

## Leukemia Presenting as H1N1 Pneumonia

Sarah ElNassir ElNigoumi, MBBS, DCH\*  
Haya Alkhayyat, MD, DCH, MSC, CABP, FRCPCH, FRCPI\*\*

**Swine flu caused by H1N1 virus has complications which could be very severe. Several studies have reported an association between influenza and malignancies.**

**We report a child with H1N1 with pancytopenia associated with acute lymphoblastic leukemia (ALL). The child presented with high-grade fever and pneumonia; a blood film revealed atypical lymphocytes with no blast cells. A repeat blood film revealed blast cells, and a subsequent bone marrow examination confirmed the diagnosis of ALL, after which child was started on chemotherapy.**

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Swine-origin influenza A (H1N1) was announced as a universal pandemic in June 2009<sup>1</sup>. Although this disease could lead to mild clinical illness, certain patients who are diagnosed with H1N1 suffer from serious complications, including severe pneumonia, bacterial co-infection and/or other systemic complications<sup>2,3</sup>. Swine flu should be closely monitored in the pediatric population because complications may be extremely severe. Risk factors for the development of severe complications include chronic lung disease and neurological conditions. Furthermore, children with acute lymphoblastic leukemia (ALL) are at a higher risk of complications if exposed to H1N1 swine flu due to their low immunity<sup>4</sup>.

The aim of this report is to present a child who was admitted with H1N1 pneumonia associated with pancytopenia.

### THE CASE

The patient was a three-year-old Bahraini male who was known to have alpha thalassemia trait. He presented with a history of fever, cough and poor appetite during the preceding week. He was admitted with H1N1 pneumonia associated with anemia and thrombocytopenia. His immunization history was up to date, and he was developmentally normal. The only significant aspect of the patient's medical history was alpha thalassemia trait. There was no history of previous hospital admissions or surgical procedures. Significant aspects of the patient's family history included sickle cell disease and thalassemia; his father has both conditions.

At admission, the patient was in respiratory distress with mild pallor and high-grade fever (40°C). His oxygen saturation was maintained above 95% with 2 liters of oxygen. Chest auscultation revealed reduced air entry in the right lung with bilateral crepitations. Physical examination was negative for lymphadenopathy and hepatosplenomegaly.

A complete blood count performed revealed a normal leukocyte count ( $8.3 \times 10^9/L$ ) with microcytic, hypochromic anemia (8.5 g/dl) and thrombocytopenia ( $15 \times 10^9/L$ ). A blood film revealed atypical lymphocytes with no blast cells. Chest X-ray revealed infiltrations of the right upper lobe.

The patient started on oseltamivir, erythromycin, vancomycin, ceftriaxone, methylprednisolone and bronchodilators. He also received multiple platelet transfusions.

The patient's fever persisted; another complete blood count revealed leukopenia ( $2.83 \times 10^9/L$ ) with an absolute neutrophil count of 0, a hemoglobin level of 7.1 g/dl and a platelet count of  $8 \times 10^9/L$ . His blood culture was negative. The antibiotics were changed to piperacillin/tazobactam and gentamicin. A hematologist's advice was sought for a bone marrow examination to exclude malignancy, and the patient was started on IVIG.

Another blood film revealed blast cells. A subsequent bone marrow examination confirmed the diagnosis of ALL, after which child was started on chemotherapy.

### DISCUSSION

Since the WHO declared H1N1 influenza to be a pandemic in 2009, scientists have been interested in investigating this new strain of the virus to prevent and manage infection in immunocompromised individuals. Even prior to the emergence of the novel 2009 H1N1 influenza strain, influenza has been a serious health problem for patients with hematological malignancies who were undergoing systemic chemotherapy or receiving a hematopoietic stem cell transplant. A few studies have described seasonal influenza outbreaks among such patients and revealed the susceptibility of immunocompromised populations. However, a limited number of studies have reported a possible association between cancers and contracting influenza in communities and at healthcare facilities<sup>5-8</sup>.

In a study, a two-step polymerase chain reaction was used to assess nasopharyngeal specimens and confirm the H1N1 influenza<sup>9</sup>. Eight (25.8%) patients had leukopenia, and six (19.4%) patients had thrombocytopenia; four patients with persistent fever and cytopenias underwent bone marrow aspiration; one was newly diagnosed with acute myeloid leukemia, another had ALL, and a third had hemophagocytic lymphohistiocytosis<sup>9</sup>. Kaynar et al reported two previously healthy individuals with H1N1 infection as the initial presentation of acute leukemia<sup>10</sup>. One of these individuals was

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\* Pediatric Resident  
\*\* Senior Consultant Pediatrician and Endocrinologist  
Department of Pediatrics  
Bahrain Defence Force Royal Medical Services  
Associate Professor in Pediatrics, RCSI-MUB  
Kingdom of Bahrain  
E-mail: sarahnelnigoumi@gmail.com

diagnosed with H1N1 infection, pneumonia and acute myeloid leukemia upon presentation to the hospital. However, the second patient had a normal blood smear, and bone marrow aspiration biopsy was eventually required due to the persistence of cytopenia. The bone marrow was suggestive of ALL<sup>11</sup>.

## CONCLUSION

**Most studies, including this report, have shown an association between severe immunosuppression and the development of influenza-associated pneumonia. Unfortunately, due to immunosuppression, vaccines, such as the seasonal influenza vaccine may provide very little benefit for immunosuppressed children. Data regarding the association of leukemia with H1N1 pneumonia and other viral pneumonias are limited, and further studies are required.**

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