Onderstepoort J. vet. Res., 54, 653–654 (1987)

RESEARCH COMMUNICATION

THE ISOLATION OF A PARAMYXOVIRUS FROM PIGEONS IN SOUTH AFRICA

ANNA C. E. PIENAAR and J. A. CILLIERS, Veterinary Research Institute., Onderstepoort 011

ABSTRACT

PIENAAR, ANNA C. E. & CILLIERS, J.A., 1987. The isolation of a paramyxovirus from pigeons in South Africa. *Onderstepoort Journal of Veterinary Research*, 54, 653–654 (1987)

A paramyxovirus was isolated from diseased pigeons, submitted to the Poultry Section of the Veterinary Research Institute, Onderstepoort, for post-mortem examination. The mean death time for the isolates was determined to ascertain the virulence of the virus. Infectivity trials showed that the paramyxovirus was non-virulent for 60- and 4-week-old chickens infected by the intraocular and intratracheal routes.

INTRODUCTION

A disease in pigeons resembling Newcastle disease in chickens and caused by a paramyxovirus has been reported from Iraq (Mohammed, Sokkar & Tantawi, 1978), several European countries, (Perini, Marastoni & Pascucci, 1982; Viaene, Spanoghe, De Vriese, Bijnens & De Vos, 1983; Biancifiori & Fioroni, 1983; Kaleta, Meister, Horber & Polten, 1984; Guittet, Bennejean, Morin, Morin & Le Coq, 1984; Alexander, Russel & Collins, 1984a) the Sudan (Eisa & Omar, 1984), Israel (Weisman, Aronovici, Malkinson, Schimanter & Lipkind, 1984) and the United States (Pearson, Senne & Peterson, 1985).

The paramyxovirus found in pigeons is viscerotropic and neurotropic but not pneumotropic (Wilson 1986). The disease is characterized by a high morbidity and low mortality, with most of the mortalities occurring in young birds (Wilson 1986). Affected pigeons show watery excretions and nervous symptoms, including torticollis, paralysis of the wings and deformation of the feathers (Lemahieu, De Vriese & Bijnens, 1985). The incubation period of the disease was found to vary from 1–6 weeks (Wilson 1986).

The virus isolated from pigeons belongs to the paramyxovirus 1 group (Alexander *et al.*, 1984a). It differs from the classical Newcastle disease virus by the peculiar binding pattern of monoclonal antibodies directed to the HN-1 epitope (Alexander *et al.*, (1984a).

MATERIALS AND METHODS

Since September 1986, several pigeons have been submitted to the Poultry Section of the Veterinary Research Institute, Onderstepoort, from various parts of the Republic of South Africa. All of the pigeons showed clinical signs similar to those described by Wilson (1986), Viaene *et al.* 1983 and Alexander, Wilson, Thain & Lister 1984b. Samples of brain, trachea, kidney, liver, spleen and pancreas were used to isolate the virus in embryonated chicken eggs, according to the methods described by Hanson (1975). Eggs were candled daily and all mortalities were tested for haemagglutinin activity (Hanson 1975). Samples showing haemagglutinin activity were identified as paramyxoviruses by a standard haemagglutination inhibition test (Hanson 1975).

The mean death time of the isolates were determined by the methods described by Hanson (1975).

An infectivity trail was done to determine whether the virus isolated from pigeons was capable of causing clinical signs in chickens. A group of 50 chickens, consisting of 10, 60-week-old hens from a specific pathogen-free flock and 40 4-week-old unvaccinated White Leghorns of both sexes were used in this trial. Chickens were inoculated intra-ocularly and intratracheally with 0,1 mℓ samples of allantoic fluid of the A 683/86 isolate having an EID_{50} of $10^{7.5}$, and the A 741/86 isolates having EID_{50} of $10^{9.5}$, per dose. A control group was used for each age group. All the birds were bled on Day 0 and again on Day 16. Paramyxovirus antibody titres in the serum were determined by the haemagglutination inhibition (HI) test (Hanson 1975), using the La Sota strain of NCD virus as the antigen.

TABLE 1 Mean death time in eggs of paramyxovirus isolated from pigeons

Isolate	MDT (HR) of MLD
A 683/86	96
A 741/86	92
A 808/86	118
A 818/86	116
A 819/86	117
A 854/86	94

MDT = mean death time
MLD = minimum lethal dose

RESULTS AND CONCLUSIONS

The symptoms shown by the pigeons (i.e. watery excretions and nervous symptoms) were similar to those described by Viaene *et al.* (1983), Wilson (1986) and Alexander *et al* (1984b), although feather deformation was not seen. The morbidity and mortality patterns in pigeons also corresponded with those described by Wilson (1986).

All 6 isolates listed in Table 1 haemagglutinated chicken erythrocytes. The identity of those insolates was confirmed by the HI test. It can therefore be concluded that a paramyxovirus had been isolated from the pigeons.

According to the mean death time results, summarized in Table 1, and the guide-lines laid down by Hanson & Brandly (1955), these isolates belong to the lentogenic group of paramyxovirus. Similar results were obtained by Biancifiori & Fioroni (1983) and Pearson *et al.* (1985) from isolates in Italy and the U.S.A. respectively.

