AVIAN INFLUENZA: THE POTENTIAL PANDEMIC DANGER

Govind Chandra Sahoo

Department of Otolarryngology, Rajah Muthiah Medical College & Hospital,Annamalai Nagar
Annamalai University, Chidambaram (T.N.) – 608 002. India

Abstract: *Bird flu or Avian influenza is spreading like wild fire from Cambodia to Croatia and Romania to Russia including India in 2006, engulfing more than seventeen countries. The genetics of the H5N1 virus plays an important role in the virulence and the impending threat of the influenza pandemic for which more than 150 million chickens have died or culled in Hong Kong only. Recent deaths in migrating birds also have been reported from China, Russia and Mongolia including 70 deaths in human beings.*

The first epidemic of avian influenza was reported from Italy more than 100 years ago. But in recent year there has been regular outbreak of influenza which was first detected in 1996 in a domestic goose from the Guangdong province of China followed by the first infection of H5N1 virus both in poultry and humans in the 1997 epidemic of Hong Kong[1]. There have been regular outbreaks, since 1996 to 2006 in Indonesia, Thailand, Vietnam, Turkey, Laos, Malaysia, Ukraine, Iraq, Egypt, Nigeria, India and European countries etc.,[2] Tigers and leopards of a zoo also died who had fed on fresh bird carcasses infected by H5N1. The first great influence pandemic of last century in 1918-19 affected more than 25% of the total population world wide with an estimated 40-50 million death within a single year without any warning and causing unprecedented illness with maximum of death In the young and healthy persons in the age group of 15 to 35 years. The subsequent pandemics in 1957 and 1968 including Spanish flu spreading rapidly also killed millions of people. The influenza viruses are highly resilient, which can survive in contaminated manure for at least three months and one gram of H5N1 manure can contain enough viral particles to infect one million birds. The virus can survive potentially for indefinite period in frozen materials[3,4]. Out of the types of influenza virus(A,B,C), the avian influenza virus is the subtype of Type A influenza virus. Type A influenza virus is subtyped on the basis of surface of Glycoproteins, hemagglutin (HA) and neuraminidase (NA). There are 16 known HA subtypes and 9 known NA subtypes of influenza viruses which can recombined in permutation and combination to create novel combination of influenza[5]. The Eight separate gene segment composing the influenza A virus has the capacity of re-assortment of these gene segments to develop a novel virus leading to pandemics due to the lack of immunity. This major antigenic change is known as antigenic shift in contrast to the typical seasonal influenza virus exhibiting frequent point mutation, leading to more gradual shifts in their genome, which is known as antigenic drift, the reason for which new influenza vaccines must be prepared every year[6,7]. The influenza viruses are RNA viruses, lacking effective genetic proof-reading and minor mutations can cause genetic drift with a grave concern of increasing possibility of a human pandemic by H5N1 virus.

The main role of transmission of avian influenza on humans is via inhalation of respiratory droplets from coughing and sneezing. As the humans are very rarely exposed to avian influenza virus, so there is very minimal immunity in the general population which could become an epidemic or pandemic very rapidly. Of the three pre-requisites to start an influenza pandemic VIZ..

(a) Emergence of novel susceptible virus
(b) Ability of the new virus to replicate and cause disease in humans.
(c) New virus transmitting efficiently from human to human.

The first two of the above prerequisites have already been met by the current H5N1 outbreaks in Asian birds. All the conditions for a pandemic will be fulfilled if the last criteria of human to human transmission is met by the H5N1 virus, the potential candidate for the next pandemic. Although no one can predict with certainty the timing of pandemic, but there is a concern that it is imminent and there is a great possibility that it would occur sooner than latter beginning from Asia. Other than the morbidity and mortality the direct economic loss in the current H5N1 outbreaks to the affected countries were to the tune of 8 to 10 billion US dollar. It is estimated that the next pandemic may cause more than one billion case, with 2-7 million deaths resulting on sever strain on the health and other essential services with massive social, political and economic disruption. A modest pandemic lasting over one year may result in a loss of 150 to 200 billion dollars on GDP which is equivalent to 3% of GDP of Asia. The outbreaks of SARS in early 2003 spanning 30 countries in six continents which is the first new disease of this millennium on the global health stage, caused an estimated loss of 30 to 150 billion dollars to the affected countries with a significant mortality rate of around 11%. Individuals at high risk for developing influenza complications like primary viral pneumonia, multi organ failure etc., are usually children, old people, pregnant women, immuno compromised patients etc.,

