Severe Pneumonia and Convulsion Caused by Influenza H1N1 Virus in an Asthma Patient: Case Report

Onur Özdemiş1, Emine Kürt2

Pandemic influenza virus (H1N1) has a higher attack rate than seasonal influenza virus and is more contagious than seasonal influenza infection. H1N1 infection might cause more severe disease leading to death, if patients have a debilitating chronic disease such as asthma or are pregnant, elderly, and younger than 5 years. The case of a 12-year-old asthmatic patient with pneumonia and convulsion secondary to H1N1 infection during her asthma attack is presented. The 12-year-old asthmatic patient presented with one-month history of coughing and dyspnea. When she was admitted, her fever was 36.5°C, respiratory rate was 42/min, blood pressure was 105/54 mmHg, pulse was 154/min, and oxygen saturation was 96%. Her physical examination revealed rhonchi and crackles on her lung. When her asthma attack improved at the day 3 after admission, she began to experience fever, fatigue, anorexia, and myalgia. She then had diarrhea and vomiting. Laboratory test results revealed anemia (Hemoglobin: 10.7g/dL), leucopenia (3.470) and thrombocytopenia (137,000). She had a C reaktif protein (CRP) level of 81, Sedimentasyon (ESR) of 89 mm, Aspartat aminotransferaz (AST) level of 430 U and Alanin transaminaz (ALT) level of 320 U. Her chest X-ray demonstrated bilateral consolidations at the lung bases. Cefuroxime was replaced with meropenem, azithromycin, and vancomycin when her fever did not resolve. During this febrile episode, she had an afebrile tonic-clonic convulsion. Lumbar puncture and magnetic resonance imaging (MRI) revealed normal findings. Her fever and symptoms were thought to be due to H1N1 infection, and oseltamivir was started; her fever resolved next day. On the 10th day after her admission, H1N1 was detected in her nasopharyngeal swab. When an asthmatic patient has an unknown origin of fever that leads to pneumonia and convulsion, pandemic influenza infection should be kept in mind.

Keywords: Asthma, H1N1 virus, pneumonia, convulsion

Introduction

Pandemic influenza A (H1N1) virus, unlike seasonal influenza, has a high attack rate and contagiousness (1). While the pandemic influenza virus shows symptoms like many seasonal influenza viruses in many people, unlike seasonal influenza, it may cause severe infections in healthy and young adults. These clinical differences between seasonal and pandemic influenza are shown in Table 1. It can cause more serious infections and deaths in those with underlying chronic illnesses, such as asthma, in infants, children aged under 5 years, and the elderly (1, 2).

In this case report, we present a 12-year-old patient who had asthma as an underlying chronic disease, who applied to our clinic with the complaint of attacks and had bacterial pneumonia and convulsions secondary to pandemic influenza.

Case Report

A 12-year-old girl who complained of a 1-month-long cough and newly started shortness of breath was hospitalized with the diagnosis of asthma by the polyclinic that followed up the patient. The weight of the patient was 30 kg, height was 157 cm, fever at the time of admission was 36.5°C, respiratory rate was 42/min, arterial tension was 105/54 mmHg, pulse was 154/min, and oxygen saturation was 96%. While the patient was receiving asthma attack treatment and recovering in the clinic, she began to develop fever, malaise, loss of appetite, and widespread muscle pain on the third day of hospitalization. On the following day, diarrhea and vomiting occurred two to three times. Then, leukopenia, anemia, and thrombocytopenia developed. In the laboratory examination of the patient at this time, leukocyte was 3,470/mm³, hemoglobin was 10.7 g/dL, platelet was 137,000/mm³, C-reactive protein (CRP) was 81mg/L (normal: <5), sedimentation was 89/h, aspartate aminotransferase (AST) was 430 U/L, alanine transaminase (ALT) was 320 U/L, and lactate dehydrogenase (LDH) was 1524 U/L. Posterioranterior (PA) chest X-ray showed consolidation (pneumonic infiltration) in the bilateral basal segments (Figure 1). Meropenem treatment was initiated in the patient. The patient did not have any previous history of convulsion and experienced a tonic–clon-
ic seizure on the seventh day with fever. No microbiological and biochemical properties were detected in cerebrospinal fluid (CSF) examination. No pathology describing epilepsy was found in the magnetic resonance imaging (MRI) of the patient. Oseltamivir was administered for 5 days to the patient who had influenza due to clinical findings, history, and seasonal characteristics. In addition to meropenem, azithromycin and vancomycin were administered. A single dose of 500 mg/kg of immunoglobulin was administered intravenously on the basis of worsening of the clinical condition despite the treatment. Reproduction did not occur in the blood, urine, and CSF cultures. The patient’s nasopharyngeal swab sample that was taken 1 week before was detected as H1N1 positive. The fever of the patient receiving meropenem, oseltamivir, vancomycin, and azithromycin dropped on the eighth day of hospitalization and on the second day of oseltamivir therapy. The sedimentation and CRP of the patient whose general condition improved and lung findings recovered became negative. Her thrombocytopenia recovered. Liver enzymes started to improve. The patient was discharged with full recovery. Polyclinic follow-ups revealed that all laboratory findings returned to normal, and the anticonvulsant treatment was terminated because the EEG was normal, and she continued to use asthma-control drugs. Informed consent was verbally received from the parents of the patient presented in this case study.

