

Influenza Type A Subtype H1N1 with MDR Klebsiella Pneumoniae superinfection

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Abstract: Majority of the morbidity and mortality due to Influenza A H1N1 (swine flu) are attributable to pneumonia and the acute respiratory distress syndrome (ARDS). Although it is rare in adults, a common cause of severe influenza pathogenesis is superinfection with bacterial pathogens, namely, *Staphylococcus aureus* and *Streptococcus pneumoniae*. Here we report a rare case of Influenza A H1N1 superinfected with Multi-Drug-Resistant *Klebsiella pneumoniae*.

Keywords: H1N1, MDR *Klebsiella pneumoniae*, Bacterial superinfection.

1. INTRODUCTION

Influenza A H1N1, also called influenza type A subtype H1N1 or swine flu, is a virus that is best known for causing widespread outbreaks, including epidemics and pandemics, of acute upper or lower respiratory tract infection. The influenza A H1N1 virus is a member of the family Orthomyxoviridae (a group of RNA viruses). Type A is one of the three major types of influenza viruses (the other two being types B and C). Type A is divided into subtypes, which are differentiated mainly on the basis of two surface antigens (foreign proteins) hemagglutinin (H) and neuraminidase (N). Therefore, H1N1 represents a subtype of influenza A. This subtype is further differentiated into strains based on minor variations in RNA sequence. First isolation of swine influenza virus from a human was done in 1974. In the past, though cases of person to person transmission have been reported, it resulted in small outbreaks only [2]. Then in March and April 2009, there was an outbreak of swine H1N1 influenza A virus in Mexico with subsequent cases being detected later in several other countries including United States and India (so called 2009 flu pandemic). The signs and symptoms of swine flu caused by H1N1 influenza A virus are similar to those in seasonal influenza virus. However, although its rare, secondary bacterial superinfection of the lung may complicate viral pneumonia and it was reported in 4 to 29 percent of cases that resulted in hospitalization or death in the United States, Argentina, Australia, New Zealand, and Spain. Here, we report a case of influenza type A subtype H1N1 superinfected multi-drug-resistant *Klebsiella pneumoniae*.

2. CASE REPORT

A 54 years old Saudi male patient presented to the emergency room after experiencing shortness of breath and dry cough for 2 days. He complained of flu like symptoms and low grade fever. He denied any chills, sick contacts at home, recent travel. He did not receive influenza vaccine during this year. He also denied alcohol intake, smoking, or illicit drugs. His past medical history was significant for treated recurrent low grade transitional cell cancer of the urinary bladder 8 years ago and diabetes. On initial presentation in the emergency room patient was conscious, tachypnic and severely dehydrated. He had a fever of 38°C, 105 mm Hg systolic blood pressure, and hypoxia with oxygen saturation of 78% on room air. On auscultation of the chest, bronchophony and tubular breath sounds were found bilaterally. He was started on intravenous fluids and high flow oxygen with non-rebreathing mask. Laboratory values revealed blood glucose level of 21 mmol/L, urea nitrogen (BUN) of 6.2 mmol/L, serum creatinine of 131.23 μmol/L, neutrophilic leukocytosis (total white blood cell [WBC] count 15,400 X10³/uL with 90% neutrophil) and hemoglobin 15.7 g/dL and platelets count 202 X10⁹/L. AST 57 U/L, ALT 21 U/L, LDH 642 U/L. Chest X-ray revealed bilateral pneumonitis. The throat swab specimen for real-time reverse transcriptase-polymerase chain reaction (rRT-PCR) H1N1 panel was taken in the

emergency room . During his course in the emergency room he developed respiratory distress requiring intubation and mechanical ventilation and admitted to intensive care unit. Initially he was diagnosed as a case of DKA with chest infection and treated symptomatically with adequate hydration along with oseltamivir and antibiotic therapy empirically for suspected swine flu and bacterial super-infections. On 3rd day of admission a positive result for swine flu was confirmed and H1N1 pneumonia diagnosis was established. Suction material from endotracheal tube was sent for bacteriological culture and sensitivity . Next day, the culture and sensitivity reports showed Multi-Drug-Resistant *Klebsiella pneumoniae* sensitive only to colistin (minimal inhibitory concentration [MIC] <0.2mcg/ml) and intermediate sensitivity to tigecycline and Imipenem .Antibiotics then adjusted according to that .after 9 days patient was successfully extubated and maintaining oxygen saturation with 3 L/min by nasal canula .two days later patient was shifted to general medical ward.

3. DISCUSSION

In March 2009, an outbreak of respiratory illnesses was first noted in Mexico, which was eventually identified as being related to H1N1 influenza A [1]. The outbreak spread rapidly to the United States, Canada, and throughout the world as a result of airline travel [3]. In June 2009, the World Health Organization (WHO) raised its pandemic alert level to the highest level, phase 6, indicating widespread community transmission on at least two continents [4,5]. The pandemic was declared to be over in August 2010 [6].

More than 214 countries and territories reported laboratory-confirmed cases of pandemic H1N1 influenza A [7]. In early July 2009, the WHO ceased closely tracking the number of cases because it had become difficult for countries to continue such monitoring in the setting of widespread community transmission [8]. Furthermore, even with close tracking, the true numbers of cases were many-fold higher than the numbers of confirmed cases [9]. Influenza viruses can be transmitted through sneezing and coughing via large-particle droplets. In addition to respiratory secretions, certain other bodily fluids (eg, diarrheal stool) should also be considered potentially infectious .The 2009 to 2010 pandemic of H1N1 influenza A infection demonstrated sustained human-to-human transmission, as suggested by the large numbers of patients with respiratory illnesses identified within a short period of time at various locations around the world [10]

Majority of the morbidity and mortality due to swine flu are attributable to pneumonia and the acute respiratory distress syndrome (ARDS). Pneumonia may be primary viral or mixed viral and secondary bacterial. Those progressing to ARDS have the worst prognosis. Secondary bacterial infection is much more prevalent in swine flu affected patients than their seasonal counterpart. A study on lung specimens from 77 fatal cases of pH1N1 infection found 29% prevalence of bacterial superinfection and *Pneumococcus*, *Staphylococcus aureus*, and *Streptococcus pyogenes* being the commonest.

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