Volume 70 Number 1

Treatment of Avian Influenza

Kourkouta L.[1], **Koukourikos K.**[2], **Iliadis Ch.**[3], **Ouzounakis P**[4], **Tsaloglidou** A.[5]

[1,2] *Professor, Nursing Department, International Hellenic University, Greece*
[3]*Lecturer in Nursing, Nursing Department, International Hellenic University, Greece*
[4]*RN, Private Diagnostic Health Center of Thessaloniki, Greece*
[5]*RN, General Hospital of Alexandroupolis, Greece*

Abstract - *Avian influenza is an infectious disease affecting all species of birds. It is caused by the type A influenza virus, which is transmitted to susceptible poultry after contact with infected nasal or respiratory secretions and contaminated feces of diseased or infected birds. Most outbreaks of avian influenza in humans occurred in cottages where small flocks of birds are bred. Little has been identified in high-risk groups, such as poultry workers and veterinarians.*
The aim of this review was the investigate the effects of avian influenza on humans and its management, as well as measures to prevent influenza pandemics. An extensive review of the recent literature was performed via electronic databases (Medline, Scopus, Google Scholar) and the Association of Hellenic Academic Libraries(HEAL-Link).
The most important disease control measure is the direct killing of infected birds and those who have been exposed to the virus, as well as the proper removal of corpses. The farms having infected poultry should enter quarantine and take measures of disinfection. Hygiene rules should be strictly followed during and after exposure to raw poultry or eggs. The proper measures will contribute to the analytical determination and the effective treatment of the potential threat and its ongoing consequences.

Keywords - *avian influenza, infectious diseases, birds, influenza virus, treatment*

I. INTRODUCTION

Avian influenza is an infectious disease affecting all species of birds and is caused by the type A influenza virus.[1]
Influenza is an acute respiratory disease caused by influenza A, B, and C. In these three types, there are many different subtypes depending on what is on the surface of the virus. Elements found on the surface are proteins, such as hemagglutinin (H) or neuraminidase (N). In each formula, H and N, a different number is given, and these numbers are also called influenza types, such as H5N. [2]
The disease has two forms. The first form causes moderate severity of the disease, which may sometimes appear with molt or with a reduction in spawning. The second form is known as "highly pathogenic avian influenza" and is called H5N1. It had appeared in China in 1996 and has some very contagious strains with a presence in North America. [3, 4]
This form was first recognized in Italy in 1878 and is very contagious. The infected birds may die on the same day that the first symptoms appear, and the mortality reaches 90-100%. Until today, all epidemics of this form of influenza have been caused by H5 and H7 subtypes of the influenza A virus. [5]
The most commonly accepted date of the first appearance of the virus - originally known as the poultry pest, is in 1878 when it was differentiated from other diseases causing a high degree of mortality in birds. Until the 1950s,Newcastle disease was also included in poultry fever. Between 1959 and 1995, there were 15 documented cases of highly contagious type in poultry, with few incidents leading to death. Between 1996 and 2008, however, there were 11 incidents with highly contagious types, with 4 of them being transmitted to millions of birds. [6]
Since 2003, more than 700 cases of people infected by the Asian HPAI H5N1 have been reported by the World Health Organization, mainly in 15 countries in Asia, Africa, the Pacific, Europe, the Middle East, and more than60 countries in total. 7]
Between early 2013 and early 2017, there were 916 confirmed cases of people affected by the H7N9 type, according to data of the World Health Organization, with the majority being in China from November to December. A similar increase of infections has been observed in previous years from December to January [8].
Most outbreaks of avian influenza in humans occurred in cottages where small flocks of birds are bred, and little has been identified in high-risk groups, such as poultry workers and veterinarians. [9]
It cannot be differentially diagnosed with other acute respiratory infections based on the clinical picture, and as such, laboratory tests are necessary for its confirmation.
The purpose of this review is to investigate the effects of avian influenza on humans and its management, as well as measures to prevent influenza pandemics.

II. METHODS

A review of Greek and international literature was conducted focusing on views on avian influenza, its effects, transmissibility, treatment, and prevention. The material of the study consisted of articles on the topic found in Greek and international databases such as Google Scholar, Mednet, Pubmed, Medline, and the Association of

Hellenic Academic Libraries (HEAL-Link), using the following keywords: birds, avian influenza. The criterion for exclusion of articles was the language, except Greek and English.

