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DETECTION OF HAEMAGGLUTINATION–INHIBITION ANTIBODIES AGAINST HUMAN H_1N_1 STRAINS OF INFLUENZA A VIRUSES IN SWINE IN IBADAN, NIGERIA

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A survey of haemagglutination inhibition (HI) antibodies against influenza A virus was carried out on pigs sera collected at Bodija abattoir, Ibadan between December, 2001 and August 2002. Out of the 107 sera tested, 101 (94.39%) had HI antibodies to influenza A (H_1N_1) human strain while the remaining 6 (5.61%) were negative. The result of this work indicates that H_1N_1 influenza viruses are currently circulating among the pigs slaughtered in Bodija abattoir. The public health implications in terms of possible transmission contact with the pigs are discussed. The result of the HA titres obtained with turkey red blood cells (RBC) compared to that of guinea pig RBC indicated that the H_1N_1 stains of influenza A viruses have greater avidity for turkey RBC than those of guinea pigs. This is equally of diagnostic importance

INTRODUCTION

Influenza is an acute, highly contagious and febrile respiratory disease associable with the destruction of cell lining the upper respiratory tract, trachea and bronchi. (1, 2). Influenza viruses belong to the family orthomyxoviridae and are classified as A, B, or C based on the antigenic differences in their nucleoprotein (NP) and matrix (M) protein. These three types have been shown to cause true influenza in man (3).

Influenza A viruses are widespread in nature infecting a wide range of host species including man, horses, swine, birds and mammals (4). According to Murphy and Webster (5), Influenza B and C viruses infect only human hosts. However, Adeniji *et al* (6) reported the detection of haemagglutination inhibition (HI) antibodies to B/Victoria/2/87 strain of influenza in pigs in Nigeria. This study was carried out to detect the presence of HI antibodies against human strain of H_1N_1 influenza virus in pigs' sera and to establish the zoonotic nature of the infection between humans and swine.

MATERIALS AND METHODS

One hundred and seven blood samples were collected from slaughtered pigs at the Bodija Municipal Abattoir, Ibadan between December 2001 and August 2002. The sera from these samples were stored at -20°C until tested. The virus antigen influenza A (H_1N_1) strain and its positive control antiserum were collected from the Department of Virology, College of Medicine, University of Ibadan. The haemagglutination antibody (HA) test was carried out using the standard method as previously described (6). The use of 1% turkeys' red blood cells (RBC) and 1% guinea pig RBC as indicator for the test was also compared. Haemagglutination–inhibition (HI) test was then carried out using the positive control antiserum and the test serum samples.

RESULTS

Out of the 107 sera samples tested, a total of 101 (94.39%) had HI antibodies to the influenza H_1N_1 strain. The HI titre values obtained ranged between 4 and 4096. The HI titre value of 63 (58.88%) of the tested samples ranged from 4 – 32, 37 (34.58%)

ranged from 64 – 256 while the remaining 7 (6.54%) ranged from 512 – 4096. Four HA units with 1% turkey RBC was 1024 while 4 HA units with 1% guinea pig RBC was 256. The presence of HI antibodies in the tested samples however indicated current circulation of the H_1N_1 viruses in the pigs in Ibadan.

DISCUSSION

Surveillance can assist in identifying the transmission pathways of influenza viruses through sero-surveys and it is an important component of influenza monitoring activities. One hundred and one (94.39%) of the 107 sera tested were positive for HI antibodies. The result indicates that there is a continuous and high activity of H_1N_1 strain of influenza A virus among pigs in Ibadan. This implies a prevalence of influenza A virus infection among the pig population in Ibadan. Since there was no record that these pigs were vaccinated, the antibody response could only have been due to natural exposure to a wild strain of the virus.

The result of this study conform to the work of Easterday (1) who found that influenza A viruses infect pigs, horses, seals, birds and humans. It also corroborates the findings of other workers who reported high prevalence of antibodies to A/Mississippi/1/85 (H_3N_2), A/Victoria/3/75 (H_3N_2), A/Chile/83 (H_1N_1) strains of influenza A viruses in horses and pigs (7). The HA result showed a very high titre of the virus antigen, indicating a high potency of the virus antigen with high avidity for turkey RBC compared to guinea pig RBC. This is of diagnostic importance particularly in influenza outbreaks involving human and swine host species. The result of this work also has implication for possible transmission to humans who are in close contact with the pigs. This is of significant public health importance as pigs and chickens have been hitherto incriminated in playing some major roles in the epidemiology of influenza viruses in Nigeria (8). Detection of HI antibodies against human H_1N_1 strain of influenza A viruses in swine indicates the presence of the virus in Ibadan. In order to confirm this and to establish other types or subtypes present in Ibadan and other parts of the country, further work needs to be carried out especially in the isolation and characterization of the virus. Vaccination of the pigs is also recommended due to the zoonotic nature of the infection.

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