

BRIEF REVIEW ΒΡΑΧΕΙΑ ΑΝΑΣΚΟΠΗΣΗ

Canine and feline influenza: Possible new emerging zoonoses?

Key words

Canine
Feline
Influenza

1. INTRODUCTION

The influenza virus is a group of pathogenic viruses that has recently become well known. Many animal species, including mammals and birds, can be infected by the influenza virus. Influenza virus infection is considered to be a form of respiratory tract infection, and all the signs and symptoms of respiratory infection can be observed in affected cases. In human beings, the influenza virus is an important infection that has been a public health problem for many centuries. There have been many extensive outbreaks of influenza virus infection over the years, some of which have resulted in millions of deaths.^{1,2}

An important concern in medicine is the emergence of new infections. In the past few years, there have been many new outbreaks of influenza virus infection in human beings, among which the new viruses identified as being pathogenic to humans are of special interest. Specifically, the crossing of species of influenza virus from animals to human beings is increasingly being seen. The two recent new pathogenic influenza viruses, avian flu and swine flu, have their origins in animals and crossed to human beings following some unexpected natural genetic modifications.^{3,4}

A major consideration for any new animal-derived emerging influenza virus infection is the zoonosis process.⁵ Many animals can have influenza, and hence the occurrence of new human influenza that is a zoonosis can be expected. This brief article focuses on canine and feline influenza, which are important infections in pets,⁶ and on the possibility of these two influenza virus infections becoming new zoonoses.

ARCHIVES OF HELLENIC MEDICINE 2011, 28(2):224–226
ΑΡΧΕΙΑ ΕΛΛΗΝΙΚΗΣ ΙΑΤΡΙΚΗΣ 2011, 28(2):224–226

V. Wiwanitkit

Wiwanitkit House, Bangkhuae, Bangkok,
Thailand

Γρίπη των σκύλων και της γάτας:
Είναι πιθανές αναδυόμενες
ζωνόσοι;

Περίληψη στο τέλος του άρθρου

Submitted 11.3.2010
Accepted 24.3.2010

2. CANINE INFLUENZA

The dog is an animal that everyone knows. Due to the fact that dog can be well trained and friendly, many people have dogs in their homes as pets. Dogs can have many diseases, including canine influenza, which is considered to be an important new infection for dogs.⁷ A variety of pathogens, including canine parainfluenza virus, canine adenovirus and *Bordetella bronchiseptica*, as well as mycoplasmas, *Streptococcus equi* subsp. *zooepidemicus*, canine herpesvirus and reovirus-1, -2 and -3 have been reported as causes of respiratory infection in dogs.⁸ For parainfluenza virus infection, it is believed that the transmission of active human infection to dogs is the main kind of infection.⁹ Influenza virus infection in dogs is not a new topic, and there are many old reports on influenza in dogs. In 1975, Fyson et al reported that dogs constituted an unequivocal reservoir for human influenza A virus.¹⁰ In 1980, Houser studied the seroepidemiology of influenza among dogs and reported the presence of antibody to A/Texas/77 and further suggested that "these dogs had at some time been infected with this virus, and that dogs could play a role in the epidemiology of influenza in man".¹¹ Another interesting report is on the seroepidemiology of influenza C infection in dogs.¹² It is reported that "the distribution of antibodies in the tested canine population, in contrast to that of humans, did not show a significant degree of association with age".¹²

In 2004, the isolation of a new influenza virus from a dog was reported.⁷ This virus did not have its origin in a previously described human influenza virus but came from a virus with an equine history, and there was ad-

ditional evidence of transmission from dog to dog.⁷ The confirmation of viral jumping across species from horse to dogs is established.^{13,14} This was named canine influenza and assigned as a H3N8 influenza virus.¹⁵ This emerging case was well controlled, but the problem remains of lack of extensive knowledge about this new infection as the data on this new virus are incomplete. In addition, there has been no epidemiological study to investigate the exact prevalence of this new virus in the dog population. Fortunately, attempts to develop a vaccine have been continued and successful production is near.¹⁶ In addition to H3N8 influenza virus, H3N2 and H5N1 influenza viruses have also been reported to be new causes of influenza in dogs.¹⁵ These viruses have recently been documented during the recent global crisis on bird flu.^{17,18}

It should be remembered that many people keep dogs very close to themselves in their homes. If the dogs have canine influenza virus or other influenza viruses, the possibility of transmission of the virus to their owners can be expected.

