COMPARATIVE SEROLOGICAL RESPONSES AND PROTECTION CONFERRED BY VACCINATION WITH NDV and BCRDV IN CHICKENS


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ABSTRACT

The serological responses and protection of Indian breed chickens with Australian Newcastle disease virus, heat-resistant (NDV/HR) live freeze-dried vaccine (Australian Rettori Poultry Ltd., Sydney) was compared with that of locally produced conventional La Sota F-strain Baby Chick Reovirulent Disease vaccine (BCRDV, DLS, Dhaka). Thirty day-old chicks were purchased from Mirpur Govt. Poultry Farm, Dhaka and maintained hygienically with commercial feed and water supply ad libitum during the experimental period from November 2002 to January 2003. These birds were divided into three groups (A, B and C) each consisting of 10 birds. Each bird of group A was vaccinated with NDV/HR and group B with BCRDV. Subsequently, primary vaccination was on 7 days and booster vaccination in 28 days of age, whereas the birds of group C kept under control. Serum samples of each of the birds of all the three groups were collected at 14 days of post-vaccination following each of the primary and booster vaccination at 23 and 44 days of age of birds. Each of the serum samples of all the three groups of birds was tested by using haemaglutination inhibition (HAI) test and results recorded that both the NDV/HR vaccine (32:40 and 23:34) and BCRDV (28:28 and 10:34) produced sera with similar serological response at two weeks after booster vaccination. The result of challenge experiment showed that the NDV/HR vaccine (100%) apparently conferred higher protection as birds than the BCRDV vaccine (50%). Therefore both the vaccines may be recommended to control ND in commercial chickens but NDV/HR vaccine could provide a practical method of control ND in rural scavenging chickens.

Key words: Serological responses, F-strain (BCRDV), NDV/HR vaccine, HI antibody titre, protection, chickens.

INTRODUCTION

Newcastle disease (ND) is endemic in Bangladesh and causes high rate of morbidity and mortality in chickens. Vaccination as a means of protecting chickens against ND is routinely practised in the endemic country like Bangladesh which are reviewed by Samaal (2000). The homogenic strain F is widely used as Baby Chick Rhabdovirus Disease Vaccine (BCRDV) as intranasal inoculation within 7 days of age, and replaced dose with F strain to growing chickens followed by avian vaccinating (RDV) are used to boost up the immunity produced by Mahseerwal strain. The reports on preparation, application and evaluation of different vaccines including conventional vaccines (BCRDV & RDV) against ND have been made locally (Crewdson et al., 1981; Saefer et al., 1981; Saisemann et al., 1986, 1940, Amin et al., 1987b; Husain et al., 1989; Saha et al., 1998). Maintaining a cold-chain, catching and handling each individual bird, skilled vaccinator and repeated doses of vaccine are required for immunization of birds with conventional vaccines. Recently ND vaccine with heat resistant V2 strain of ND virus (NDV/HR) has been developed in Australia (Brahim et al., 1981) and Malaysia (Amin et al., 1987) showed several advantages over conventional vaccines like easy to transport without a cold-chain, easy to administer, suitable for delivery by any route and any age of chickens and without need of subsequent vaccination (Bell et al., 1995; Bitwa et al., 1996a; Rahman, 1996). The comparative serological response and protection between locally produced conventional vaccines and Australian heat resistant V2 strain of NDV have been evaluated in indigenous scavenging chickens in Bangladesh (Biswas et al., 1996a). This paper further describes the comparative serological responses and protection between the locally produced conventional F strain (BCRDV) vaccine and Australian heat resistant V2 strain of ND virus (NDV/HR) vaccine in Sylhet breed commercial chickens.

MATERIALS AND METHODS

Thirty six-old-checks of Sylhet breed with the history of vaccination of parent stock against Newcastle disease (ND) were purchased from Mirpur Govt. Poultry Farm, Dhaka and reared at the experimental house of the Department of Microbiology and Hygiene, Bangladesh Agricultural University, Mymensingh during the period from November 2002 to January 2003.

