

SEROPREVALENCE OF H5 AVIAN INFLUENZA VIRUS IN BIRDS FROM THE UNITED ARAB EMIRATES

E. Obon¹, T.A. Bailey², A. Di Somma¹, C. Silvanose¹, D. O'Donovan², S. Mc Keown³, S. Joseph⁴ and U. Wernery⁴

¹Dubai Falcon Hospital, ²Dubai; Wadi Al Safa Wildlife Centre, Dubai; ³H. E. Sheikh Butti Maktoum's Wildlife Center³, Dubai; ⁴Central Veterinary Research Laboratory, Dubai.

INTRODUCTION

Avian influenza (AI) (*Orthomyxoviridae*) is a well-known viral disease that affects birds worldwide. In recent years, highly pathogenic avian influenza (HPAI) has re-emerged worldwide, raising concern in human and veterinary health authorities.

Avian influenza has been reported in many countries from the Middle East region. In Pakistan outbreaks of HPAI H7N3 subtype occurred in poultry in 1995 (Naeem 1998) and of H9N2 in 1998 (Naeem et al. 1999). In Iran five subtypes of avian influenza virus, H3N8, H7N3, H8N4, H9N2 and H10N7, were isolated from migratory ducks during a surveillance campaign in 2003-2004 (Fereidouni et al. 2005). In Kuwait two birds were found to be infected with avian influenza in 2005, a migratory flamingo tested positive for H5N1 and an imported falcon was confirmed to have H5N1 (PROMED 2005). However, the recent isolates of the HPAI H5N1 in falcons of Saudi Arabia (Samour et al, 2007) are of greater concern due to the proximity to UAE.

Influenza virus strains have also been isolated sporadically from birds in the UAE including H7N3, H7N1 and H9N2 (Wernery and Manvell 2003; Kent et al. 2006). Only the H7N3 strain, isolated from a peregrine falcon (*Falco peregrinus*) proved to be highly pathogenic for chickens (Manvell et al. 2000). Because there is little serological data concerning AI in birds in UAE (Bailey et al. 1996), we decided that a serological study would be beneficial to understand the epidemiology of the disease.

MATERIALS AND METHODS

In total, 443 serum samples were obtained from birds showing no obvious signs of disease. Globally, 7 orders (*Anseriformes*, *Charadriiformes*, *Ciconiiformes*, *Columbiformes*, *Falconiformes*, *Galliformes* and *Gruiformes*) and 38 species (plus 4 hybrid species of falcons) were represented in this serological study. The population was formed mainly by captive birds, some receiving routine annual health checks in the Dubai Falcon Hospital (DFH) while others were part of a pre-vaccination serological investigation. Only 33 wild birds were included, 32 mallards (*Anas platyrhynchos*) and one black headed gull (*Larus ridibundus*). None of the animals had been previously vaccinated against AI. The serological technique used was the haemagglutination inhibition (HI) against the H5N2 antigen using 1% specific pathogen free chicken red blood cells as described elsewhere (OIE 2004). Titres greater or equal to 1/8 were considered positive.

RESULTS

Out of 443 individual samples, 58 birds (13%) tested positive to the H5N2 antigen. Overall, individuals from 17 (19 if considering 2 hybrid species of falcons) of the 38 species examined, including representatives of all 7 orders were seropositive to the HI test used. Antibody titres ranged from 1/8 to 1/128. The highest titre, 1/128, was determined in one bird, a hybrid falcon (gyr x saker).

In reference to orders the seropositive proportion was as following: *Anseriformes* (15/76; 20%), *Charadriiformes* (1/34; 3%), *Ciconiiformes* (18/60; 30%), *Columbiformes* (1/4; 25%), *Falconiformes* (10/130; 7.7%), *Galliformes* (10/76; 13%) and *Gruiformes* (3/63; 4.7%).

DISCUSSION

A prevalence of 13% was found in our serological study for H5 AI. Avian influenza antibodies were detected in representatives of all orders and in individuals of both, wild and captive bird populations. Our study cannot rule out the possibility of cross reaction between the neuraminidase N2 antigen and birds seropositive to AI subtypes other than H5N2, e.g. H9N2 (a common strain in the Middle East). Future studies should use an H5 antigen with a different neuraminidase i.e. N9. Indeed some laboratories test suspected seropositive samples against at least two different antigens with different neuraminidase subtypes to be sure (Manvell, pers comm.).

Our data is revealing as no H5 AI serotypes have been isolated to date in the UAE, nor has any associated bird mortality been detected. The source of H5 AI exposure is unclear. However, some of the falcons included in the study travel regularly to other countries of the Middle East, where cases of H5 have been reported and therefore could have become exposed there to the virus. For captive birds maintained in open facilities a direct contact with migrant wild birds cannot be ruled out. Wild birds visit the different ponds where some captive waterfowl and flamingos are kept.

Only a small number of wild birds were involved in the study and therefore we were unable to draw any statistically supported conclusions about a possible difference in prevalence of H5 avian influenza between captive and wild populations and our results should be considered preliminary. Further studies using larger numbers of animals from a broader geographic area within the UAE and Middle East would be beneficial to understand the epidemiology of the disease.

ACKNOWLEDGEMENTS

The authors thank His Highness Sheik Hamdan bin Rashid al Maktoum and Mr Humaid Obaid al Muhari, Dubai Falcon Hospital Director, for their support of the Dubai Falcon Hospital. We thank the staff of the DFH and the CVRL for their technical support.

REFERENCES

- BAILEY, TA., WERNERY, U., GOUGH, RE., MANVELL, R., SAMOUR, JH. Serological survey for avian viruses in houbara bustards (*Chlamydotis undulata macqueenii*). Vet Rec 1996; 139(10): 238-239.
- FEREIDOUNI, SR., AGHAKHAN, M., WERNER, O., STARICK, E., BOZORGHMEHRIFARD, MH. Isolation and identification of avian influenza viruses from migratory birds in Iran. Vet Rec 2005; 157(17): 526.
- KENT J., BAILEY, TA., SILVANOSE, CD., McKEOWN, S., WERNERY, U., KINNE, J., MANVELL, R. An outbreak of low pathogenic avian influenza in a mixed-species aviculture unit in Dubai in 2005. Vet Clin North Am Exot Anim Pract 2006; 9(3): 523-531.
- MANVELL, RJ., MCKINNEY, P., WERNERY, U., FROST, K. Isolation of a highly pathogenic influenza A virus of subtype H7N3 from a peregrine falcon (*Falco peregrinus*). Avian Pathol 2000; 29: 635-637.
- NAEEM, K. The avian influenza H7N3 outbreak in South Central Asia. Proc fourth International Symposium on Avian Influenza, Athens, GA, USA 1998: 31-35.
- NAEEM, K., ULLAH, A., MANVELL, RJ., ALEXANDER, DJ. Avian influenza A subtype H9N2 in poultry in Pakistan. Vet Rec 1999. 145(19): 560.
- PROMED, 2005. Archive number 20051112.3304. www.promedmail.org (Accesed 12.09.2006)
- SAMOUR, J.H., NALDO, J.L., WERNERY, U., BEER, M. Highly pathogenic avian influenza H5N1 phenotype in a saker falcon (*Falco cherrug*). Proceedings of the European Association of Avian Veterinarians. 2007: 155-162.
- WERNERY, U., MANVELL R. Avian viral diseases in the United Arab Emirates (UAE). Proc European Ass Avian Vet, Tenerife, Spain 2003: 72-78.