Humoral Antibody Immune Response of Newcastle Disease Vaccination in Lovebirds (*Agapornis roseicollis*)

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Abstract: Clinical and immunological parameters of vaccinated lovebirds (*Agapornis roseicollis*) against Newcastle Disease (ND) were evaluated. Forty eight birds were distributed into four different experimental groups, vaccinated or not against ND: GI (Ulster 2C strain), GII (B1 strain), GIII (LaSota strain) and GIV (not vaccinated-control). The humoral antibody immune response was evaluated by the inhibition of hemagglutination test (HI). The LaSota strain provided higher antibody response when compared to Ulster 2C and B1 strains. No clinical signs associated with post-vaccinal reactions were observed.

Key words: Lovebirds, vaccination, newcastle disease, Ulster 2C, B1 and LaSota strains

INTRODUCTION

Lovebirds (*Agapornis roseicollis* Selby, 1836) are birds of the order Psittaciformes, common in captivity in Brazil (Lima, 2007; Silva *et al*., 2009). They are native of African forests and savannas and are colorful, small birds and reach approximately 15 cm (Forshaw, 1989). Newcastle Disease (ND) is an acute viral disease that can affect domestic and wild birds. It is considered one of the most important infectious diseases in birds throughout the world (Alexander *et al*., 1997). Routine vaccination combined with the sacrifice of affected birds have helped to control this disease caused by a virus classified as *Avian Parainfluenzavirus* type 1 (APMV-1/NDV) viruses which is a member of the genus *Avulavirus*, of the *Paramixoviridae* family (Mayo, 2002; ICTV, 2010).

Newcastle disease is one of the main sanitary barriers for the international trade of poultry and poultry products (OIE, 2012) and the disease is worldwide distributed in a large range of hosts. Natural or experimental infection with ND virus has been demonstrated in at least 241 species from 27 of the 50 orders of birds (Kaleta and Baldauf, 1988). A high level of susceptibility to the NDV was reported for Psittaciformes (Erickson, 1977). However, there is no information available on health programs considering ND in Lovebirds. Thus, the aim of this study was to evaluate the humoral antibody response and clinical aspects of lovebirds vaccinated against ND.

MATERIALS AND METHODS

Experimental birds and management: A total number of 48 (5 month-old) lovebirds were distributed in four different treatments, with 12 birds each. Lovebirds were allocated in experimental cages, receiving water and food proper to this species *ad libitum*.

Vaccines: Birds were designated to treatments, according to vaccination strain as GI (Ulster 2C), GII (B1), GIII (LaSota) and GIV (control-non vaccinated). Commercial line NDV vaccines (Ulster 2C, B1 and LaSota strains) were administered to each experimental group, as described by Paulillo *et al*., (1996). All birds, except those in the control group, were vaccinated at 5 months of age and revaccinated at 6.5, 7.5 and 8.5 months of age with the same vaccine strain that was applied in the first vaccination. Vaccine titers were obtained by determining 50% of the embryo-infecting dose in embryonated eggs of specific-pathogen-free breeders at 8 and 10 days of incubation. Titers of live vaccine strains Ulster 2C, B1 and LaSota were 7.15 log10/0.1 mL, 7.2 log10/0.1 mL and 7.35 log10/0.1 mL, respectively. Birds were vaccinated and revaccinated by eye drop.

Serology: 216 blood samples from the lovebirds were collected by clipping of a toenail, from 5 to 9.5 months of age. The blood was impregnated in Whaltmann (n°1) filter-paper with 1.5cm², with corresponded to 75 µL of blood. The filter-papers were kept in paper bags for 24 hours at room-temperature. The filter papers were divided into two equal parts; each part was treated with 187.5 µL of PBS, at 4°C overnight. There was 12.5 µL of serum in each half of the filter paper that when reconstituted resulted in a 1:16 serum dilution (Fonseca
Table 1: Mean antibody titers measured by HI test (log_2) of lovebirds (*Agapornis roseicollis*) submitted to different vaccination programs against Newcastle disease (*n* = 48)

<table>
<thead>
<tr>
<th>Groups</th>
<th>Vaccination/Revaccination</th>
<th>5</th>
<th>6</th>
<th>6.5</th>
<th>7</th>
<th>7.5</th>
<th>8</th>
<th>8.5</th>
<th>9</th>
<th>9.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>I Ulster 2C</td>
<td>0.0</td>
<td>2.17b</td>
<td>2.33a</td>
<td>7.33ab</td>
<td>0.0a</td>
<td>0.0ab</td>
<td>0.0</td>
<td>4.33a</td>
<td>5.67a</td>
<td></td>
</tr>
<tr>
<td>II B1</td>
<td>0.0</td>
<td>0.0a</td>
<td>2.17a</td>
<td>5.5a</td>
<td>1.5ab</td>
<td>5.5a</td>
<td>0.0</td>
<td>5.17ab</td>
<td>5.67a</td>
<td></td>
</tr>
<tr>
<td>III LaSota</td>
<td>0.0</td>
<td>4.4c</td>
<td>3.33a</td>
<td>8.33b</td>
<td>3.0b</td>
<td>7.0b</td>
<td>0.0</td>
<td>6.0b</td>
<td>7.33b</td>
<td></td>
</tr>
<tr>
<td>IV*</td>
<td>0.0</td>
<td>0.0a</td>
<td>0.0b</td>
<td>0.0c</td>
<td>0.0a</td>
<td>0.0c</td>
<td>0.0</td>
<td>0.0c</td>
<td>0.0c</td>
<td></td>
</tr>
</tbody>
</table>

*Control group-not vaccinated
1 Means followed by the same letter, in the same column, are not different at 5% of probability by Tukey’s test (*p* > 0.05)

RESULTS AND DISCUSSION

Mean antibody titers against ND from lovebirds are shown in Table 1. Lovebirds from all groups vaccinated or not against ND did not show any clinical signs of post-vaccine reactions. Until 5 months of age, none of the birds showed maternally-derived antibodies (HI) against ND. As the control group (GIV) was not vaccinated, its antibody titers (HI) were null during all the experimental period. At seven months of age, antibody titers (HI) against NDV were detected in the vaccinated groups (GI to GIII). This active immunity was induced by revaccination at 6.5 months of age. However, at 8.5 months of age, antibody titers against NDV were null for GI, GII and GIII but the procedure of revaccination at 9 months of age maintained antibody titers against NDV up to 9.5 months of age. Table 1 shows that the LaSota vaccine strain provided higher antibody response to lovebirds when compared to Ulster 2C and B1 strains. The low diffusion potential of the Ulster 2C strain (McFerran and Nelson, 1971) and the low invasion capacity of the B1 strain (Hofstad, 1951) may explain the low to moderate antibody titers detected by HI in vaccinated lovebirds. The high antibody titers detected for the lovebirds vaccinated with LaSota strain are compatible with great diffusion potential of this strain (Winterfield *et al*., 1957). Generally, there was significant differences (*p* < 0.05) among groups vaccinated with Ulster 2C, B1 and LaSota strains. The analysis of the serological results clearly shows that lovebirds produce antibody when vaccinated against ND.

Conclusion: The LaSota strain provided higher antibody response to lovebirds when compared to Ulster 2C and B1 strains. Furthermore, lovebirds from all groups vaccinated against ND did not show any clinical signs of post-vaccine reactions.

ACKNOWLEDGMENTS

Dr. Gislaine Regina Vieira Martins wishes to thank FAPESP (Brazil) for the assistantship and financial support (process number 2010/04543-0).

REFERENCES


