Pancytopenia associated with influenza A infection

Pneumopathie par le virus de la grippe A compliquée d’une pancytopenie

Influenza is a major cause of morbidity and mortality in the world. Influenza infection in humans manifests as lower respiratory tract disease. Hematologic abnormalities are also prominent with lymphopenia and thrombocytopenia frequently reported. However, pancytopenia is noted in only one case series [1]. This is the first report of serious and transient pancytopenia associated with influenza A in a pediatric patient.

Case report

A 2-year-old girl (from black population) was admitted in pediatrics intensive care unit, for oxygen-requiring pneumonia with pleural effusion. The medical history was peanut and cow milk allergy. There was no exposure to potential bone marrows toxins or self-medication. Physical examination showed a fever to 40°C, a cough and respiratory distress syndrome. Breath sounds were decreased and inspiratory rales on the left lung side. Chest X-ray (figure 1) confirmed a left condensation associated with left pleural effusion. On admission, blood samples showed a hemoglobin of 10.4 g/dl, a white blood cell count of 5.6 × 10^9/L, a platelet count of 334 × 10^9/L, a systemic inflammatory response syndrome with C-Reactive Protein of 436 mg/L and procalcitonin of 9.7 ng/mL, without electrolytes and liver function tests disturb. A nasopharyngeal aspirate revealed the presence of influenza A virus by PCR. One hemoculture was positive of Streptococcus pneumoniae.

The patient was treated with chest tube drainage, intravenous cefotaxim (100 mg/kg/d), antiviral treatment by osel-tamivir (2 mg/kg/d) and oxygenotherapy. Outcome was favourable. Apyrexia was obtained in 24 hours, and without shock or renal failure. Forty-eight hours after admission, the patient had a severe pancytopenia. Platelets count was 5 × 10^9/L, hemoglobin was 5.7 g/dl and white blood cell count was 3.4 × 10^9/L. The coagulation test was normal. The peripheral blood smear evaluation did show neither schizocyte nor morphologic abnormalities of blood cells. The reticulocyte count was of 0.1%. There were no sign of intravascular hemolysis. Direct and indirect coombs tests were negative. Haptoglobin was normal at 2.65 g/dL and total bilirubin was normal at 21 μmol/L. But ferritin increased at 2791 μg/L, triglycerid increased at 3.1 mmol/L.
and lactate deshydrogenase increased at 1467 UI/L. A body control computed tomography did not find bleeding. The evolution was spontaneously better in 5 days [see the kinetics of blood lineage (figures 2–4)] failing to give reasons for marrow puncture. A complete resolution of symptoms was obtained 2 weeks later.

**Discussion**

Pancytopenia was an unusual hematologic abnormality in influenza infection. No pancytopenia complication was reported in 745 children with influenza A infection which had been identified in pediatrics Philadelphia Hospital [2]. Only one case series reported three pancytopenia with influenza A infection [1]. This case is most serious but cytopenias were transient and did not appear to have clinically significant sequelae. Anemia of our patient was a priori of central origin with decreased reticulocytes. It was not due to peripheral consumption because there were no signs of peripheral destruction. Exams did not allow asserting if neutropenia or thrombocytopenia were peripheral or central origins. Mechanism of hematologic abnormalities during influenza A infection was sure but not defined. One study suggests inhibition of erythroblastic and granulocytic lineages by influenza virus A infection without direct affection of these lineages [3]. In addition, influenza A viraemia which is necessary to contamination of stem cells, has only been found in H5N1 infections [4]. Lymphopenia [5] and isolate thrombocytopenia [4] are frequent. Thrombocytopenia was probably due to central origin by inhibition but also it was due to peripheral platelet destruction by the virus [6]. Some cases of macrophage-activation syndrome or aplastic anemia have been reported but always associated with manifestations of multiple organ dysfunction syndrome [4,7].

The other pancytopenias mechanisms were not possible. Cefotaxim and oseltamivir did probably not contribute to the hematologic abnormalities because blood cell count was corrected before treatment cessation. Secondary, this child had influenza A complicated of secondary infection by *S. pneumoniae*. In the case series reported, three pancytopenia with influenza A infection, two of them had an association of influenza and *S. pneumoniae* infections [1]. Isolated infection with *S. pneumoniae* could also have a role in anemia but it is not associated with pancytopenia. However, presence of *S. pneumoniae* is highly correlated with the severity of lung injury [8]. Viral infections (Parvovirus B19, Cytomegalovirus, Epstein-Barr virus or human immunodeficiency virus infection) in general are implicated among the causes of pancytopenia.

**Conclusion**

In conclusion, this case report presented a severe pancytopenia with favorable outcome without late sequelae. Monitoring of hematologic abnormalities with influenza A infection, respiratory virus, could help to understand the mechanism of inhibition of hematopoietic stem cells and may be able to identify a variant strain of influenza A virus which leads to severe hematological impairment.

**Disclosure of interest:** the authors declare that they have no conflicts of interest concerning this article.

**References**


Letter to the editor

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