H7N9: Probable Human Transmission Case, Threat Remains

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The first probable case of human H7N9 transmission occurred in March 2013 when a woman contracted H7N9 after close unprotected contact with her father when he was ill with the disease, according to a report published online August 6 in *BMJ*.

Xian Qi, PhD, a virologist in the Department of Acute Infectious Disease Control and Prevention at Jiangsu Province Center for Disease Control and Prevention in Nanjing, Jiangsu, China, and colleagues conducted epidemiologic investigations of the 2 family members and 43 close contacts.

They obtained samples from the 2 patients, their close contacts, and the surrounding environments. Samples were tested by real-time reverse transcriptase-polymerase chain reaction (rRT-PCR), viral culture, and hemagglutination inhibition assay. rRT-PCR testing was conducted on samples from any contacts who became ill. Serological testing by hemagglutination inhibition assay was conducted on paired serum samples obtained from contacts.

The index patient was a man aged 60 years who developed a fever, cough, and shortness of breath on March 8, 2013, approximately 5 days after exposure to poultry. He was admitted to hospital A on March 11 with inflammation of the left upper lobe and given azithromycin and piperacillin-sulbactam. He developed progressive respiratory distress, persistent hyperpyrexia, and hypoxemia and was transferred to the hospital's intensive care unit. His condition deteriorated further, and he was moved to hospital B's intensive care unit on March 18. He began oseltamivir the next day and died of disseminated intravascular coagulation and multiorgan failure on May 4.

The man's 32-year-old, otherwise healthy daughter provided bedside care for him until he was transferred to the second hospital. She became ill with a fever of 39.6°C and cough on March 21 and was admitted to hospital B on March 24 with left upper lobe pneumonia. She was given azithromycin, piperacillin-sulbactam, and oseltamivir 75 mg twice daily on March 24. She developed persistent hyperpyrexia, respiratory failure, and acute respiratory distress syndrome and died from multiorgan failure and cardiac arrest on April 24.

The only fowl in the index patient's neighborhood were 2 black swans raised by the rental property management. Several kinds of live poultry were sold at 2 free live markets about 2 km away from the residential district.

The index patient purchased 6 quails in 1 of the live markets and cooked them in a single day between March 1 and March 4 (the exact date remains unclear). The daughter had no contact with live poultry but cared for her father between March 8 and March 15, providing oral care and cleaning his secretions without personal protective equipment.

The researchers identified 43 close contacts, including 39 healthcare workers, 3 members of the household, and 1 relative. The only close contact to develop a fever (37.5°C) was the husband of the second case, on March 31. He was given oseltamivir, and his throat swab sample was negative for influenza A viruses. There were no hemagglutination inhibition antibodies against A (H7N9) virus

detected in the paired serum samples of all close contacts. Both patients had higher hemagglutination inhibition antibody titers.

The index patient's endotracheal aspirate contained weak novel avian H7N9 nucleic acid on March 31, but not on March 27. The daughter's throat swab and endotracheal aspirate samples from March 27 and 31 were both positive for avian H7N9 genes. No other respiratory pathogens were detected.

Three strains were successfully isolated from the man and his daughter, and 1 from a smear sample from a poultry cage obtained on April 2. For the 2 strains from the patients, the sequences of all 8 genes were almost identical, but they were slightly different from the strain isolated from the environment.

The viral genes obtained in the 2 strains from the patients were avian and closely related to other human A (H7N9) viral sequences previously found in Shanghai, Zhejiang, and Anhui Province, but they were genetically different from those isolated from birds and the environment. All genes of the strains obtained from patients belonged to the same clade.

In an accompanying editorial, James W Rudge, PhD, a lecturer at the Communicable Diseases Policy Research Group, London School of Hygiene and Tropical Medicine at Mahidol University in Bangkok, Thailand, and Richard Coker, MD, a professor at Saw Swee Hock School of Public Health, National University of Singapore, write, "To observe some transmission of H7N9 from human to human is...not surprising, and does not necessarily indicate that the virus is on course to develop sustained transmission among humans."

"[W]hile the paper by Qi and colleagues might not suggest that H7N9 is any closer to delivering the next pandemic, it does provide a timely reminder of the need to remain extremely vigilant: the threat posed by H7N9 has by no means passed."

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