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Deaths Associated with 2009 Pandemic Influenza A (H1N1) Virus Infection

The first recorded case of laboratory-confirmed 2009 pandemic influenza A (H1N1) influenza (i.e., novel H1N1) infection in Alaska was reported to the Section of Epidemiology (SOE) by the Alaska State Virology Laboratory (ASVL) on May 27, 4 weeks after the first U.S. cases were identified in California.¹ Between May 27 and September 24, three deaths associated with novel H1N1 infection have been reported to SOE (for comparison, 592 novel H1N1-related deaths were reported nationally through September 4).² The three Alaska deaths are described below.

Patient A, a resident of Fairbanks, was reported to SOE on July 24 by the Washington State Department of Health. She was in her 40s and had a complicated past medical history (Table). She was visiting family in Washington State when she developed a headache, fever, lethargy, confusion, and sharp pleuritic chest pain over several days. She was hypoxic and hypotensive on admission to the hospital on July 13. Her initial chest roentogram showed diffuse upper lobe interstitial infiltrates, which subsequently progressed to adult respiratory distress syndrome (ARDS). She was placed on a ventilator, treated with broad spectrum antibiotics for sepsis, and underwent hemodialysis. She did not respond to treatment and died on July 16. The patient was confirmed positive for novel H1N1 on July 24.

Patient B, a 10 year old resident of Fairbanks, was reported to SOE on September 4 by Fairbanks Memorial Hospital. He had no underlying medical conditions. On September 3, he went to school but developed a fever, cough, and pleuritic chest pain mid-day; the school nurse notified his mother. Later that afternoon, he was seen as an outpatient, at which time his chest roentogram was normal; he was given a prescription for oseltamivir (Tamiflu[®]). He was admitted to Fairbanks Memorial Hospital shortly after midnight on September 4 with a positive influenza A rapid test, an oxygen saturation less than 80% and heart rate of 160. His condition worsened on antibiotics and oseltamivir. He was transferred to Providence Alaska Medical Center where copious amounts of bloody sputum were found after intubation. Hospital staff attempted to resuscitate the patient over 2½ hours without success. He was pronounced dead at 10:29 PM on September 4. Postmortem specimens were positive for novel H1N1 and 4-plus methicillin-sensitive *Staphylococcus aureus*.

Patient C, a resident of Seward, was reported to SOE on September 8. She was in her 50s with a history of a bipolar disorder. Approximately 4 days before hospitalization, she reported coughing, feeling weak and decreased intake of food and liquids. On the day of admission she had a temperature of 102.6 °F, a blood pressure of 104/53, mild tachycardia and tachypnea. A chest roentogram showed a right lower lobe infiltrate. A rapid

influenza A test was negative. During hospitalization the patient required ventilatory support, developed purpura fulminans with distal digit necrosis, and acute renal failure. Her condition continued to deteriorate despite broad-spectrum antibiotic treatment, and she died on August 28. On August 28, ASVL reported that she was positive for novel H1N1.

Discussion

All three patients described here had fever and were admitted with increasing respiratory distress. The time from onset of symptoms to death ranged from 36 hours to 18 days. Patients A and C were thought to have bacterial infections at admission, although influenza testing was ordered. Patient B was initially suspected to have influenza and was the only one treated with an antiviral agent. Despite broad-spectrum antibiotic treatment, this patient had postmortem evidence of secondary bacterial infection that might have contributed to his death.³ Both patients A and B complained of pleuritic chest pain, a finding that is not usually described with influenza infection, but could have been the result of complications such as pleuritis, myocarditis, or secondary bacterial infection.

Recommendations

1. Consider the possibility of atypical presentations of influenza, particularly in individuals with underlying medical conditions.
2. Consider the possibility of secondary bacterial infection early in the course of patients with influenza-like illness.
3. Refer to CDC's updated interim recommendations for the use of antiviral medications in the treatment and prevention of influenza for the 2009–10 season (last updated September 22).⁴
4. Submit nasopharyngeal samples for novel H1N1 testing for all hospitalized patients with influenza-like illness, regardless of rapid influenza test results. Information is available at: <http://www.hss.state.ak.us/dph/labs/pdfs/H1N1Sample.pdf>
5. Report deaths due to laboratory-confirmed influenza (rapid test positive or PCR/culture-confirmed) to Section of Epidemiology at 907-269-8000 or 800-478-0084 after hours.

References

1. Centers for Disease Control and Prevention (CDC). Swine Influenza A (H1N1) Infection in Two Children --- Southern California, March--April 2009, MMWR 2009;58:Dispatch 1-2. Available at: <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm58d0421a1.htm>
2. 2009 H1N1 Flu Situation Update: September 4, 2009. Available at: <http://www.cdc.gov/h1n1flu/updates/090409.htm>
3. CDC. Surveillance for Pediatric Deaths Associated with 2009 Pandemic Influenza A (H1N1) Virus Infection --United States, April-August 2009. MMWR 2009;58:941-947. Available at: <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5834a1.htm>
4. Updated Interim Recommendations for the Use of Antiviral Medications in the Treatment and Prevention of Influenza for the 2009-10 Season. Available at: <http://www.cdc.gov/h1n1flu/recommendations.htm>

Table: Summary of Three Alaska Patients who Died with 2009 Pandemic Influenza A (H1N1) Infection

Patient residence, age & sex	Co-morbidities	Initial symptoms	CXR	Hospital course	Duration of illness (hospital)	Date of death	Bacterial culture & treatment	Antiviral treatment	Rapid influenza test	Date of + H1N1 report
A Fairbanks 40s female	Diabetes Chronic lung dz Asthma Cardiac disease Hodgkins Hypothyroidism	Fever Headache Lethargy Confusion Chest pain	Diffuse bilateral patchy opacities	Hypoxia, Hypotension, ARDS Renal failure Ventilatory support Hemodialysis	~7 d. (4 d.)	7/16/09	Cultures negative Broad spectrum antibiotics	None	No results available	7/24/09
B Fairbanks 10 years male	None	Fever Cough Chest pain Confusion	Normal	Hypoxia Hypotension Pulmonary hemorrhage Leukopenia Ventilator support Defibrillation	36 hrs. (10 hrs.)	9/4/09	<i>S. aureus</i> (post-mortem lung tissue) Broad spectrum antibiotics	Oseltamivir	Positive	9/5/09
C Seward 50s female	Bipolar disorder	Fever Cough Weakness Decrease in oral intake	Right lower lobe infiltrate	Hypoxia Purpura fulminans Renal failure Ventilator support	~18 d. (14 d.)	8/28/09	Cultures negative Broad spectrum antibiotics	None	Negative	8/28/09