CRITICAL CARE

COMMENTARY

Clinical features of H1N1 2009 infection in critically ill immunocompromised patients

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Abstract

Seasonal influenza virus has been described as an emerging and severe pathogen in immunocompromised hosts. Since the beginning of the 2009 influenza A novel H1N1 pandemic, several series have described the clinical course of the disease in various populations. We report the clinical course of H1N1 2009 infection in 10 immunocompromised patients. Half of the patients received long-term steroid therapy. Disease was characterized by a clinical picture similar to that of non-immunocompromised patients but with prolonged course and higher mortality.

Infection is a major source of morbidity and the leading cause of death in immunocompromised patients [1]. The increased susceptibility to infection results from the intertwined effects of the immunocompromising condition, treatments, and co-morbidities [1]. Human infection with the novel H1N1 influenza virus was first recognized in early April 2009 and declared a worldwide pandemic by the World Health Organization in June 2009. Recent case series provide information on the clinical course, risk factors, and outcome of H1N1(v) infection [2-4]. Both New Zealand and Canada have experienced H1N1(v) outbreaks with severe illness requiring intensive care unit (ICU) admission, ventilatory support, and rescue therapies. However, no case series have specifically described the features of H1NI(v) infection in immunocompromised patients. Here, we report the clinical and epidemiologic features in 10 critically ill immunocompromised patients with H1N1(v) infection.

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The case definition was ICU admission for acute respiratory failure and a positive specific polymerase chain reaction test for the pandemic influenza A (H1N1) 2009 virus. All patients meeting this case definition were included.

In late 2009, 15 patients with H1N1-related acute respiratory failure, including 10 immunocompromised patients, required ICU admission. As reported in Table 1, median time from respiratory symptom onset to ICU admission was 4 days (interquartile range [IQR] 3 to 5 days). Hypoxemia was mild at ICU admission but worsened over the next few days. The chest radiographs consistently showed extensive pulmonary infiltrates (median Murray score 3; IQR 2 to 4), and 80% of cases showed an alveolar pattern. All patients were treated with oseltamivir, which was prescribed 1 day (range 0 to 6 days) after ICU admission. Superinfection (mostly bacterial pneumonia) occurred in all patients in keeping with previous data on seasonal influenza [5]. The clinical course was characterized by prolonged oxygen dependency in the survivors (10 days; IQR 6 to 15 days). Death occurred in four patients and was usually secondary to severe hypoxemia.

H1N1(v) infection can result in a wide spectrum of clinical patterns, ranging from no symptoms to fulminant viral pneumonia. This new pandemic virus is characterized by a high prevalence of severe viral pneumonitis, which often requires mechanical ventilation [2]. Influenza viruses are known to cause severe infections in immunocompromised patients, of whom variable proportions were reported in epidemiologic descriptions [2-4]. Our case series is the first to describe the course of H1N1(v) infection in immunocompromised hosts.

Several points deserve to be highlighted. First, the risk factors for H1N1(v) described in the overall population [2-4] were not found in our cohort. In contrast, none of our patients had obesity (median body mass index 26.9; IQR 21 to 26) or chronic lung disease [3]. Of our 10 patients, 7 were on long-term steroid treatment, as described in the immunocompromised subgroup of the Canadian ICU patients [3]. Cellular immunodeficiency is the main risk factor for lower respiratory tract infection

Table 1. Clinical characteristics and outcomes of H1N1(v) critically ill immunocompromised patients

Patient	Type of immune deficiency	Chemotherapy	Immuno-suppressive agents	Lymphocyte count	Time, in days, from respiratory symptoms to ICU admission	Ventilatory support	Superinfection	Anti-infectious agents[a]	Outcome
1	Chronic myeloid leukemia	No	No	4,000	3	NIV	Clinically documented	C3G/macrolide	Alive
2	Allogeneic BMT (12 months ago) with GVHD	No	Yes (steroid/CIs)	800	1	MV	Clinically documented	Piperacillin/ FQ	Dead
3	Allogeneic BMT (15 months ago) with GVHD	No	Yes (steroid/CIs)	600	1	NIV	*Escherichia coli* + *Aspergillus fumigatus*	Imipeneme/ FQ	Dead
4	Autologous BMT for multiple myeloma	Yes	Yes (steroid)	50	5	None	Clinically documented	Piperacillin/ macrolide	Alive
5	Renal transplantation	Yes	Yes (steroid/CIs/MMF)	1,200	5	MV	*Pseudomonas aeruginosa*	Piperacillin/ macrolides	Dead
6	HIV	No	No	1,800	3	None	*Streptococcus pneumoniae*	C3G/ macrolide	Alive
7	Autologous BMT for multiple myeloma	Yes	Yes (steroid)	100	5	MV	Clinically documented	Piperacillin/ macrolide	Alive
8	Myelodysplasia	Yes	Yes (steroid)	2,000	3	MV	*E. coli*	Piperacillin/ macrolide	Dead
9	Mantle cell lymphoma	No	No	100	2	NIV and MV	*S. pneumoniae*	C3G/macrolide	Alive
10	Solid organ transplantation	No	Yes (steroid)	2,000	2	None	*S. pneumoniae*	C3G/macrolide	Alive

[a]All patients were receiving oseltamivir. BMT, bone marrow transplantation; C3G, third-generation cephalosporin; CI, calcineurin inhibitor; FQ, fluoroquinolone; GVHD, graft-versus-host disease; ICU, intensive care unit; MMF, mycophenolate mofetil; MV, mechanical ventilation; NIV, non-invasive mechanical ventilation.

with influenza viruses [5] as the main defense mechanism is CD8 T-lymphocyte-mediated cytotoxicity. The clinical presentation in our patients was similar to that described in immunocompetent individuals, with symptom onset 4 days before ICU admission [2,4]. Mortality was high (40%) compared with the overall population with H1N1 2009 infection [2-4]. The ICU stay was shorter than in the overall ICU population but the hospital stay was longer, perhaps because of prolonged viral shedding in lymphopenic patients [5].

Abbreviations

ICU, intensive care unit; IQR, interquartile range.

Competing interests

EA is a member of the French and European boards of Pfizer Inc (New York, NY, USA) and Gilead (Foster City, CA, USA), respectively. The other authors declare that they have no competing interests.

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