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Illustrated Description of Recently Finding Series of Human Infection With Avian Influenza A (AIA)

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Review Article

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ABSTRACT

Mainly Avian Influenza Viruses (AIV) do not cause disorders in humans, but some are zoonotic meaning that they can infect humans and cause disease. It was found in china (Hong Kong). The spread of avian influenza A viruses from one ill person to another has been reported very hardly ever and has been limited, inefficient and not sustained. There are various series of AIA like H5N1, H5N6, H7N9, H9N2, and H10N8. However, because of the possibility that avian influenza A viruses could change and expand the ability to spread simply between people, monitoring for human infection and person to person transmission is extremely important for public health.

INTRODUCTION

Most AIV don't cause disease in humans. However, some are zoonotic, meaning that they can infect humans and cause disease. Avian Influenza A Viruses (AIAV) are classified based on molecular characteristics of the virus 1) Highly Pathogenic Avian Influenza (HPAI) and 2) Low Pathogenicity Avian Influenza (LPAI). The ability of the virus to cause infection and death in chickens in a laboratory setting ^[1]. Most AIAV do not cause disease in humans. However, a few are zoonotic i.e., meaning that they can infect humans and cause disease ^[2]. The most well-known example is the avian influenza subtype H5N1 viruses presently circulating in poultry in parts of Asia and northeast Africa, which have caused human illness and deaths since 1997. Other avian influenza subtypes including H7N7 and H9N2, have also infected people. A few of these infections have been very severe and some have resulted in deaths, but many infections have been mild or even subclinical in humans ^[3]. Because birds play an important role as a source of food and livelihoods in many countries affected by avian influenza viruses, WHO and animal health sector partners are working at the human-animal interface to identify and diminished both animal health and public health risks within national contexts. Between April 21 and 26, 2016. The National Health and Family Planning Commission (NHFPC) of China notified WHO of 2 additional laboratory-confirmed cases of human infection with avian influenza A (H5N6) virus (**Table 1**) ^[1-8].

SIGN AND SYMPTOMS

Low pathogenic avian Influenza (LPAI)

- Severe Acute Respiratory Infections symptoms (SARI) like fever and cough and sorethroat.
- Muscle aches ^[9-11].

Highly pathogenic avian Influenza (HPAI)

- Shortness of breath.

Table 1: Virus series reported with description.

Sr.No	Series	Description	References
1.	H5N1	In 2014, the lots of looming and identifications of highly pathogenic AVIA (H5N1) in poultry and wild birds rose compared with the years before, resulting in the promoting of human cases, especially in Egypt. In the same year Cambodia, China, Egypt, Indonesia and Vietnam have been reported 52 human cases of A (H5N1), including 22 deaths. Some cases (37 cases, including 14 deaths) happened in Egypt at the end of 2014 and ECDC published a rapid risk assessment. Similar to last three to four years, transmission to humans were complexed with jumbled with poultry. In January 2014, Canada has been reported a fatal imported case of AIA (H5N1) infection, with symptom onset in late December 2013. This was the 1 st confirmed human case of A (H5N1) in North America (NA), Between 2003 and 2014, WHO declared 695 human cases due to A (H5N1), involving 403 deaths worldwide.	[1-3]
2.	H5N6	In 2014, China reported two human cases infected with avian influenza virus A (H5N6). One was identified in April in Sichuan province, the other was reported a 58 year old man from Guangdong in December.	[2,7]
3.	H7N9	Since the identification of a novel reassorting LPAI A (H7N9) virus in March 2013 in China, a wave of human infections has been observed in China each winter season. Domestic human cases of A (H7N9) have been loomed from China, Hong Kong and Taiwan and Malaysia had been reported travel related cases. In 2014, 334 laboratory confirmed cases of human infection with AIA (H7N9) virus were reported. The main source of infection was exposure to infected poultry or infected environments. No sustained person to person transmission was identified, although small clusters of human cases was identified. ECDC published two quick risk assessments on 28 January 2014 and 26 February 2014 and an epidemiological update on 7 February 2014.	[3-6,7]
4.	H9N2	Two human cases with mild sickness due to AIA (H9N2) were noticed in China in late 2014. Given the spectaculars circulation of the strain in poultry in the country, it is likely that these cases were related to contact with infected poultry.	[1,5,9]
5.	H10N8	In 2014, two human cases of AIA (H10N8) virus reported in Jiangxi province in China: a 55 year old woman and a 75 year old man in January and February respectively.	[2,7]

- Conjunctivitis.
- Acute Respiratory Distress (ARD), viral pneumonia, respiratory failure with multi-organ disease, nausea, stomachache, diarrhea, induce vomiting now and then neurologic changes (altered mental status, seizures).

