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Rabies in Henan Province, China, 2010–2012

To the Editor: Rabies is considered a reemerging zoonosis in China because many cases have been reported in recent years (*1*). The first case of rabies in Henan Province was reported in 1951. No more than 10 cases were reported per year during 1995–2001. However, beginning in 2002, the number of cases increased exponentially each year, and reached >100 in 2005 (*2*). To identify the epidemic characteristics of rabies in Henan Province, we examined the archived data of cases during 2010–2012. The surveillance data were collected by the Henan Center for Disease Control and Prevention (CDC) through systematic reporting and reports from sentinel hospitals.

Henan Province is situated in the mid-eastern region of China between northern latitudes 31°23′–36°22′ and eastern longitudes 110°21′–116°39′. The climate zone spans from warm temperate to subtropical, is humid to semi-humid with risk for monsoons, and has average annual temperatures ranging from 12°C to 16°C. The province occupies an area of 165,994 km^2 divided into 18 municipalities, which are subdivided into 159 county-level divisions. Its population was reported to be ≈94 million in 2010 (*3*).

During 2010–2012, a total of 94 cases of rabies in humans were reported in Henan Province. Rabies was diagnosed in almost all of those cases in sentinel hospitals on the basis of clinical features of the disease. Rabies was

etymologia

Dirofilaria [di-ro-fĭ-lar′e-ə]

From the Latin dīrus (“fearful” or “ominous”) + fīlum (“thread”), *Dirofilaria* is a genus of nematodes of the superfamily Filarioidea. The first known description of *Dirofilaria* may have been by Italian nobleman Francesco Birago in 1626 in his Treatise on Hunting: “The dog generates two worms, which are half an arm’s length long and thicker than a finger and red like fire.” Birago erroneously identified the worms as a larval stage of another parasite, *Dioctophyme renale*. The dog heartworm was named *Filaria* by American parasitologist Joseph Leidy in 1856, and the genus was renamed *Dirofilaria* by French parasitologists Railliet and Henry in 1911.

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DOI: http://dx.doi.org/10.3201/eid2002.ET2002

confirmed in <10 patients by using a rapid fluorescent focus inhibition test in the Henan CDC. This test is performed by mixing different dilutions of test serum samples with a constant number of rabies virus isolates in a multichambered slide (*4*).

The number of patients in whom rabies was diagnosed in 2010, 2011, and 2012 were 31, 31, and 32, respectively. Thus, the prevalence of the disease during this period was 0.031 cases/100,000 inhabitants. There was no significant difference in occurrence of the disease during each year of the study period ($\chi^2 = 0.021$, p = 0.989). Rabies was reported in 13 (72.2%) of 18 municipalities and 53 (33.3%) of 159 counties (online Technical Appendix Figure, wwwnc.cdc.gov/EID/article/2012/13-1056-Techapp1.pdf).

Patients who tested positive for rabies were reported during all seasons, but more were reported during summer. Of the 94 cases, 33 (35%) were reported in summer months; the largest number of cases in 1 month (n = 15) was reported during September.

The age of the patients with rabies ranged from 2 to 83 years. The disease was most often found in persons 45–60 years of age (n = 36) and was reported least frequently in persons 15–30 years of age (n = 4). The male-to-female ratio of persons in whom rabies was diagnosed was 1.9:1.0 (n = 62 males, 32 females). The age and sex of these patients were similar to those of rabies-infected persons reported in the past in Henan or in other parts of China (*5*,*6*). Nearly all the patients with rabies were exposed to the virus through dog bites; 1 patient was exposed by being scratched by a cat. Most patients (n = 87 [92.5%]) died within 2 days of being exposed; 3 patients (3.2%) died within 9 days. The date of death was not recorded for 4 patients (4.3%).Three patients who died had received rabies vaccine after being bitten by dogs.

Rabies is a fatal infectious disease and remains a public health problem in China (*1*). In Henan Province, the increase in the number of rabies cases parallels the increase in the number of dogs (*7*). Nearly one third of China's provinces reported rabies in this survey; the number of cases reported in the central region was much higher than that in other regions (online Technical Appendix Figure). This may be related to the growing economy in the central region and a resulting increase in the number of people who keep dogs.

With regard to patient characteristics, the proportions of farmers, children, and students who had rabies were 72.3%, 9.6%, and 12.8%, respectively. The larger number of infected farmers could have been affected by many factors. The high cost of rabies vaccine and the lack of prompt treatment were related to many additional deaths. The number of children and student case-patients was 21 (22.4%). This high percentage may indicate that these groups need additional protection. Regarding the patient who was infected by cat scratch, there had been no reports of rabies in cats in China before this incident (*8*). Thus, we should be aware of this possible route of infection.

In summary, the severity of rabies and its increased incidence present a public health threat, and appropriate control strategies in Henan province are needed. A new rabies control system should be established that includes cooperation of the various health care sectors to provide protection to the public.

