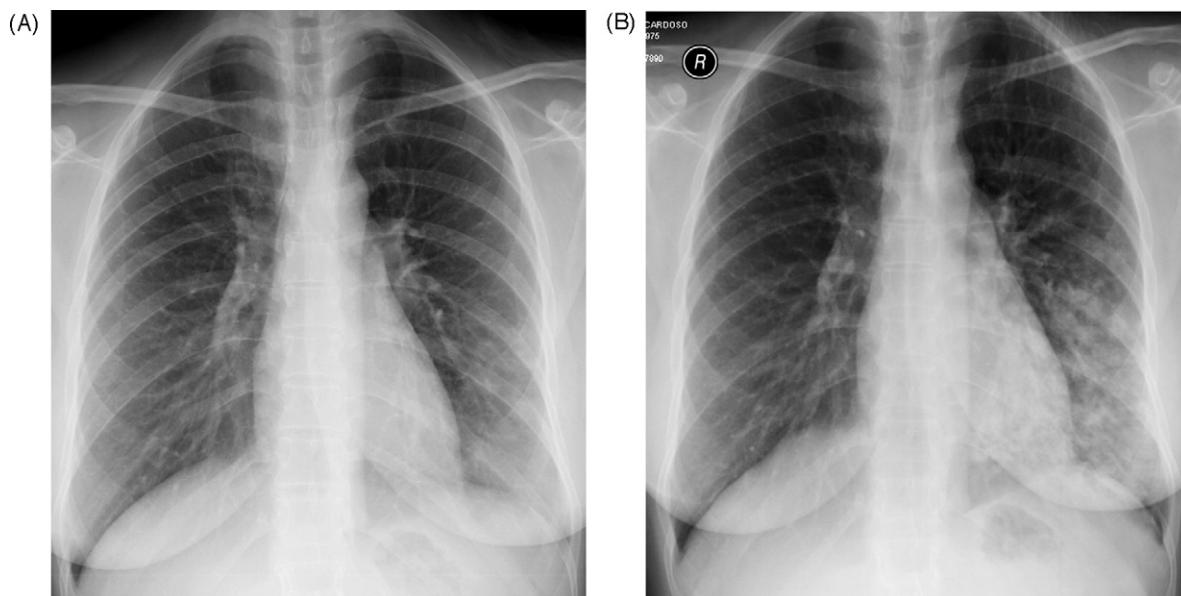


Fig. 2. 24-year-old female patient with H1N1 pneumonia. (A) Posteroanterior chest radiograph obtained 4 days after the onset of the symptoms shows a mild opacity in the left lower zone. (B) Chest radiography obtained 24 h after (A) reveals patchy areas of consolidation in the left lower region.

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