PATHOGENESIS AND APOPTOSIS

The pathogenesis of all series of AIA virus in humans has not been clearly elucidated. Apoptosis may also play an important role [12-16]. Apoptosis was pragmatic in alveolar epithelial cells which is the major target cell type for the viral replication. A several apoptotic WBC's were observed in the lung of a patient who died on day six of illness [3,9]. Our data suggest that apoptosis can play a chief role in the pathogenesis of influenza virus in humans by breakdown of alveolar epithelial cells. It causes pneumonia and destroys leukocytes, leading to leucopenia which is an important clinical feature of influenza virus in humans [13]. Whether observed apoptotic cells were a direct result of the viral replication or a result of an over activation of the immune system requires further studies. Highly pathogenic avian influenza (HPAI) virus binds to receptors with silico acids bound to galactose by α -2,3 linkages, which are primarily, but not entirely, distributed in the human lower-respiratory tract. Such receptors have also been reported in the human gastrointestinal tract. Furthermore, specific structural conformation, not just receptor binding affinity [12], may be important in binding to receptors in the upper-respiratory tract. HPAI virus obtained from human clinical samples with the ability to bind upper-respiratory tract tissue has also been reported. High and prolonged HPAI [14,16] viral replication in the lower respiratory tract induces pro-inflammatory cytokines and chemokine's, resulting in pulmonary capillary leak, diffuse alveolar damage, and acute lung injury, and can lead to the development of ARDS. HPAI viraemia has been reported in fatal cases and dissemination of HPAI H5N1 virus to infect brain tissue; isolation from cerebrospinal fluid, gastrointestinal infection, and vertical transmission with evidence of virus in placenta and fetal lung cells have been documented. Reactive haemophagocytosis has also been reported [17]. Specially for H7N9 viruses were readily transmitted to naive ferrets through direct contact but, unlike the seasonal H3N2 virus, did not transmit readily by respiratory droplets. The lack of efficient respiratory droplet transmission was corroborated by low receptor-binding specificity for human-like α 2,6-linked sialosides. Our results indicate that H7N9 viruses have the capacity for efficient replication in mammals and human airway cells and highlight the need for continued public health surveillance of this emerging virus (**Figure 1**).

AVIAN INFLUENZA A VIRUSES, INCLUDING HPAI H5N1 VIRUS, CAN POTENTIALLY BE TRANSMITTED TO HUMANS THROUGH DIFFERENT MODALITIES

Direct contact (touching) or close exposure to infected sick or dead poultry or poultry products is thought to be the major risk

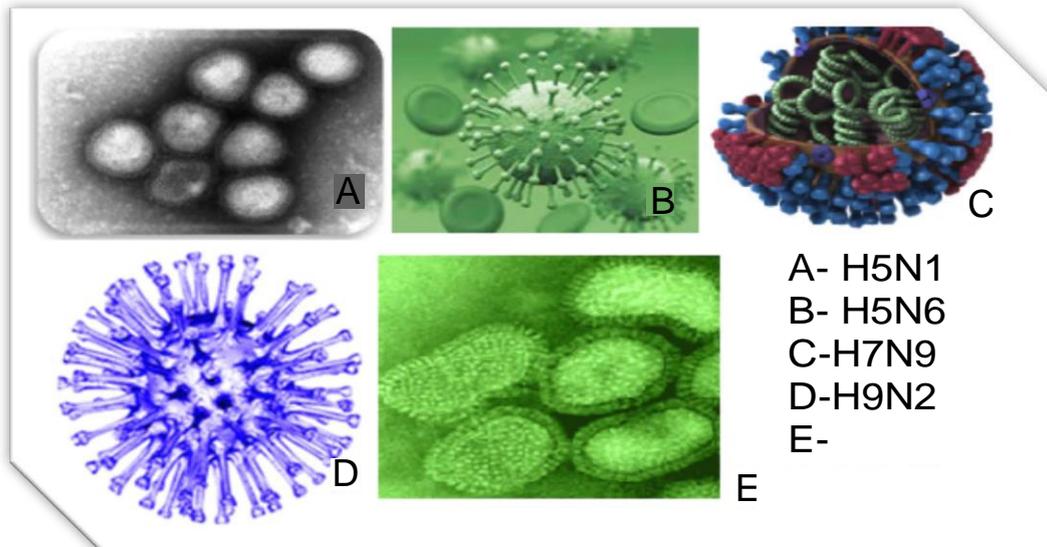


Figure 1: Series of AIA virus for transmission of avian influenza viruses to humans

Inhalation of aerosolised material (e.g., poultry faces) containing infectious HPAI H5N1 virus is a likely route of transmission from poultry to humans.

