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Case of the Month #165: Swine-origin Influenza A (H1N1) Viral Pneumonia Presenting as Crazy-paving on Computed Tomography: Case Report and Literature Review

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Clinical Presentation

A 35-year-old woman presented to the emergency department with a 1-week history of shortness of breath, nonproductive cough, and fever. The patient was a previous intravenous drug abuser and known to have hepatitis C and human immunodeficiency virus. She was not on any antiretroviral medications. On admission, she had a temperature of 38.7°C, a blood pressure of 100/50, and an oxygen saturation of 87% on room air. Results of a physical examination were unremarkable, apart from scattered chest crackles. Her initial chest radiograph is illustrated in Figure 1. Results of the initial workup revealed neutropenia, lymphopenia, thrombocytopenia, an elevated lactate dehydrogenase level, and increased serum transaminases. Blood, nasal swab, sputum, and urine cultures were negative for organisms.

Because of the patient's deterioration over the next 24 hours, she was subsequently intubated and transferred to the intensive care unit (ICU). She then had a computed tomography (CT) of the chest performed (Figure 2) and underwent bronchoscopy, from which a bronchoalveolar lavage (BAL) sample was sent for evaluation. After implementing appropriate treatment based on the BAL results, the patient improved gradually and was extubated after a 2-day ICU course. The patient was discharged home after a 10-day hospital course. Her post-treatment chest radiograph is illustrated in Figure 3.

Diagnosis

Swine-origin influenza A (H1N1) viral (S-OIV) pneumonia, manifesting with ''crazy paving'' pattern on CT.

Radiologic and Microbiologic Findings

An admission chest radiograph demonstrated bilateral asymmetric ground-glass opacities (GGO) and consolidation in a predominant perihilar distribution. A suggestion of mild enlargement of the hilar and mediastinal lymph nodes was raised. No bronchial wall thickening, hyperinflation, or pleural effusions were noted (Figure 1).

CT of the chest was performed during the patient's ICU stay, the day after hospital admission. The CT demonstrated bilateral asymmetric patchy GGO, with superimposed smooth interlobular septal thickening, which resulted in a ''crazy-paving'' appearance. The abnormalities had a slight perihilar and upper-lobar predominance (Figure 2A–C). No bronchial dilatation, bronchial-wall thickening, centrilobular nodules, tree-in-bud pattern, or air trapping were present. Multiple slightly enlarged lymph nodes (short-axis diameter between 10 and 15 mm) were seen in the mediastinum, hila, and supraclavicular regions (Figure 2D). No pleural or pericardial effusions were present.

The patient's BAL was negative for *Pneumocystis jiroveci*. Her nasal swab and BAL sample were assessed by real-time reverse transcriptase polymerase chain reaction and returned positive for swine-origin influenza A (H1N1) virus. A posttreatment chest radiograph before hospital discharge showed resolution of the airspace abnormalities (Figure 3).

Key Words: H1N1; Swine influenza; Crazy-paving; Viral pneumonia; Computed tomography.

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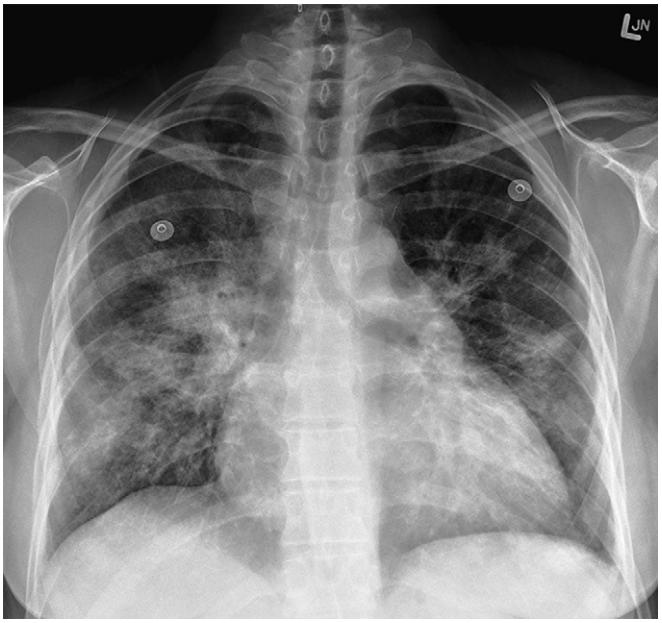

Figure 1. 35-year-old female with HIV and S-OIV. Admission poster-oanterior chest radiograph 1 week after the onset of symptoms showing bilateral, asymmetric ground-glass and consolidative opacities in a perihilar predominance. Note the hilar and mediastinal lymphadenopathy and the absence of pleural effusions.