**Discussion**

While pandemic H1N1 influenza A may be asymptomatic in healthy individuals, it may be fatal in children, the elderly, pregnant women, and those with underlying chronic disease (1, 2). The most common complication of pandemic H1N1 influenza in children is respiratory complications, primarily viral pneumonia (2-5). The most common cause of intensive care hospitalizations and deaths is respiratory failure and acute respiratory distress syndrome (ARDS) (6). Due to the fact that our patient was 12 years old and had severe underlying asthma, clinical picture was severe because of the development of bacterial pneumonia secondary to influenza.

In addition to fever and cough that are the most common clinical findings of the disease, rhinorrhea, headache, sore throat, myalgia, tremor, diarrhea, vomiting, lethargy, confusion, photophobia, earache, chest pain, croup, bronchiolitis, wheezing, apnea, respiratory distress, and exacerbation in asthma may be observed (2, 7, 8). Loss of consciousness, convulsions, encephalopathy, and paralysis have been reported among the neurological complications in childhood (2, 9-11). In our case, the patient had fever, cough, diarrhea, vomiting, myalgia, lethargy, nonfebrile convulsion (epileptic attack), and pneumonia.

In a study consisting of four H1N1-associated patients, H1N1 was detected positive in nasopharyngeal swab samples of all patients with seizure and encephalopathy, and none of them were found to have any growth in CSF culture. There was no evidence other

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**Table 1. Clinical differences between seasonal and pandemic influenza infection.**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Seasonal Influenza</th>
<th>Pandemic Influenza</th>
</tr>
</thead>
<tbody>
<tr>
<td>The duration of viral replication</td>
<td>Short</td>
<td>Long</td>
</tr>
<tr>
<td>Nausea and vomiting</td>
<td>Rare</td>
<td>Frequent</td>
</tr>
<tr>
<td>Diarrhea</td>
<td>Rare</td>
<td>Frequent</td>
</tr>
<tr>
<td>Abdominal pain</td>
<td>Rare</td>
<td>Frequent</td>
</tr>
<tr>
<td>CNS findings</td>
<td>Rare</td>
<td>Frequent</td>
</tr>
<tr>
<td>Disease duration</td>
<td>1–7 days</td>
<td>It may last up to 28 days</td>
</tr>
</tbody>
</table>

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**Table 2. Laboratory values changing between the patient’s hospitalization with asthma attack and H1N1 infection.**

<table>
<thead>
<tr>
<th></th>
<th>1st day of hospitalization</th>
<th>5th day</th>
<th>7th day</th>
<th>9th day</th>
<th>11th day</th>
<th>13th day</th>
<th>16th day</th>
<th>20th day</th>
</tr>
</thead>
<tbody>
<tr>
<td>WBC</td>
<td>17.300</td>
<td>9.040</td>
<td>5.560</td>
<td>3.470</td>
<td>5.780</td>
<td>4.200</td>
<td>5.900</td>
<td>5.700</td>
</tr>
<tr>
<td>HB</td>
<td>13.3</td>
<td>12.4</td>
<td>12.5</td>
<td>12.6</td>
<td>10.9</td>
<td>10.7</td>
<td>10.7</td>
<td>12.9</td>
</tr>
<tr>
<td>PLT</td>
<td>219.000</td>
<td>384.000</td>
<td>314.000</td>
<td>221.000</td>
<td>137.000</td>
<td>197.000</td>
<td>496.000</td>
<td>680.000</td>
</tr>
<tr>
<td>CRP</td>
<td>130</td>
<td>28.0</td>
<td>81.0</td>
<td>12.0</td>
<td>27.0</td>
<td>12.0</td>
<td>&lt;3.45</td>
<td>&lt;3.45</td>
</tr>
<tr>
<td>ESR</td>
<td>64</td>
<td>89.0</td>
<td>41.0</td>
<td>27.0</td>
<td>47.0</td>
<td>46.0</td>
<td>39.0</td>
<td>19.0</td>
</tr>
<tr>
<td>AST</td>
<td>13</td>
<td>474.0</td>
<td>302.0</td>
<td>64.0</td>
<td>87.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ALT</td>
<td>8</td>
<td>195.0</td>
<td>169.0</td>
<td>108.0</td>
<td>40.0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

