Rev. Inst. Med. Trop. Sao Paulo
56(4):367-368, July-August, 2014
doi: 10.1590/S0036-46652014000400019

LETTER TO THE EDITOR

HUMAN INFECTION WITH AVIAN INFLUENZA A (H7N9) VIRUS

Shanghai, February 24th, 2014

Dear Editor,

On March 31st, 2013, the National Health and Family Planning Commission (NHFPC) of China announced that three fatal cases of rapidly progressive pneumonia, respiratory failure and acute respiratory distress syndrome (ARDS) were confirmed to be infected with a novel reassortant avian-origin influenza A (H7N9) virus[9]. As of February 18th, 2014, a total of 347 laboratory-confirmed cases and 109 deaths had been reported in mainland China[7]. The novel avian influenza virus has caused global concern as a potential pandemic threat.

According to recent studies, the elderly have increased risk for H7N9 virus infection[2,3]. Furthermore, patients with underlying diseases are significantly associated with the infection[1-3]. It is reported that the median age of 111 patients with H7N9 virus infection was 61 and 42.3% of them were 65 years of age or older[3]. A total of 61.3% of the patients had one or more underlying medical conditions, such as hypertension, diabetes, coronary heart disease, chronic obstructive pulmonary disease (COPD) and so on[3].

Human infection with H7N9 virus has been reported sporadically and is mainly associated with exposures to poultry[1,4]. However, no history of recent close contact with poultry was found in some cases[2,8]. Indeed, H7N9 virus had been detected among live poultry at local markets in some areas of China[8,11]. Therefore, the most likely source of H7N9 virus in these cases seems to be from the environments contaminated with the novel avian influenza virus. Epidemiologically, the elderly patients predominate in the H7N9 avian influenza outbreak, for the reason that retirees have more opportunities to shop in the live animal markets and are, therefore, more likely to be exposed to the environments that are contaminated with H7N9 virus[3].

The clinical features of H7N9 virus infection are broadly similar to those of H5N1 virus infection[3,8]. The laboratory findings including leukopenia, lymphocytopenia, thrombocytopenia and increased levels of aspartate aminotransferase (AST), lactate dehydrogenase (LDH), creatine kinase (CK) and C-reactive protein (CRP) are also commonly seen in patients with H7N9 virus infection[3,8]. Furthermore, the disease is characterized by bilateral ground-glass opacities and consolidation[3,8], as seen in Fig. 1.

Human infection with H7N9 virus shows a case-fatality rate of 31% (109/347), which is not as high as that of H5N1 virus infection (59%)[6]. The clinical outcome, on the other hand, is inconsistent with that of previous reports on avian influenza A (H7) virus infection, which is usually associated with poultry outbreaks, but causes mild or moderate illness in humans[4]. It is estimated that the fatality risk is 36% (95% CI 26-45) on admission to hospital for H7N9 virus infection[10]. Increasing age along with a history of smoking, chronic lung disease, immunosuppression, chronic drug use and delayed antiviral treatment are considered as risk factors which might contribute to the fatal outcome[5]. According to statistics, the median time from onset of symptoms to initiation of antiviral therapy is 7.4 and 4.6 days in the fatal and non-fatal cases, respectively[5]. Importantly, the relatively good clinical outcome may be attributed to early diagnosis and antiviral treatment, which are the most effective strategies for managing H7N9 virus infection.

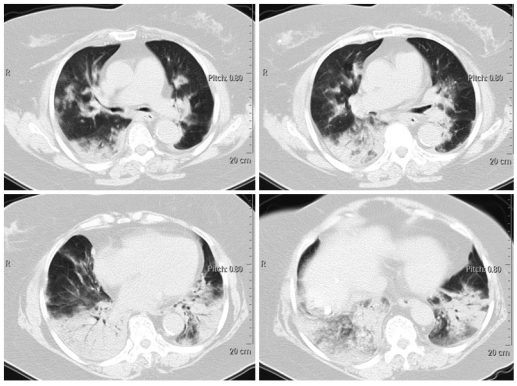

Fig. 1 - Computed tomography (CT) scan of the chest in a 74-year-old female infected with avian influenza A (H7N9) virus showing a mixed pattern of ground-glass opacities and consolidation with bilateral pleural effusions.

Yi ZHANG
Yong-Sheng YU
Zheng-Hao TANG
Xiao-Hua CHEN
Guo-Qing ZANG
Department of Infectious Diseases,
Shanghai Jiao Tong University Affiliated Sixth People's Hospital,
Shanghai, P. R. China
Correspondence to: Guo-Qing Zang,
Department of Infectious Diseases,
Shanghai Jiao Tong University Affiliated Sixth People's Hospital,
600 Yishan Road, 200233 Shanghai, P. R. China
Phone: + 86 21 64369181-58673; Fax: + 86 21 24058384
E-mail: zangguoqin@126.com

ACKNOWLEDGEMENTS

This work was partly supported by the Medical Education Research Project of Shanghai Jiao Tong University School of Medicine (No. YB130910).

REFERENCES

1. Ai J, Huang Y, Xu K, Ren D, Qi X, Ji H, *et al.* Case-control study of risk factors for human infection with influenza A (H7N9) virus in Jiangsu Province, China, 2013. Euro Surveill. 2013;18:20510.

2. Chen X, Yang Z, Lu Y, Xu Q, Wang Q, Chen L. Clinical features and factors associated with outcomes of patients infected with a Novel Influenza A (H7N9) virus: a preliminary study. PLoS One. 2013;8:e73362.

3. Gao HN, Lu HZ, Cao B, Du B, Shang H, Gan JH, *et al.* Clinical findings in 111 cases of influenza A (H7N9) virus infection. N Engl J Med. 2013;368:2277-85.

4. Li Q, Zhou L, Zhou M, Chen Z, Li F, Wu H, *et al.* Epidemiology of human infections with avian influenza A (H7N9) virus in China. N Engl J Med. 2014;370:520-32.

5. Liu S, Sun J, Cai J, Miao Z, Lu M, Qin S, *et al.* Epidemiological, clinical and viral characteristics of fatal cases of human avian influenza A (H7N9) virus in Zhejiang Province, China. J Infect. 2013;67:595-605.

6. Mei Z, Lu S, Wu X, Shao L, Hui Y, Wang J, *et al.* Avian influenza A (H7N9) virus infections, Shanghai, China. Emerg Infect Dis. 2013;19:1179-81.

7. Ministry of Agriculture of the People's Republic of China. National poultry H7N9 influenza eradication program (Chinese). [Cited: Feb 22, 2014]. Available from: http://www.moa.gov.cn/zwllm/tzgg/tfw/201402/t20140220_3791429.htm

8. Shi J, Xie J, He Z, Hu Y, He Y, Huang Q, *et al.* A detailed epidemiological and clinical description of 6 human cases of avian-origin influenza A (H7N9) virus infection in Shanghai. PLoS One. 2013;8:e77651.

9. World Health Organization. Human infection with influenza A (H7N9) virus in China. Global Alert and Response (GAR). [Cited: Feb 10, 2014]. Available from: http://www.who.int/csr/don/2013_04_01/en/

10. Yu H, Cowling BJ, Feng L, Lau EH, Liao Q, Tsang TK, *et al.* Human infection with avian influenza A H7N9 virus: an assessment of clinical severity. Lancet. 2013;382:138-45.

11. Yu H, Wu JT, Cowling BJ, Liao Q, Fang VJ, Zhou S, *et al.* Effect of closure of live poultry markets on poultry-to-person transmission of avian influenza A H7N9 virus: an ecological study. Lancet. 2014;383:541-8.