Discussion

S-OIV was first reported in Mexico in the spring of 2009 [1]. Since then, the virus has disseminated rapidly all over the world. By June 11, 2009, the World Health Organization (WHO) declared S-OIV as a global pandemic [2]. The diagnosis and treatment of S-OIV continues to represent a major health issue a year later. As of March 26, 2010, the WHO has documented more than 16,931 related S-OIV deaths [3].

Many of the clinical manifestations of S-OIV are similar to those seen in the seasonal influenza: fever, cough, sore throat, myalgia, headaches, rigors, and fatigue [4]. However, diarrhoea and vomiting, which are seen in only 5% of the seasonal flu, are more common with S-OIV [4]. Although most cases are mild, some result in severe pneumonia, acute respiratory distress syndrome, and may progress to multi-organ failure [4]. Those at risk of acquiring more severe disease are children under the age of 5 years, adults 65 years and older, patients with chronic underlying conditions (eg, asthma, diabetes), pregnant women, and immunosuppressed patients [5]. Laboratory findings in patients with S-OIV include lymphopenia, thrombocytopenia, elevated serum lactate dehydrogenase, and increased serum transaminases [6]. At present, there are 2 antiviral agents that are effective at diminishing the duration and severity of S-OIV [6]. These include zanamivir (Relenza; GlaxoSmithKline, Mississauga, Ontario, Canada) and oseltamivir (Tamiflu; Roche Laboratories, Laval, Quebec, Canada). Therapy is typically given for 5 days but can be continued for up to 10 days in severe cases [6].

Several studies have shown that the initial chest radiograph is abnormal in approximately 50% of patients [7–10]. A recent study by Aviram et al [10] demonstrated that the most common abnormalities were GGOs in a predominantly

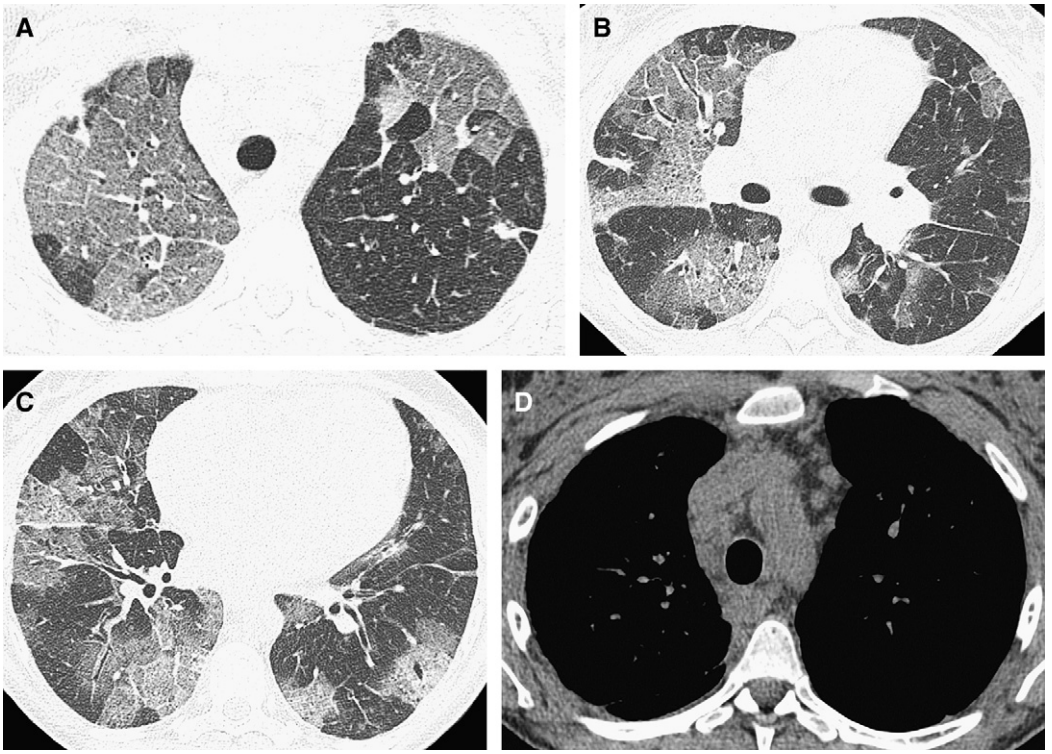

Figure 2. 35-year-old female with HIV and S-OIV.