

EXPERIMENTAL INFECTION OF DOMESTICATED PIGEONS WITH
NEWCASTLE DISEASE VIRUS (KUDU 113 STRAIN)

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SUMMARY

Ten adult domesticated pigeons were challenged with Newcastle disease virus (Kudu 113 strain). A mean pre-challenge haemagglutinating antigen (HA) titre of 24.8 was observed. The mean antibody titre rose to 267.1 at one week and 682.7 and 1024 at two and three weeks post-challenge (PC) respectively. The pigeons did not show any clinical signs PC Three of the pigeons necropsied after three weeks PC showed petechial haemorrhages in the intestines and congestion of the liver, spleen and kidneys. It is concluded that the pigeons even though they did not show any clinical signs to infection were actually infected by the virus (subclinically) and could disseminate the agent by contaminating the environment with their droppings as they flew around.

KEYWORDS: Newcastle disease, pigeons, antibody titre

INTRODUCTION

The common species of pigeons found in Zaria and surroundings are speckled pigeon (*Columba guinea*), fruit pigeon or green fruit pigeon (*Treton australis*) and Adamawa turtle dove (*Streptopelia hyppyrhus*) (Elgood, 1960). Prior to 1971, no case of natural infection of pigeons by Newcastle disease was reported. However, an outbreak of epidemic proportion decimated aviculture in Europe between 1971 and 1973 (Vindevogel and Dutchatd, 1988). Alexander *et al.*, (1984) reported the spread of NDV to chickens in several countries including Great Britain where 20 outbreaks in unvaccinated chickens occurred in 1984 as a result of feed contaminated by faeces of infected pigeons. In Nigerian villages, it is common

to find a combination of different species of poultry being kept in the same compound (Ibrahim and Abdu, 1992). It is common to find chickens, turkeys, ducks and pigeons in the same compound.

The study was designed to ascertain whether domestic pigeons in Nigeria show clinical signs, gross lesions or serological changes when infected with NDV.

Ten (10) adult pigeons of different sexes were obtained from Samaru market. The pigeons were housed in a cage. The cage had 5 partitions and two pigeons were kept in each partition. The birds were fed with millet, guinea corn, and corn bran. Water was provided *ad libitum*.

Serum samples: The pigeons were bled via the brachial vein using a 5ml syringe

and 22G needle before inoculation at one, two and three weeks PC. The blood was centrifuged at 1500g. The serum was aspirated into labeled sterile containers and stored at 0°C until used.

Chicken red blood cells (RBC): A 0.25% suspension of RBC was prepared for use in haemagglutination (HA) and haemagglutination in hibition (HI) tests (Allan and Gough, 1974). Newcastle Lasota virus antigen obtained from National Veterinary Research Institute (NVRI), Vom, was used as antigen for HI test. The HA titres of the Newcastle Lasota antigen was determined as described by Allan and Gough (1974) and Allan *et al.*, (1978) and diluted to contain 4HA units. This concentration was used for the HI test. The HI titre for each bird was determined and expressed as the reciprocal of the last dilution that completely inhibits agglutination of the chicken RBC. The mean for each week was calculated.

Challenge virus: Newcastle disease virus (Kudu 113) strain obtained from the National Veterinary Research Institute (NVRI), Vom, was used as the challenge

virus. 0.2 mls of the reconstituted virus was administered to each pigeon intramuscularly at the thigh muscle using a sterile syringe.

Clinical examination: The birds were monitored on daily basis for clinical signs and mortality.

Post mortem examination: At the end of the experiment, three pigeons were randomly selected, euthanized and post mortem examination was conducted on them.

RESULTS AND DISCUSSION

A mean pre-challenge antibody titre of 24.8 was observed. This increased to 267.1 one week post-challenge and 682.7 and 1024 at two and three weeks post-challenge respectively. The pigeons did not show any clinical signs and a post mortem examination of three pigeons randomly selected revealed petechial haemorrhages in the intestines and congestion of the liver, spleen and kidneys.

TABLE I: Pre-challenge and post-challenge antibody titre in domesticated pigeons

Serial number of samples	Pre-challenge antibody titre	Post-challenge antibody titre		
		1 st week	2 nd week	3 rd week
1	8	32	1024	1024
2	16	16	512	1024
3	16	16	1024	1024
4	8	4	256	1024
5	8	16	256	1024
6	32	16	512	1204
7	32	256	512	1024
8	32	1024	1024	1024
9	32	1024	1024	1024
10	64			
Total	248	2404	6144	9216
Mean antibody titre	24.8	267.1	682.7	1024

The detection of some level of Newcastle disease antibodies in the domestic pigeons before challenge shows that domestic pigeons are infected by NDV. This finding is similar to that of Ezeifeke *et al.* (1992) who reported that 62.5% of pigeons tested for HI antibodies in Zaria were positive and the median HI antibody titre is high. Ezeifeke *et al.* (1992) attributed this finding to natural infection of the pigeons with NDV. In a similar work, Saidu *et al.* (2004) reported that among all the columbiformes tested for HI antibodies titre, a high percentage of the pigeons were positive for ND antibodies and that the HI antibody titres of the pigeons tested were below the protective level. Unlike what is observed in this study and the reports of other workers, Oladele *et al.* (1996) reported that the pigeons they tested were negative for HI antibody titre.

The pigeons were challenged with Kudu 113 strain of Newcastle disease virus which is a velogenic strain of NDV (Echeonwu *et al.*, 1993). It is important to note that throughout the course of the experiment, the pigeons did not show clinical signs or mortality PC. This may be due to the fact that all the pigeons used in this experiment had HI antibody titres and the titres were within the protective range as reported by Philips, (1973). Therefore, the antibodies might have protected the pigeons against clinical signs and mortality after infection with the virulent strain of NDV (Kudu 113 Stain).

Pigeons are usually reared together with other poultry species in the same compound (Ibrahim and Abdu, 1992) and are fed in the mornings and late evenings. They are allowed to fly out to fend for themselves in between meals. This system may encourage dissemination of NDV from one house to another. Unlike in United Kingdom, where the pigeon was

incriminated in spreading Newcastle disease to chicken in 1984 (Alexander *et al.*, 1984), in Nigeria there is no reported clinical outbreak of Newcastle disease in pigeons.

It can be concluded that domestic pigeons around Zaria could be infected with NDV and they may play a role in the spread of the virus to chickens and other poultry species. Therefore it becomes imperative to control Newcastle disease in pigeons.

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