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Extensive surveillance for avian influenza A(H5N6) virus in Southern China

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Objective

To determine avian influenza A(H5N6) virus infection in human and environment using extensive surveillances. To evaluate the prevalence of H5N6 infection among high risk population.

Introduction

Since the emergence of avian influenza A(H7N9) virus in 2013, extensive surveillances have been established to monitor the human infection and environmental contamination with avian influenza virus in southern China. At the end of 2015, human infection with influenza A(H5N6) virus was identified in Shenzhen for the first time through these surveillances. These surveillances include severe pneumonia screening, influenza like illness (ILI) surveillance, follow-up on close contact of the confirmed case, serological survey among poultry workers, environment surveillance in poultry market.

Methods

Severe pneumonia screening was carried out in all hospitals of Shenzhen. When a patient with severe pneumonia is suspected for infection with avian influenza virus, after consultation with at least two senior respiratory physicians from the designated expert panel and gaining their approval, the patient will be reported to local CDC, nasal and pharyngeal swabs will be collected and sent for detection of H5N6 virus by RT-PCR.

ILI surveillance was conducted in 11 sentinel hospitals, 5-20 ILI cases were sampled for detection of seasonal influenza virus by RT-PCR test every week for one sentinel. If swab sample is tested positive for influenza type A and negative for subtypes of seasonal A(H3N2) and A(H1N1), it will be detected further for influenza A(H5N6) virus.

Follow-up on close contacts was immediately carried out when human case of infection with H5N6 was identified. All of close contacts were requested to report any signs and symptoms of acute respiratory illness for 10 days, nasal and pharyngeal swabs were collected and tested for influenza A(H5N6) virus by RT-PCR test. In the meantime, environmental samples were collected in the market which was epidemiologically associated with patient and tested for H5N6 virus by RT-PCR test.

Serological survey among poultry workers was conducted in ten districts of Shenzhen. Poultry workers were recruited in poultry markets and screened for any signs and symptoms of acute respiratory illness, blood samples were collected to detect haemagglutination-inhibition (HI) antibody for influenza A(H5N6) virus.

Environment surveillance was conducted twice a month in ten districts of Shenzhen. For each district, 10 swab samples were collected at a time. All environmental samples were tested for influenza A(H5N6) virus by RT-PCR test.

Results

From Nov 1, 2015 to May 31, 2016, 50 patients with severe pneumonia were reported and detected for H5N6 virus, three patients were confirmed to be infected with H5N6 virus. Case 1 was a 26 years old woman and identified on Dec 29, 2015. She purchased a duck at a live poultry stall of nearby market, cooked and ate the duck 4 days before symptom onset. After admission to hospital on Dec 27, her condition deteriorated rapidly, on Dec 30 she died. The case 2 was a 25 years old man and confirmed on Jan 7, 2016. He visited a market everyday and had no close contact with poultry, except for passing by live poultry stalls. He recovered and was discharged from hospital on Jan 22. The case 3 was is a 31 years old woman and reported on Jan 16, 2016, she had no contact with live poultry and died on Feb 8.

For 60 close contacts of three cases, none of them reported signs or symptoms of acute respiratory illness, all of nasal and pharyngeal swabs were tested negative for influenza A(H5N6) virus by RT-PCR test. Of 146 environmental swabs collected in the case's living places and relevant poultry markets, 38 were tested positive for influenza A(H5N6) virus by RT-PCR test.

From Nov 1, 2015 to May 31, 2016, 2812 ILI cases were sampled and tested for influenza type A and subtypes of seasonal influenza. Those samples tested positive for influenza type A could be further subtyped to seasonal A(H3N2) or A(H1N1), therefore no sample from ILI case was tested for influenza A(H5N6) virus.

Serological surveys among poultry workers were conducted twice, for the first survey 186 poultry workers were recruited in Oct 2015, for the second survey 195 poultry workers were recruited in Jan 2016. Blood sample were collected and tested for HI antibody of influenza A(H5N6) virus. 2 individuals had H5N6 HI antibody titer of 1:40, 5 individuals had H5N6 HI antibody titer of 1:20, rest of them had H5N6 HI antibody titer of <1:20. According to the WHO guideline, HI antibody titer of ≥1:160 against avian influenza virus were considered positive.

From Nov 1, 2015 to May 31, 2016, of 1234 environmental swabs collected in poultry markets, 339 (27.5%)were tested positive for influenza A(H5N6) virus by RT-PCR test. Each of the ten districts had poultry markets which was contaminated by influenza A(H5N6) virus.

Conclusions

In 2015-2016 winter, three cases of infection with influenza A(H5N6) virus were identified in Shenzhen, all of them were young individuals with average age of 27.3 years and developed severe pneumonia soon after illness onset, two cases died. For acute and severe disease, early detection and treatment is the key measure for patient's prognosis.

H5N6 virus was identified in poultry market and other places where patient appeared, implying poultry market probably was the source of infection. Despite the high contamination rate of H5N6 virus in poultry market, we found that the infection with H5N6 virus among poultry workers was not prevalent, with infection rate being 0/381. Human infection with H5N6 virus seemed to be a sporadic occurrence, poultry-human transmission of H5N6 virus might not be very effective.

Keywords

Influenza; H5N6; Surveillance

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