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ORIGINAL ARTICLE

Epidemiology of human influenza A(H7N9) infection in Hong Kong



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Abstract *Background/Purpose:* We conducted a case series study to review the epidemiology of human influenza A(H7N9) infection reported in Hong Kong.

Methods: We reviewed case records of confirmed human cases of influenza A(H7N9) infection reported in Hong Kong in the 2013–2014 winter season. We compared the median viral shedding duration and interval from illness onset to initiation of oseltamivir treatment between severe and mild cases. We estimated the incubation period of influenza A(H7N9) virus from cases with a single known date of poultry exposure.

Results: A total of 10 cases were reported and all were imported infection from Mainland China. Four patients died and the cause of death was related to influenza A(H7N9) infection in two patients. The median interval from illness onset to initiation of oseltamivir treatment for the severe cases (4.5 days) was significantly longer than the mild cases (2 days; $p = 0.025$). Severe cases had a significantly longer viral shedding duration than mild cases ($p = 0.028$). The median incubation period for cases with a single known exposure date was 4 days. Nasopharyngeal aspirate taken from the 88 close contacts of the 10 patients all tested negative for influenza A virus using reverse transcription polymerase chain reaction.

Conclusion: Delayed administration of antiviral treatment may be associated with a more severe illness for influenza A(H7N9) infection. Despite our aggressive contact tracing policy with laboratory testing of all close contacts, no secondary case was identified which implied that the potential of human-to-human transmission of the circulating influenza A(H7N9) virus remains low.

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Introduction

Human influenza A(H7N9) infection was first reported in China in March 2013.¹ Since then, >450 laboratory confirmed cases were reported to the World Health Organization.² These cases were reported in different provinces or municipalities in Mainland China, Taiwan, and Malaysia.^{3–5}

In Hong Kong, human influenza A(H7N9) infection is a notifiable infectious disease under “Novel influenza A infection”. Medical practitioners are required by law to report suspected or confirmed cases to the Centre for Health Protection (CHP) of the Department of Health. Reporting criteria with clinical and epidemiological components are in place (Table 1), and medical practitioners are required to report suspected cases that fulfil both the clinical and epidemiological criteria to the CHP for investigation. A confirmed case is defined as a patient with clinically compatible illness with either positive viral culture or molecular testing for influenza A(H7N9) virus, or a four-fold or higher rise in influenza A(H7N9) virus specific antibody titer in paired serum samples.

The CHP conducted epidemiological investigations for all reported cases. The patients and their attending doctors were interviewed using a standardized questionnaire to obtain clinical and exposure history. All reported cases were admitted to public hospital for isolation, treatment, and laboratory testing. Patients were placed under droplet, contact, and airborne precautions until the diagnosis of influenza A(H7N9) infection was refuted for suspected cases, or until three consecutive respiratory specimens tested negative for influenza A virus using reverse transcription polymerase chain reaction (RT-PCR) for confirmed cases.

We conducted contact tracing for all confirmed cases. Contacts were categorized into “close contact” or “other contact”. A close contact refers to a person who had close (<1 m) unprotected contact with a case patient 1 day before, through 14 days after symptom onset. This includes healthcare workers who provided care for the patient without adequate personal protective equipment. Other contact refers to all other types of contacts who do not fulfil the definition of close contact.

All close contacts were placed under quarantine for 10 days after last exposure to the index patient. They were quarantined either at an isolation room of the public hospital or at a designated quarantine camp. Nasopharyngeal aspirate was taken from each close contact including those who were asymptomatic once quarantine commenced. They were subject to an additional 10 days of medical surveillance after the end of quarantine. For other contacts, they were placed under medical surveillance for 20 days after last exposure to the index patient. All contacts who developed fever or respiratory symptoms during the quarantine or medical surveillance period were treated as a suspected case of influenza A(H7N9) infection and were immediately transferred to a public hospital for isolation and laboratory testing.

The first case of human influenza A(H7N9) infection in Hong Kong was confirmed on 2 December 2013.⁶ A total of 10 confirmed cases were reported in the winter season of 2013–2014. For the current winter season, three confirmed cases were reported from December 2014 to February 2015. We conducted a case series study to review the epidemiology of the 10 confirmed cases of human influenza A(H7N9) infection reported in the winter season of 2013–2014.

Methods

Data collection

We reviewed case records of the 10 confirmed cases of human influenza A(H7N9) infection reported in the winter season of 2013–2014. We retrieved information including demographic characteristics (age, sex, and ethnicity), past medical history, clinical presentation, details of antiviral treatment, poultry exposure history, and serial RT-PCR results for influenza A of the patients from the case records.

Definitions

In this study, we defined severe cases as patients who had developed respiratory failure or patients who died due to influenza A(H7N9) infection. Other cases were regarded as mild cases. Viral shedding duration was defined as the

Table 1 Reporting criteria for influenza A(H7N9) infection in Hong Kong

Clinical criteria:

- a person with acute respiratory illness, characterized by fever (temperature >38°C) and cough and/or sore throat; or
- a person with pneumonia; or
- a person who died of unexplained acute respiratory illness.

Epidemiological criteria—one or more of the following exposures in the 10 days prior to symptom onset:

- contact with a human case of influenza A(H7N9); or
- contact with poultry or wild birds or their remains, or to environments contaminated by their feces in countries/areas with documented avian influenza A(H7N9) infection in birds and/or humans in the past 6 months^a; or
- consumption of raw or undercooked poultry products in countries/areas with documented avian influenza A(H7N9) infection in poultry and/or humans in the past 6 months^a; or
- close contact with a confirmed influenza A(H7N9) infected animal other than poultry or wild birds; or
- worked in a laboratory that processes samples from persons or animals that are suspected of avian influenza infection; or
- worked in the live poultry industry.

^a The latest list of affected areas is regularly updated and is available on the website of the Centre for Health Protection of the Department of Health, Hong Kong.

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