Self-inoculation of the mucous membranes after direct contact with material containing HPAI H5N1 virus (touching or cleaning infected birds) or indirect (fomite) contact transmission from surfaces contaminated with poultry faces or products containing HPAI H5N1 virus to mucous membranes has also been hypothesized.

Consumption of uncooked poultry products, including blood from infected birds, has been identified as a potential risk factor in field investigations, but whether transmission can occur by primary HPAI H5N1 virus infection of the human gastrointestinal tract is unknown^[18-22].

PUBLIC HEALTH RESPONSE

The Chinese Government has taken the following observation and control dealings:

- Strengthening surveillance, analysis and research;
- Promote the medical care of the case;
- Conducting public risk communication and releasing information^[3,9,23].

SUGGESTION

World Health Organization (WHO) advises that travellers to countries with known outbreaks of avian influenza^[24,25].

Should evade poultry farms and contact with animals in exist bird markets, entering areas where poultry may be slaughtered, or contact with any surfaces that emerge to be tainted with faces from poultry or other animals.

Travellers should also wash their hands regularly with soap and water.

Travellers should follow good food safety and hygiene practices.

WHO advises that travellers to countries with recognized outbreaks of avian influenza should avoid poultry farms, get in touch with animals in live bird markets, entering areas where; poultry may be slaughtered or contact with any surfaces that show to be polluted with faces from poultry or other animals.

AIIV should be considered in those who develop SARS while travelling from an area where; avian influenza is a concern.

WHO encourages countries to continue strengthening influenza surveillance, involving surveillance for Severe Acute Respiratory Infections (SARI) and to carefully review any unusual patterns, in order to ensure exposure of individual infections under the IHR (2005), and continue national health preparedness actions.

VACCINATION

In the meantime, providentially, a new vaccine has been developed that can answer most of the objections that we had

against vaccination. In every flock, there will be some birds missed during the vaccination process. It is generally acceptable for an epizootic disease like Avian Influenza (or Newcastle Disease) if the percentage of missed birds remains low (less than 3-4%) and if the challenge pressure is not constantly applied to every chicken (as it is for the Infectious Bursal Disease of Marek's disease). Vectormune AI is a live vector frozen vaccine, for the active immunization of chickens against Avian Influenza H5 subtypes and Marek's disease [26-30].

COMPOSITION

vectormune AI contains a Marek's disease vaccine of serotype 3 (turkey herpesvirus or HVT) expressing avian influenza key protective antigens. This Marek's disease vaccine containing serotype 3 is presented in a frozen cell associated form.

INDICATIONS

Vectormune AI is recommended for use in healthy one day-old-chicks as an aid in the prevention of avian influenza caused by the h5 subtype and Marek's disease.

ADMINISTRATION AND DOSAGE

Prior to use, the vaccine must be diluted properly with the vaccine diluent as stated in the package insert. Instantaneously use the vaccine and mix hardly ever to ensure uniform suspension of cells. The vaccine is administered sub-cutaneously with a 0.2 mL diluted vaccine dose to one-day-old chicks in the back of the neck.

STORAGE

Store this vaccine in liquid nitrogen (N₂).

PACKAGE

1000, 2000 and 4000 dose ampules. For Veterinary Use Only.

Notes: VECTORMUNE® AI is manufactured by Ceva Biomune in the United States

CONCLUSION

AIAV generally don't infect peoples, rare cases of human infection with these viruses had been noticed. Infected birds shed AIV in their saliva, mucous and feces. Human infections with bird flu viruses can occur when virus gets into a person's eyes and nose or mouth or is inhaled. It will occur when virus is in the air droplets or possibly dust particles and a person breathes it in or when a person touches something that has virus on it then feels their mouth, eyes or nose. Rare human infections with some AIAV have happened most occur after unprotected contact with infected surfaces contaminated with avian influenza viruses or birds. Still, a few infections have been reported where direct unknown contact to have happened. Illness in humans had ranged from mild to severe. The spread of AIAV illness from one person to another had been noticed very rarely and limited, inefficient and not easily sustained.

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