Acknowledgments

We thank Bin Qiao of the First Affiliated Hospital of Zhengzhou University, Zhengzhou, China, for his assistance in improving this manuscript.

This work was supported by grants from the Natural Science Foundation of Luohe Medical College (No: 2010S02) to Z.-Y. Q.

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DOI: http://dx.doi.org/10.3201/eid2002.131056

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Avian Influenza A(H7N9) Virus Infection in Pregnant Woman, China, 2013

To the Editor: In February 2013, human infection with reassortant avian influenza A(H7N9) virus occurred in eastern China. A total of 135 laboratory-confirmed cases and 44 deaths among case-patients have been reported as of August 11, 2013. Unlike infection with other H7 subtype viruses (e.g., H7N2, H7N3, and H7N7), which often cause mild-to-moderate-human disease (*1*), infection with H7N9 subtype virus caused severe pneumonia and acute respiratory distress syndrome in most laboratory-confirmed case-patients (*2,3*). Pregnant women are particularly susceptible to severe complications from influenza (seasonal and pandemic), and have an increased risk for maternal death (*4*).

On March 30, 2013, a 25-year-old pregnant woman came to the outpatient department of a hospital in Zhenjiang, Jiangsu Province, China. She had cough and fever (temperature 38.0°C), which had begun 2 days earlier. She also reported mild myalgia and mild sore throat. The patient had no any underlying medical conditions and was at 17 weeks gestation, as estimated by ultrasound. On April 5, she was admitted to the respiratory department of the hospital with a temperature of 39.9°C, a leukocyte count of 7.9 $\times 10^9$ cells/L, and a lymphocyte count of 0.7 $\times 10^9$ cells/L.

On April 6, she was transferred to the intensive care unit because of shortness of breath, respiratory failure, and loss of consciousness. She was given mechanical ventilation, broad-spectrum antimicrobial drugs, oseltamivir, gamma-globulin, antifibrotic therapy (glutathione), and nutritional support. Oseltamivir (150 mg/d, 2 times/d) had been administered during April 6–12. A chest radiograph showed extensive infiltrates of both lungs.

On April 21, she regained consciousness, and her condition stabilized over the next few days. On April 23, she was extubated, transferred to the common ward, and given nasal oxygen supplementation and antimicrobial and antifibrotic drug therapy. Her condition improved gradually, and on May 14 she was discharged in good health without fetal abnormality.

The fetus was monitored daily by using ultrasound to check the heart rate; fetal heart rate and activity were normal during hospitalization. The fetus continued to grow appropriately and was delivered by cesarean section at 35 weeks' gestation on July 17 (length 48 cm, weight 3,300 g, and Apgars scores of 9 at 1 min and 10 at 5 min). The clinical timeline for the case-patient is shown in the Figure.

The patient and her husband lived in a house with her husband's parents. No live poultry were present in the residential district, but the husband's parents worked as pork butchers in a live animal market ≈500 m from the residential district. Several kinds of live poultry (e.g., chicken, duck, pigeon, and quail) were sold in the market. During the 2 weeks before illness onset, the patient did not have contact with persons known to be febrile. However, during that time, she visited the live animal market once. Eighteen potential close contacts of the patient were identified (15 health care workers and 3 household members). Respiratory symptoms did not develop in any of these contacts during a 7-day surveillance period.

Four methods were used for laboratory diagnosis: real-time reverse transcription PCR, virus isolation, full-genome sequencing, and modified hemagglutination inhibition assays. Clinical samples tested were 2 throat swab specimens obtained from the patient on April 6 and 7, 38 paired serum samples obtained from the patient and close contacts during the acute and convalescent phases of infection, and 6 environmental samples (2 avian feces samples and 4 poultry cage specimens obtained from the live animal market that the patient visited). Throat swab specimens from patient

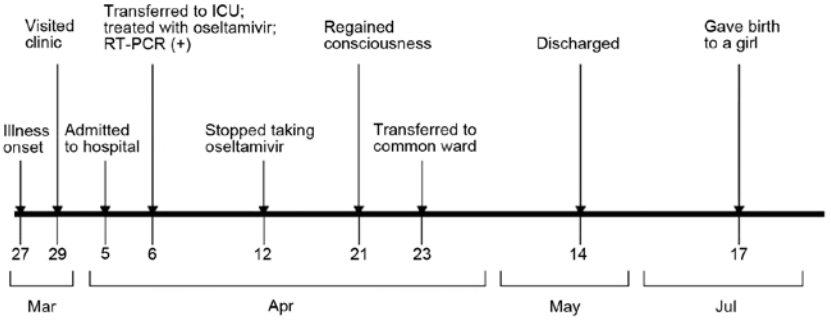

Figure. Clinical timeline for a pregnant woman infected with avian influenza A(H7N9) virus, China, 2013. ICU, intensive care unit; RT-PCR, reverse transcription PCR.