Important measures for the pandemic preparation as per the guide lines of the center for disease control and prevention are based on surveillance for avian influenza infection control of the poultry and animals including healthy poultry and infection control on medical settings. The drugs which can be used both for the prophylaxis and therapeutic are Zanomivir (Relanza) and Oseltamivir (Tamiflu). At present there is no specific vaccine to prevent avian influenza in human beings, although clinical trials have started. The WHO influenza surveillance network and collaborating centers have developed recombinant H5N1 prototype vaccine strain according to the requirement of major national and international pharmaceutical licensing agencies. However, incase of a pandemic, the vaccine strain for production of the vaccine for commercial availabilities will take 3-6 months and it is highly unlikely that any developing country will have access to this vaccine. WHO is planning to stock pile 1 to 3

Correspondence: **Govind Chandra Sahoo,** B-4. R.S.A.Housing Complex,Annamalai Nagar – 608 002,Chidambaram, Tamilnadu., India

million courses of anti avian influenza drugs which could be used as a pre-emptive measures anywhere in the world for the impending pandemic.

There is global concern about the spread of avian influenza and the possibility of pandemic for which international organizations like WHO, FAO and international organization for animal health are exchanging information, advising national governments and assisting in resource mobilization. The formulation of a national pandemic preparedness is fundamental to harness the national resources and activate the systems in health and veterinary sectors to respond rapidly to the threat of pandemic. The concern of environmentalist about the want on killing of birds and animals though normally justified but past experience shows that prompt culling of birds is the only effective way to control the epidemic before it is pandemic. The role of WHO is very significant to avoid an avian influenza pandemic if the guide lines are followed strictly. WHO can play a major role on averting a pandemic by providing technical support develop guidelines, assist outbreak investigation, provide diagnostic reagents, stock pile anti-virals, develop vaccine strain and support research [8]. The present scenario in India is very vulnerable and precarious in the event of a pandemic as the number of immunocompromised people are growing due to HIV / AIDS [9]. With a growing number of immunocompromised people in addition to diabetes, malnourishment, geriatric and pediatric age group, an infectious disease like avian influenza will have devastating effect and growing chance of achieving its pandeminion vision is very much possible.

The lack of ready and repeatable transmissibility of the avian influenza between human is one of the only factors preventing a potential H5N1 pandemic in human beings. However, there is a high possibility of further mutation in the H5N1 virus and or intermixing with human influenza virus, which may remove this last hurdle of crossing the species barrier, thereby fulfilling all the condition for a H5N1 virus, the potential candidate for the next pandemic[10].

REFERENCES

1. *World Health Organization; H5N1 avian influenza http://www.who.int/entity/csr/disease/avian_influenza/timeline_3_03.pdf.*
2. *Centre for disease control and prevention. Avian influenza: current situation. http://www.cdc.gov/flu/avian/outbreaks/current.html*
3. *U.S. Department of labor occupational safety and Health Administration. Guidance for protecting workers against avian flu http://www.osha.gov/dsg/guidance/avian_flu.html.*
4. *Bio-security for the Birds, Avian influenza (AI). http://www.usda.gov/agency/oc/design/test/bird biosecurity/hpai.html*
5. *Centre for Disease control and prevention. Key facts about avian influenza (Bird Flu) and Avian influenza A (H5N1) virus. http://www.cde.gov/flu/avian/gen_info/facts.html*
6. *Centre for Disease control and prevention. Transmission of influenza A viruses between animals and people. http://www.cdc.gov/flu/avian/gen_info/transmission.html.*
7. *Centres for Diseases control and prevention. Prevention and control of influenza: Recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR 2005; 54:(RR-8).*
8. *World Health Organization Guidelines on Avian influenza. http://www.who.int/csr/diseases/avian_influenza/en/*
9. *Avian influenza: Preparing for a pandemic. A cleon, S.Galwankar, JAPI, Vol.54, 2006.*
10. *Centre for Disease control and prevention. Question and answers about avian influenza (bird flu) and avian influenza A(H5N1) virus available online at: http://www.cdc.gov/flu/avian/gen-info/qa.html.*

The **IDEAL** choice in
ESBL producing pathogens

The First BID Nitrofurantoin

NIFTRAN™ 100mg

The USFDA approved NDDS Nitrofurantoin

AUA Annual Meeting, May 2008

Nitrofurantoin is an inexpensive, effective and acceptable treatment for uncomplicated urinary tract infections and should now be **considered first line treatment**

The **susceptibility of ESBL** producers to imepenem, **nitrofurantoin** and amikacin was found to be 100%, **89%** and 86% respectively.

Dosage

Acute Cystitis : 1 capsule bid

Long-term suppressive therapy : 1 capsule at bed time

RANBAXY UROLOGY SPECIALITY