3. FELINE INFLUENZA

In addition to the dog, the cat is another common pet

that is kept and fed everywhere around the world. As in the case of dogs, cats can have many diseases including influenza. Feline influenza is considered to be an important respiratory tract infection for cats, and there have been many reports of influenza in cats. In the recent outbreak of bird flu, the reports of bird flu in cats give rise to great concern about the lack of species specificity of the bird flu virus.^{19–21} It was suggested that “no H5N1 vaccines are commercially available for cats. In the event of confirmed cases of H5N1 avian influenza in birds in the area, owners should keep their cats indoors until further information is available, and follow official regulations.”²¹ Ayyalasomayajula et al concluded that “a better understanding of the behavior of domestic cats and the H5N1 influenza virus can be used to predict epidemic dynamics following the introduction of H5N1 virus into the United States and to develop effective strategies to prevent virus transmission to both cats and humans.”²²

There has still been no report, however, on the new cat influenza virus, feline influenza virus, to compare with those on canine influenza virus. As in the case of dogs, many people keep cats very close to themselves in their houses. If the cats have the influenza virus, the chance of transmission to their owners can be expected.

ΠΕΡΙΛΗΨΗ

Γρίπη των σκύλων και της γάτας: Είναι πιθανές αναδυόμενες ζωνόσοι;

V. WIWANITKIT

Wiwanitkit House, Bangkhae, Bangkok, Ταϊλάνδη

Αρχεία Ελληνικής Ιατρικής 2011, 28(2):224–226

Ο ιός της γρίπης αφορά σε μια ομάδα παθογόνων ιών, που είναι ιδιαίτερα γνωστοί στη σημερινή εποχή. Αρκετά είδη ζώων, όπως είναι τα θηλαστικά και τα πτηνά, μπορεί να νοσήσουν από τον ιό της γρίπης. Επίσης, τα είδη των ιών της γρίπης πιθανόν να μεταφέρονται από τα διάφορα ζώα στον άνθρωπο. Τα δεδομένα που προέκυψαν τα δύο τελευταία έτη από τη γρίπη των πτηνών και των χοίρων έδειξαν ότι αυτοί οι δύο ιοί προήλθαν από τα ζώα και μεταδόθηκαν στον άνθρωπο λόγω ορισμένων, μη αναμενόμενων φυσικών γενετικών τροποποιήσεων. Στην παρούσα βραχεία ανασκόπηση αναφέρονται κάποια στοιχεία που αφορούν στη γρίπη των σκύλων και της γάτας, εστιάζοντας στην πιθανότητα οι δύο εν λόγω ιώσεις να είναι νέες ζωνόσοι.

Λέξεις ευρετηρίου: Γάτα, Γρίπη, Σκύλος

References

1. ANSART S, PELAT C, BOELLE PY, CARRAT F, FLAHAULT A, VALLERON AJ. Mortality burden of the 1918–1919 influenza pandemic in Europe. *Influenza Other Respi Viruses* 2009, 3:99–106
2. ERKOREKA A. Epidemics in northern Basque: Black death and the Spanish influenza. *Hist Sci Med* 2008, 42:113–122
3. MALIK PEIRIS JS. Avian influenza viruses in humans. *Rev Sci Tech* 2009, 28:161–173
4. WIWANITKIT V. Swine flu: The present pandemic infectious disease. *Kulak Burun Bogaz Ihtis Derg* 2009, 19:57–61
5. YEN HL, WEBSTER RG. Pandemic influenza as a current threat.