WBC: total leukocyte count (mm3), HB: hemoglobin (g/dL), PLT: platelet count (mm3), CRP: C-reactive protein (mg/L), ESR: Sedimentation in the 1st hour, AST: Aspartate aminotransferase (U/L), ALT: Alanine transaminase (U/L)
than sinusitis and calcification in computerized brain tomography, and while no evidence was found in brain MRI of three patients, hyperintense areas in nonspecific T2 in white matter were detected in one patient. While no epileptic focus was detected in the EEG of any of the patients, waves compatible with encephalopathy were observed in three patients. The result of H1N1 was positive in our patient, and no growth was detected in CSF culture. There was no pathology compatible with epilepsy in the MRI. Her EEG was assessed as normal. Our patient’s seizure was evaluated as a neurological complication due to H1N1 influenza virus (9, 12).

High aspartate aminotransferase (AST), alanine transaminase (ALT) levels, anemia, leukopenia, leukocytosis, thrombocytopenia, and bilirubinemia are among the laboratory findings of influenza. Patients with severe disease may have high levels of creatine kinase and lactate dehydrogenase (LDH) (2, 13). Similarly, our patient had anemia, leukopenia, thrombocytopenia, and elevated AST, ALT, and LDH levels. Some laboratory indicators of our patient during the stay in the hospital are given in Table 2.

Because most people who had pandemic H1N1 influenza recover without complications, hospitalization and antiviral treatment are not recommended for those who do not have chronic disease and risk factors, but it is recommended that they consume plenty of fluid and that fever should be brought down using acetaminophen or nonsteroidal anti-inflammatory drugs. Aspirin should not be used in children due to the risk of Reye’s syndrome (2, 3).

Studies have shown that prolonged clearance of nasopharyngeal influenza viral RNA load is associated with the severity of the disease, and a rapid decrease in viral load was noted as of the first day of oseltamivir initiation (6, 14). It was reported in the study conducted by Jain et al. (15) that antiviral treatment was not initiated in any one of the patients who died of influenza in the first 48 h after the onset of symptoms. For this reason, we think that the antiviral treatment, which is started early, changed the course of the disease. We also attempted to initiate the antiviral treatment early in our patient, and the patient’s fever dropped on the second day of oseltamivir.

In the treatment of H1N1 influenza, oseltamivir and zanamivir are effective as antivirals. Oseltamivir is the first-choice antiviral that can be used in newborns (1). The most important limiting point of oseltamivir is that it only exists in an oral form. It can be administered especially to intensive care patients through a nasogastric probe. Zanamivir is the second choice due to the fact that its systemic distribution is not sufficient and that it is difficult to use in severe cases because it is administered through inhalation and that it leads to bronchospasm (1, 2). The World Health Organization recommends zanamivir treatment when oseltamivir is not available or when there is a resistance against oseltamivir (1). Antiviral oseltamivir treatment was initiated because our patient had persistent asthma, and secondary pneumonia and nonfebrile convulsions developed.

Because H1N1 influenza has high infectivity, contact and droplet isolation should be considered in intensive care units and services; masks should be worn, and patients should be isolated (6).

**Conclusion**

Pandemic H1N1 influenza may be severe and complicated in some of the patients, and it may require antiviral treatment. Care should be taken, especially in risk groups such as patients with asthma, and antiviral treatment should be initiated as soon as possible.

**Informed Consent:** Verbal informed consent was obtained from parents of the patient who participated in this study.

**Peer-review:** Externally peer-reviewed.


**Conflict of Interest:** No conflict of interest was declared by the authors.

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**References**


