Pandemic (H1N1) 2009

Infection control of pandemic (H1N1) 2009 influenza in hospitals — a logistic challenge

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Clinical record

On 1 June 2009, a 79-year-old man presented to the emergency department of a tertiary hospital in Melbourne with a 1-week history of dyspnoea and a productive cough. He had underlying chronic obstructive airways disease (COAD) and type 2 diabetes mellitus. He reported no history of fever and no recent travel or contact with people with influenza-like illness (ILI). On examination, his temperature was 37.0°C, oxygen saturation was 97% in room air, and he had an expiratory wheeze. No abnormalities were seen on chest x-ray. Full blood examination showed a peripheral white cell count within the reference range (RR), and a raised C-reactive protein level (27 mg/L; RR, < 5 mg/L).

The patient was admitted to a four-bed hospital ward and treated with oral doxycycline, corticosteroids and nebulised salbutamol. A nasal swab was sent to the state reference laboratory for polymerase chain reaction (PCR) testing for respiratory viruses to identify any potential viral precipitant for the apparent exacerbation of COAD. Results received 2 days later were positive for influenza A virus, which was confirmed to be the pandemic (H1N1) 2009 strain. Treatment was then begun with oseltamivir, and the patient was placed in a single room with droplet precautions.

The patient's contacts within the hospital were traced through review of his bed movements and all staff rosters (medical, nursing, allied health, patient support services and clerical staff of the emergency department and wards). All health care workers who had come into contact with the patient were telephoned, and the extent of their contact and individual risk factors were assessed. High-risk contact was defined as having spent more than 15 minutes within 1 m of the patient without wearing appropriate personal protective equipment.

Twenty-one people with high-risk contact were identified, comprising nine medical staff, six nurses, three allied health staff and three patients.

All were given oseltamivir prophylaxis. By this time (2 days after the patient's admission), three of the medical staff who had high-risk contact with the patient (eg, taking a history or examining the patient while he was receiving nebulised therapy) reported the new onset of an ILI. They were therefore given treatment doses of oseltamivir. Furthermore, one of these medical staff reported having had significant contact, while symptomatic, with nine medical registrars during a 1-hour radiology tutorial in a confined space.

At that stage of the pandemic, the reference laboratory was testing a high volume of specimens for H1N1 2009 influenza, and the average time for results of specific tests to be returned was, in our experience, 2 working days. Consequently, we decided to assume that the three medical staff with ILI had pandemic 2009 influenza and to initiate a second round of contact tracing. This included contacting all patients and health care workers who had come into contact with any of these staff. We identified a further 17 medical staff and seven patients and offered them oseltamivir prophylaxis. All accepted this prophylaxis. Symptomatic staff were asked to stay home from work, but it was considered impractical to redeploy asymptomatic health care workers receiving prophylaxis to areas with less patient contact.

The evaluation of exposed health care workers and dispensing of medication were conducted by infection control practitioners, infectious diseases staff and microbiology staff, in addition to their normal duties. The extra workload was estimated to be almost 2 full days for at least two staff members. Four days later, the swab results from the three symptomatic medical staff showed they were negative for influenza A, and prophylaxis for their contacts was ceased. None of the other 18 people who had significant contact with the index patient developed ILI.

This case illustrates some of the practical challenges of infection control during the recent influenza (H1N1) 2009 pandemic. The patient's presentation was atypical for pandemic influenza, and a number of health care workers and patients had significant exposures before the illness was diagnosed. Each exposed person required follow-up, counselling and management, which created a significant workload for infection control staff. This case illustrates the need for additional infection control resources — "surge capacity" — to protect staff and their contacts both inside and outside hospitals.

Influenza A has been associated with exacerbations of COAD.[1] However, at the time our patient was admitted to hospital, he did not meet the case definition for pandemic (H1N1) 2009 influenza proposed by the Victorian Department of Health: "acute onset of illness with a measured temperature of greater than or equal to 38°Celsius or significant history of fever (rigors, sweating, chills) plus two or more of cough, sore throat, body aches, fatigue/tiredness or shortness of breath".[2]

As the pandemic progressed, clinicians began to recognise atypical presentations of influenza (H1N1) 2009. Soon after our patient's presentation, our hospital began isolating all patients who presented with any respiratory symptoms and testing them for influenza (H1N1) 2009 as part of a more proactive strategy. However, this strategy

became practical for us only when our hospital had access to “in-house” PCR testing with a reliable turnaround time of less than 24 hours. Before this, despite the extraordinary efforts of the state reference laboratory in the face of huge numbers of specimens, the logistic problems and consequent delays in obtaining results[3] led to practical concerns about “bed block”.

This patient was admitted early in the pandemic, and thus the management of exposed health care workers had not been well tested. Transmission of the virus to staff members had been reported elsewhere,[4] and, as observed during the pandemic of severe acute respiratory syndrome, the risk of occupational exposure to respiratory pathogens is real and can be fatal.[5] It was therefore essential that staff members who had significant exposure to the patient were promptly contacted, counselled and appropriately managed. Management had to be tailored to confounding factors, such as pregnancy and immunosuppressive states. This process was time-consuming and required extra staff. Novel communication methods, such as group emails and intranet updates, were used to ensure consistency and accuracy of advice to staff. New links were forged between hospital administration and infection control services to ensure appropriate information was circulated. New channels of communication between infectious diseases physicians across several hospitals, and with representatives of the state Department of Health, also allowed for discussion of management strategies.

This case illustrates some of the practical problems for infection control services that were probably mirrored in hospitals across the country as the influenza (H1N1) 2009 pandemic evolved. Management of staff exposure is difficult, and a single missed case can affect many staff members. Given our experience, we believe it is crucial that additional infection control resources be provided during such an outbreak to deal with staff exposure. The Australian Health Management Plan for Pandemic Influenza[6] is a useful resource, but needs to be tailored to the context. Reflection is now needed on how we might improve our response.

Lessons from practice

- In the early stages of a pandemic, the case definition should be broad to capture atypical presentations.
- Diagnostic test results need to be rapidly available to allow early diagnosis and appropriate treatment, and to assist bed management in hospitals for appropriate infection control.
- It is important that infection control departments have extra staff available to facilitate contact tracing across the hospital and thus prevent transmission to high-risk patients and health care workers.

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