

Nothing to Sneeze at: The Basics of Avian Influenza

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Viral respiratory threats have caused significant morbidity and mortality, but perhaps none as numerous as the human influenza pandemics of the past. Worldwide public health efforts are therefore continuous, with surveillance of influenza strains infecting the population and appropriate response with vaccinations tailored to each influenza season. Recent concern about an overdue influenza pandemic has surfaced with findings of avian influenza A strain (H5N1) in human populations of Southeast Asia. As of September 28, 2006, there have been 251 confirmed cases of human avian influenza by the World Health Organization (WHO) in 10 countries since 2003, with 148 cases (59%) resulting in death.



What is avian influenza?

Avian influenza was discovered more than 100 years ago in Italy as an infectious disease in birds caused by influenza type A strains. Susceptibility of avian influenza varies among bird species, with migratory waterfowl (mostly wild ducks) appearing to be the most resistant to infection, but still able to shed the virus in asymptomatic carriers. Epidemics of highly pathogenic forms of avian influenza (subtypes H5 and H7) occur mostly in domestic poultry. The highly pathogenic form of the disease

Carlton's case

Carlton, 19, recently returned to Canada from a four-month exchange trip to Indonesia. He presents to you with symptoms of:

- cough,
- dyspnea,
- fevers of 39°C and
- myalgias.

History

Upon further questioning, you find he lived on a farm with a local family while in Indonesia, where numerous poultry were dying shortly before his trip back home.

While at the farm, he helped to slaughter and defeather the poultry. No other people that he had come in to contact with were ill.

It has now been six days since his return home and his symptoms began two days prior to his visiting you. One week prior he had diarrhea, but this resolved just before traveling back home.

Conclusion: Avian influenza A

FAQ

When should avian influenza be considered in a patient?

Recent travel to an endemic region with the:

- contact of birds or of their excrement, or
- contact with known cases of avian influenza.

carries a mortality of close to 100% in poultry flocks. It has been shown that low pathogenic strains can mutate after introduction to poultry flocks into highly pathogenic strains within months of circulation.

The highly pathogenic form of the disease carries a mortality of close to 100% in poultry flocks.

Avian influenza and human influenza strains are usually species-specific, but pigs are susceptible to both. It is therefore theorized that pigs can be coinfecting with two different strains and allow for genetic recombination, which would result in influenza strains capable of infecting multiple species, including humans.

Outbreaks of avian influenza A (H5N1) in birds appear to parallel human cases of influenza A (H5N1) in Southeast Asia. Hong Kong was the original site of the first documented human infections with avian influenza in 1997, coinciding with the strain in the poultry population at the same time. There have been three waves of documented human avian influenza pandemics, with the latest beginning in the northern part of Vietnam.

 *How is avian influenza transmitted to humans?*

The main routes of human infection are considered to be bird-to-human and environment-to-human. There have been limited cases of human-to-human transmission.

• **FAQ** •

Is there a cure for avian influenza?

Neuraminidase inhibitors and supportive care are available. Despite this, mortality rates are still high.

Table 1

Symptoms of avian influenza A

Respiratory

- Cough
- Sputum production (with or without hemoptysis)
- Sore throat
- Rhinorrhea
- Dyspnea

GI

- Diarrhea
- Abdominal pain
- Vomiting

Non-specific symptoms

- Fever
- Headache
- Myalgias

Laboratory findings

- Lymphopenia
- Thrombocytopenia
- Elevated aminotransferase enzymes
- Pulmonary infiltrates on chest radiographs

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Table 2

Recommended doses of neuraminidase for human influenza A*

Oseltamivir

- 75 mg taken orally b.i.d. for 5 days

Zanamivir

- Two inhalations (5 mg each) b.i.d. for 5 days

* Please note that optimal doses for avian influenza A are not known at present. Severe avian influenza A infections may require higher doses and prolonged courses of treatment.

The main path of human infection appears to be direct contact with infected poultry, or fomites contaminated with infected bird feces. Implicated routes include:

- the slaughtering and defeathering of diseased poultry,
- the handling of fighting cocks,
- drinking duck blood, or
- the consumption of undercooked poultry.

No evidence exists that the avian influenza virus is transmitted through the consumption of poultry, or poultry products, as long as standard precautions with food storage, handling and preparation are maintained.

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FAQ

Is there a vaccine available for avian influenza?

No approved vaccine for avian influenza A exists, but yearly human influenza vaccines should still be recommended despite no documented protection against avian influenza.

In all cases of limited human-to-human transmission, the virus has not spread beyond a first-generation close contact. Deciphering whether these are truly human-to-human cases is difficult as these family members tend to be exposed to the same environmental and animal exposures, in addition to one another. No case of human-to-human transmission via small particle aerosols of avian influenza A has been documented.



What are the symptoms of avian influenza?

The incubation period for avian influenza A (H5N1) appears to be longer than conventional human influenza A, with a range of two days to eight days. Most individuals who develop avian influenza are usually healthy prior to the acquisition of the disease. Typical symptoms include high fevers (> 38 C) and lower respiratory tract symptoms (Table 1). Those affected with avian influenza will have clinically-apparent pneumonia, with a wide spectrum of radiographic findings. Watery diarrhea can occur before respiratory symptoms and is more common than infections with human influenza strains. Patients with

avian influenza A usually lack conjunctivitis, unlike human strain infections. Progression to acute respiratory distress syndrome, multiorgan system failure and sepsis syndrome, with no documented bacteremia, can occur.

Viral detection may be greatest in pharyngeal samples, as opposed to nasal samples in avian influenza A strains. H5N1 strains can be confirmed with viral isolation, or the detection of H5 ribonucleic acid (RNA). Commercial rapid antigen testing is also available, but is less sensitive than reverse transcription-polymerase chain reaction.

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What treatment options are available for avian influenza?

Presently, treatment is limited, but should include supportive care (*i.e.*, ventilatory and hemodynamic support). Early institution of neuraminidase inhibitors (oseltamivir or

Take-home message

- Avian influenza A is a relatively new disease documented in humans
- A major route of transfer is via bird-to-human transmission
- Potential for human-to-human transmission exists if enough genetic mutation of the virus occurs
- Most symptoms are similar to other respiratory infections
- Treatment is limited, but should involve infectious disease specialists

zanamivir) have been used with mixed results (Table 2). The optimal dose and duration of treatment is not known. Advances in vaccine research continue, but no approved specific H5N1 vaccine has emerged.

Appropriate infection control measures, including strict respiratory isolation (negative pressure isolation room if available) and N95 masks for all staff and visitors are as equally important. Since the science of avian and pandemic influenza is evolving on a daily basis, it is important to check with local health authorities to determine how to proceed with and which types of respiratory protection and precautions may be needed in the event of avian and/or pandemic influenza. 

References

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