Editorial

Bird flu due to avian influenza A (H7N9) virus

Sri Lanka Journal of Child Health, 2013; **42**(3): 113-114

(Key words: Avian influenza A (H7N9) virus)

Avian influenza (Bird flu) is an infectious disease of birds caused by different subtypes of influenza A virus. These subtypes differ because of changes in haemagglutinin and neuraminidase proteins on the surface of the virus[1]. On 31 March 2013, the public health authorities of China reported three cases of laboratory-confirmed human infection with avian influenza A (H7N9) virus. By 29 May 2013, approximately 2 months after the initial report, the number of laboratory-confirmed H7N9 infections reached 132, with 37 deaths, A review of the literature indicated that human infections with H7N9 viruses have not been reported previously[2].

Clinical findings in patients with confirmed H7N9 infection at hospital admission included high fever, non-productive or productive cough, shortness of breath, dyspnoea, hypoxia, and evidence of lower respiratory tract disease with opacities, consolidation, and infiltrates noted on chest imaging[3,4,5]. The case fatality rate reached approximately 25%, which is a provisional value because many patients remained hospitalized and the numbers of mild cases remain unknown[6].

Leukocyte counts have been normal or low, with leukopenia, lymphopenia, and moderate thrombocytopenia in some cases. Complications of H7N9 virus infection have included septic shock, respiratory failure, acute respiratory distress syndrome, refractory hypoxaemia, acute renal dysfunction, multiple organ dysfunction, rhabdomyolysis, encephalopathy, and bacterial and fungal infections such as ventilator-associated pneumonia and blood-stream infection sometimes by multi-drug resistant bacteria[3].

The median time from onset to hospital admission was approximately 4.5 days, and a high proportion of patients with confirmed H7N9 infection have been admitted to intensive care[6]. The median time from illness onset to death was approximately 11 days, ranging from 7 to 20 days[6]. A small number of clinically mild H7N9 virus infections with uncomplicated influenza (febrile upper respiratory tract illness) have been identified in children and adults[6,7]. A recent study on hospitalized patients with pneumonia suggests that systemic high-dose steroid use may result in increased risk of prolonged viral replication and shedding providing a favourable condition to the emergence of antiviral resistance[8].

Investigations of H7N9 cases have so far revealed that except for four confirmed clusters of two or more cases that were in close contact, the patients did not appear to have known exposure to each other. However, most patients had a history of recent exposure to poultry, generally at live bird markets[4,6]. On April 5, 2013, the Ministry of Agriculture of China reported to the World Organization of Animal Health (OIE) the detection of low-pathogenic avian influenza A (H7N9) in a pigeon sampled at an agricultural wholesale market in the Shanghai municipality; this being the first H7N9 reported in birds in Asia since 2011[9,10,11].

Surveillance for influenza like illness (ILI) among people in close contact with laboratory-confirmed H7N9 cases indicated that infected individuals are not a likely source of infection[6]. These preliminary studies suggested that despite numerous cases of H7N9 virus infection associated with poultry exposure, there is no evidence of sustained onwards virus transmission to other people[6].

Based on the sequence of the M2 protein, H7N9 viruses are predicted to be resistant to adamantine antiviral drugs[3] which are therefore not recommended for use. In accord with the NA (neuraminidase) sequencing data, testing of the A/Anhui/1/2013 virus in the neuraminidase inhibition assay indicates that this virus is susceptible to neuraminidase inhibitor antiviral drugs oseltamivir and zanamivir[12].

The H7N9 viruses seem to transmit from animals to humans more readily than the Asian lineage A (H5N1) viruses, judging by the low frequency of detection in poultry and the relatively high number of human cases detected since the start of the outbreak[12]. On 6 April 2013, as soon as the epidemiologic data suggested that H7N9 infections were associated with exposure to poultry at live bird markers, the municipal authorities of Shanghai ordered the closure of live bird markets. Similar

action was taken by several major cities in eastern China. The rate of new human infections with H7N9 with onset of clinical symptoms in the following weeks has decreased substantially since markets closure, further suggesting that the primary risk factor is exposure to infected poultry, especially at markets where live poultry are sold[12].

At this time, investigations have not revealed evidence of sustained (ongoing) spread of this virus from person to person; however in a few small clusters of human H7N9 virus infections, the possibility of limited human-to-human spread cannot be excluded.

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