III. AVIAN INFLUENZA: WAYS OF TRANSMISSION

A host of influenza A-type viruses - other than humans - are various animal species, including wild birds, ducks, and chickens. The virus is transmitted to susceptible poultry after contact with infected nasal or respiratory secretions and contaminated feces of diseased or infected birds. However, the gastrointestinal tract is the most common way of transmission. Recent data have shown that domestic ducks can also be infected without becoming ill - which under certain circumstances can play a crucial role in the spread of the virus [10]

Influenza virus type A is continually subject to minor antigenic changes of its surface proteins, called "antigenic drift", which is responsible for most virus changes from season to season. [9] Influenza can also occur in the form of global epidemics, called pandemics, due to major antigenic changes of type A virus, called "antigenic shift", which is independent of season. Such antigenic shift occurs occasionally, then a new virus strain appears, against which there is no immunity, large sections of the population are affected, and it is possible to have pandemic influenza. [11] All avian species can be affected by the disease, but domestic poultry (especially chickens and turkeys) are particularly vulnerable, and the disease in them can very quickly take the form of an epidemic. [12]

When such infections are observed in humans, Public Health Services closely monitor the situation due to the risk of widespread transmission to the human population. [13] Laboratory diagnosis of influenza is done in various ways. In recent years there have been rapid diagnosis methods (30 minutes), and there is the possibility of PCR testing (24 hours) and virus culture (> 48 hours). In Greece, there are two Reference Centers recognized by the World Health Organization of Influenza. [9]

Contaminated birds shed viruses into saliva, nasal secretions, and feces. Transmission is by direct contact with infected bird secretions or surfaces contaminated with secretions. Man is also infected by direct contact with infected birds or contaminated surfaces. Within a country, the disease can spread easily from a poultry farm to another one by the secretions of diseased birds, containing large amounts of the virus and contaminating the dust and mud. [10, 12]

Secretions from infected wild birds can spread the virus to poultry farms and poultry kept in homes. This risk is greatest when they are free to graze, share the same water storage with wild birds, or use water that may be contaminated by secretions of wild birds carrying the virus.[9]

The disease can also be airborne transmitted from bird to bird. The virus can be transported from a poultry house to another by infected objects, food, or clothes, and especially shoes. Rodents and other animals can also carry the virus with their body and legs and disseminate it by playing the role of the mechanical transmitter. [13]

The disease can also be transmitted from country to country by the trade of live poultry. Migratory wild birds can carry the virus over long distances and have previously been involved in the transmission of highly pathogenic avian influenza viruses around the world. [10]

IV. AVIAN INFLUENZA: WAYS OF MANIFESTATION

Avian influenza symptoms in birds vary and depend on many factors, including the severity of the disease, the species and age of the bird, existing diseases, and the environment. The main problem with avian influenza is that it is possible to have similar features with many other diseases. The most obvious indication is the sudden death of birds. [14] Other common symptoms for which we need to be vigilant include scrambled plumage, unusual head or neck posture, inability to walk or stand, reluctance to move, eat or drink, downward mood, breathing difficulties, diarrhea, swollen head, reduction in egg production. [15]

In many patients, the disease caused by the H5N1 virus is manifested very quickly. It can be manifested by common cold symptoms such as fever, cough, sore throat, muscle aches, headache, as well as by pneumonia, adult respiratory distress syndrome, conjunctivitis, or eye infection. Symptoms depend on the strain of the virus causing the disease. [16, 17] There may be more symptomsthan those listed above, which are not present in all patients. The complications that can cause death are [18]:

- Pneumonia
- Acute respiratory failure
- Brain and heart inflammation

Scientists are also afraid that the H5N1 virus may be mutated, causing the disease to be highly infectious and fatal. If this happens, the virus is likely to be unusual for the human body. [19] Without immune protection, the infection may have terrible dimensions, such as the Spanish pandemic influenza in 1918-1919, estimated to have killed 40-50 million people. [20]

V. TREATMENT OF AVIAN INFLUENZA

The most important disease control measure is the direct killing of infected birds as well as those who have been exposed to the virus and the proper removal of corpses. It is also necessary for the farms that were found to have infected poultry to enter quarantine and take measures of disinfection. [21] To protect the public, hygiene rules should be strictly followed during and after exposure to raw poultry or eggs. [9] Therefore, the following rules should be followed [11, 22]:

- All poultry and eggs should be properly cooked
- Raw poultry meat should not be stored with cooked meat or other ready-to-eat foods.
- There should be good handwashing with soap and water for at least 15-20 seconds after contact with raw poultry. Hand washing potentially removes infectious agents from the skin and is a key precaution against diseases transmission.
- There should be careful washing with soap and water on all surfaces in the kitchen that have been in contact with raw poultry and eggs.

- Contact with live or dead poultry and wild birds should be avoided
- Visit flea markets of animals, birds or poultry should be avoided
- Contact with contaminated feces or birds excretions should be avoided.

If someone has returned from a country where avian influenza cases have been observed, he should monitor his health for a period of 10 days. If he develops a high fever and cough or difficulty in breathing at this time, he should necessarily refer to the nearest hospital or physician without being overwhelmed by panic. [10]

Available vaccines do not provide protection against this strain. The World Health Organization (WHO), in collaboration with the International Influenza Surveillance Network, works to create an original H5N1 strain that can be used to prepare vaccines. [11]

Medicines against influenza viruses like oseltamivir (Tamiflu) and zanamivir may be effective against the H5N1 (avian) influenza virus. However, studies are still needed to prove their effectiveness. The oldest anti-influenza medicines, such as amantadine and rimantadine, are not effective against the avian influenza virus. [18]