- Curr Top Microbiol Immunol* 2009, 333:3–24
6. BODEWES R, EGBERINK HF. An update on viral diseases of the dog and cat. *Tijdschr Diergeneeskde* 2009, 134:330–336
 7. DUBOVI EJ, NJAA BL. Canine influenza. *Vet Clin North Am Small Anim Pract* 2008, 38:827–835
 8. BUONAVOGLIA C, MARTELLA V. Canine respiratory viruses. *Vet Res* 2007, 38:355–373
 9. MAYR A. Infections which humans in the household transmit to dogs and cats. *Zentralbl Bakteriol Mikrobiol Hyg B* 1989, 187:508–526
 10. FYSON RE, WESTWOOD JC, BRUNNER AH. An immunoprecipitin study of the incidence of influenza A antibodies in animal sera in the Ottawa area. *Can J Microbiol* 1975, 21:1089–1101
 11. HOUSER RE, HEUSCHELE WP. Evidence of prior infection with influenza A/Texas/77 (H3N2) virus in dogs with clinical parainfluenza. *Can J Comp Med* 1980, 44:396–402
 12. MANUGUERRA JC, HANNOUN C. Natural infection of dogs by influenza C virus. *Res Virol* 1992, 143:199–204
 13. CRAWFORD PC, DUBOVI EJ, CASTLEMAN WL, STEPHENSON I, GIBBS EP, CHEN L ET AL. Transmission of equine influenza virus to dogs. *Science* 2005, 310:482–485
 14. ENSERINK M. Epidemiology. Horse flu virus jumps to dogs. *Science* 2005, 309:2147
 15. HARDER TC, VAHLENKAMP TW. Influenza virus infections in dogs and cats. *Vet Immunol Immunopathol* 2010, 134:54–60
 16. DESHPANDE MS, JIRJIS FF, TUBBS AL, JAYAPPA H, SWEENEY D, SPENCER SJ ET AL. Evaluation of the efficacy of a canine influenza virus (H3N8) vaccine in dogs following experimental challenge. *Vet Ther* 2009, 10:103–112
 17. SONG D, KANG B, LEE C, JUNG K, HA G, KANG D ET AL. Transmission of avian influenza virus (H3N2) to dogs. *Emerg Infect Dis* 2008, 14:741–746
 18. GIESE M, HARDER TC, TEIFKE JP, KLOPFLEISCH R, BREITHAUPT A, METTENLEITER TC ET AL. Experimental infection and natural contact exposure of dogs with avian influenza virus (H5N1). *Emerg Infect Dis* 2008, 14:308–310
 19. SPONSELLER BA, STRAIT E, JERGENS A, TRUJILLO J, HARMON K, KOSTER L ET AL. Influenza A pandemic (H1N1) 2009 virus infection in domestic cat. *Emerg Infect Dis* 2010, 16:534–537
 20. LIU D, LIU X, YAN J, LIU WJ, GAO GF. Interspecies transmission and host restriction of avian H5N1 influenza virus. *Sci China C Life Sci* 2009, 52:428–438
 21. THIRY E, ADDIE D, BELÁK S, BOUCRAUT-BARALON C, EGBERINK H, FRYMUS T ET AL. H5N1 avian influenza in cats. ABCD guidelines on prevention and management. *J Feline Med Surg* 2009, 11:615–618
 22. AYYALASOMAYAJULA S, DeLAURENTIS DA, MOORE GE, GLICKMAN LT. A network model of H5N1 avian influenza transmission dynamics in domestic cats. *Zoonoses Public Health* 2008, 55:497–506

Corresponding author:

V. Wiwanitkit, Wiwanitkit House, Bangkhuae, 10160 Bangkok, Thailand
e-mail: wwiwoj@yahoo.com