From the results of the infectivity trial (Table 2), it would appear that the isolates tested were of low pathogenicity for chickens in the age groups used. Isolate A 741/86 caused very mild symptoms in one out of ten (10 %) of the unvaccinated 4-week-old chickens inoculated by both routes. This isolate also had the shortest mean death time as can be seen from Table 1. From the results summarized in Table 3 it can clearly be seen that there was a significant increase in the antibody titres in chickens infected by both routes by the A 683/86 and A 741/86 isolates.

These results show conclusively that a lentogenic paramyxovirus had been isolated from diseased pigeons in South Africa. These isolates do not appear to be pathogenic for chickens, but were capable of eliciting an immune response and of stimulating the production of antibodies. It is proposed that these isolates are pigeon paramyxoviruses belonging to the paramyxovirus 1 group.

Received 26 June 1987 Editor

TABLE 2 Symptoms in chickens resulting from inoculation with pigeon paramyxovirus isolates

Group	Isolate	Route	Symptoms	No. showing symptoms	Days PI
1	A 683/86	Eye	Negative	0/5	—
2	A 683/86	Trachea	Negative	0/5	—
3	A 741/86	Eye	Sneeze	1/10	3
4	A 741/86	Trachea	Sneeze	1/10	3
Control, 1	—	—	Negative	0/10	—
Control, 2	—	—	Negative	0/5	—

TABLE 3 Mean antibody titres in groups of chickens before and after inoculation with virus isolates

Group	Isolate	Titre (Day 0)	Titre (Day 16)
1	A 683/86	1,6	8,2
2	A 683/86	0,1	6,5
3	A 741/86	0,3	8,2
4	A 741/86	0,4	8,6
Control, 1	—	0,3	1,6
Control, 2	—	1,0	2,2

REFERENCES

ALEXANDER, D. J., RUSSEL, P. H. & COLLINS, M. S., 1984a. Paramyxovirus type 1 infections of racing pigeons. 1. Characterisation of isolated viruses. *Veterinary Record*, 114, 444–446.

ALEXANDER, D. J., WILDOS, G. W. C., THAIN, J. A. & LISTER, S.A., 1984b. Avian paramyxovirus type 1 infection of racing pigeons. 3. Epizootiological considerations. *Veterinary Record*, 115, 213–216.

BIANCIFIORI, F. & FIORONI, A., 1983. An occurrence of Newcastle disease in pigeons: Virological and serological studies on the isolates. *Comparative Immunology, Microbiology and Infectious Diseases*, 6, 247–252.

EISA, M. & OMAR, E. A., 1984. A natural outbreak of Newcastle disease in pigeons in the Sundan. *Veterinary Record*, 114, 297. pp.

GUITTET, M., BENNEJEAN, G., MORIN, M., MORIN, Y. & LE COQ, C., 1984. La paramyxovirus du pigeon. *L'Aviculteur*, 445, 59–62.

HANSON, R. P., 1975. Isolation and identification of avian pathogens. Ithaca, New York: Arnold Printing Corporation.

HANSON, R. P. & BRANDLY, C. A., 1955. Identification of vaccine strains of Newcastle disease virus. *Science*, 122, 156–157.

KALETA, E. F., MEISTER, J., HORBER, E. & POLTEN, B., 1984. Beitrag zu Klinik, Epizootiologie, Diagnose und Prophylaxe der Paramyxovirusinfection der Taube. *Praktische Tierarzt*, 65, 522–525.

LEMAHIEU, P., DE VRIESE, L. & BIJNENS, B., 1985. Feather abnormalities associated with paramyxovirus 1 variant in pigeons and chickens. *Veterinary Record*, 116, 591 pp.

MOHAMMED, M. A., SOKKAR, S. M. & TANTAWI, H. H., 1978. Contagious paralysis of pigeons. *Avian Pathology*, 7, 637–643.

PEARSON, J. E., SENNE, D. A. & PETERSON, L. A., 1985. Newcastle disease virus infection of pigeons—is it a threat to poultry? *Proceedings of 89th annual Meeting of U.S. Animal Health Association, Wisconsin*, 293–295.

PERINI, S., MARASTONI, G. & PASCUCCI, S., 1982. Sull' attuale epizooiadi malattia di Newcastle nei piccioni. *Selezione Veterinaria*, 23, 129–130.

VIAENE, N., SPANOGHE, L., DE VRIESE, L., BIJNENS,, B. & DE VOS, A., 1983. Paramyxovirus by duiven. *Vlaams Diergeneeskundig Tijdschrift*, 52, 278–286.

WEISMAN, Y., ARONOVICI, A., MALKINSON, M., SCHIHMANTER, E. & LIPKIND, M., 1984. Isolation of paramyxoviruses from pigeons in Israel. *Veterinary Record*, 115, 605.

WILSON, G. W. C., 1986. Newcastle disease and paramyxovirus 1 of pigeons in the European Community. *World's Poultry Science Journal*, 42, 143–153.

Printed by the Government Printer, Private Bag X85, Pretoria, 0001