Regarding the prevention of avian influenza, the prophylaxis of the virus in endemic areas and individually concerns the good cooking of poultry meat and their eggs, as the virus is destroyed at temperatures above 70 degrees Celsius. [17] General prevention of avian influenza includes the following measures [9, 23]:

- Persons traveling to countries where there is avian influenza should avoid contact with wild or domestic birds, such as chickens, ducks, geese, turkeys.
- Good handwashing by adults. Children need even more attention to hand washing because they tend to put objects or their hands in the mouth.
- Disposable alcohol wipes can be used for hand cleaning and the prevention of pathogenic virus transmission.
- Good washing of all cooking tools and utensils, as well as surfaces used for handling and processing raw poultry meat
- The eggs must be thoroughly washed. The shell may have secretions or feces containing pathogenic viruses.
- Eggs should not be eaten raw but cooked at high temperatures
- Chickens should be well cooked. At a temperature of 800 C and above for 60 seconds, the avian influenza virus is destroyed
- When someone returns from Asia or other countries where there is avian influenza and then a flu-like syndrome occurs, immediate advice from a doctor should be asked. [24] Teaching about taking a few precautionary measures to prevent infections and diseases is imperative.[25]

VI. CONCLUSIONS

The design of the necessary actions to limit the consequences of the outbreak of avian influenza is considered necessary. These actions will contribute to the analytical determination and the effective treatment of the potential threat and its ongoing consequences, the recovery of the population, and the management of avian influenza crises.

REFERENCES

[1] Hiromoto, Y., Yamazaki, Y., Fukushima, T., Saito, T., Lindstrom, S. E., Omoe, K., Nerome, R., Lim, W. et al. l Evolutionary characterization of the six internal genes of H5N1 human influenza a virus. The Journal of General Virology, 81(5) (2008) 1293–1303
[2] Timm, C., Harder and Ortrud W., Avian Influenza. Chapter Two in Influenza Report., B.S., Kamps, C., Hoffmann, W., Flying Publisher, (2006). http://www. InfluenzaReport. Com
[3] Rudi, H., Avian Influenza in Pigeons. https://web.archive.org/web/20140222151548/http://www.internationalmodenaclub.com/
[4] Avian Influenza Low Pathogenic H5N1 vs. Highly Pathogenic H5N1, United States Department of Agriculture. (2015).
[5] Alexander, D.J., Brown, I.H., History of high pathogenic avian influenza. Rev. Sci. Tech, 28(1) (2009) 19–38
[6] H5N1 avian influenza: Timeline of major events, World Health Organization, (2012).
[7] Human infection with avian influenza A(H7N9) virus – China, WHO, Disease outbreak news, (2017).
[8] Avian Influenza http://www.european-lung-foundation.org
[9] Soltaridou. E.S., Crisis Management. Avian Influenza. Graduate Thesis, Postgraduate Program, Health Management, The University of Piraeus. Piraeus, (2006).
[10] Evangelopoulos, I., et al., (2006). Avian Influenza, Strategic Publications, Athens
[11] Ministry of Health & Social Solidarity, National Action Plan to tackle the influenza pandemic in Greece, (2005).
[12] Transmission of Influenza Viruses from Animals to People. www.cdc.gov. Posten on 2016-05-12.
[13] Tountas, G., Health Policy, Odysseus Publications, Athens, (2002).
[14] How is avian influenza transmitted? http: // www. enimerosi.moec.gov.cy/archeia/1/dde531b
[15] Avian influenza. (2015) http://www.agroepirus.gr/eagro/farmers/articles/article.jsp?categoryid=5732&context=9104&globalid=13583&articleid=5944
[16] Hadjipanagis, A., Avian influenza. https://www.paidiatros.com/asthenies/limoxis/bird-flu
[17] Avian Influenza: Symptoms and Transmission, (2016). https://www.healthyliving.gr/2016/03/30/griph-pthnon/
[18] Poultry Flu: What You Need to Know https://www.medlook.net/%CE%99%CE%BF%CE%AF/217.html
[19] Kostopoulos, G., Special Bacteriology, Fungi, Virology and Infectious Diseases. Kyriakides Publications IKE. Thessaloniki, (2016).
[20] Chaussois, R., The Spanish Flu of 1918-1919. History Illustrated, 17 (1969) 60-6.
[21] Iordanidis, P.A., Pathology of Leisure Birds. Modern Education. Athens, (2012).
[22] Jardin, N., Pathologies of the Small Ruminant. Chavalis A - Chatzisimeon K. OE Publications, Thessaloniki, (2015).
[23] Georgakis, S.A., Vareltzis, K.P., Ambrosia, I.A., Food technology of animal origin, Christina and Vassiliki Kordali Publications OE Thessaloniki, (2002).
[24] Center for Disease Control and Prevention (KELP), Avian Influenza Measures When Traveling by Ship to Countries with Outbreaks of Avian Influenza. December (2005). http://www.pepen.gr/pagesgr/yphresies/XRHSIMA/Avian_influenza_marine_dec2005.htm
[25] Dr.S.Ramesh., Importance of Hygiene for Young Children, SSRG International Journal of Nursing and Health Science, 1(1) (2015) 15-18.