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These birds were divided into three groups (A, B & C), each consisting of 10 birds. Birds were provided with commercial feed and tap-water drinking fresh water at libation throughout the experiment. The Australian blue epidemic virus (NB. vacc.) (NDVx18) vaccine was obtained from Dr. Jonathan Bell, Smoke Advisor, MIPF-2 project, and F strain, Baby Chick Rambler Delta virus (BCRDV) vaccine locally produced by the Director of Livestock Diseases (DSL) were used for the comparative trial experiment. Each bird of group A were inoculated with NDVxB and each bird of group B were inoculated with BCRDV intramuscularly at 2 doses every two times at the age of 7 and 26 days, whereas birds of group C kept as unvaccinated control. Blood samples were collected from the wing vein of each of the thirty birds, of all the three groups at the age of 6 days, i.e., one day before primary vaccination and at the age of 23 days, i.e., two weeks after the primary vaccination and 44 days, i.e., two weeks after booster vaccination. Sera were separated and stored at 29°C until tested. Each of the collected sera sample was titrated for NDV antibody using the Haemagglutination inhibition (HI) test by using reference Newcastle disease HA antigen (Nineteen Co. Ltd.). Jalan 1 per method of Allen and Gough (1974). Each of 20 vaccinated birds of group A and B, and of 10 unvaccinated control birds were challenged IM at the age of 45 days, i.e., 16 days post-booster vaccination with 1/2 ml of 10^6 EID50 NDV obtained from Department of Virology and Hygiene, B.A.U., Myersthorpe. Challenged birds were observed for two weeks twice daily. Any bird showing the symptoms of ND was recorded, and necropsy examination was conducted in all the dead birds. Results were analyzed statistically by using contingency-categorical program (SPS, Version 13).

**RESULTS AND DISCUSSION**

The mean HI antibody titre of the birds in a group A (5.74 ± 0.80) which were vaccinated with NDVx18 and group B (5.60 ± 0.79) which were vaccinated with BCRDV did not differ significantly (p > 0.05) in comparison to unvaccinated control group C (5.60 ± 0.25) at the age of 23 days, i.e., two weeks of post-primary vaccination (Table 1).

<table>
<thead>
<tr>
<th>SN</th>
<th>Vaccinated with</th>
<th>No. of birds</th>
<th>Pre-vaccination HI titre</th>
<th>Vaccinated age (days)</th>
<th>Post-vaccination HI titre</th>
<th>Challenge (% protection)</th>
<th>No. of protected</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>NDVx18</td>
<td>10</td>
<td>0</td>
<td>85-20</td>
<td>13.50 ± 2.58</td>
<td>28</td>
<td>0.10</td>
</tr>
<tr>
<td>2.</td>
<td>BCRDV</td>
<td>10</td>
<td>0</td>
<td>75-20</td>
<td>17.53 ± 3.55</td>
<td>28</td>
<td>0.10</td>
</tr>
<tr>
<td>3.</td>
<td>Control</td>
<td>10</td>
<td>0</td>
<td>90-20</td>
<td>13.05 ± 2.58</td>
<td>28</td>
<td>0.10</td>
</tr>
</tbody>
</table>

**Mean HI antibody titre of birds at 44 days of age, i.e., two weeks after booster vaccination was significantly (p > 0.01) higher in both the group A (32.49 ± 23.94) and group B (28.25 ± 10.54) vaccinated with NDVx18 and BCRDV respectively in comparison to their respective values of 23 days of age and controls (Table 1). The mean HI antibody titre in birds of group A (32.49 ± 23.94) vaccinated with NDVx18 was found insignificantly (p > 0.05) higher in comparison to group B (28.25 ± 10.54) vaccinated with conventional BCRDV. This observation did not confirm the earlier report of Biswas et al. (1996) who reported higher HI titre in the birds vaccinated with conventional vaccine (BCRDV & ROY) than in the NDVx18 vaccinated birds. However, the results of control group C showed a similar level of HI titre like primary vaccinated at 23 days of age but it did not protect the birds during the challenge experiment. The presence of HI antibody in control birds before challenge might be due to very mild exposure to NDV possibly transmitted by feeds and attendants. The challenged test revealed that the conventional BCRDV and NDVx18 vaccines protected 70% to 80% of the chicks (Table 1). NDVx18 vaccine apparently produced higher protection in birds (80%) that the BCRDV vaccine which produced 76% protection (Table 1). All birds of control group developed clinical signs of ND, after exposure to virulent NDV and died. The results of

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the present study indicate that both the locally produced conventional BC 206 and Australian NDUV JR vaccines stimulated similar and satisfactory histopathological responses that are subjected to protect a virulent challenge. Therefore both vaccines could be recommended for field use but vaccine with NDUV JR vaccine could be an easy and effective method to immunize chickens.

REFERENCES


