Short Communication

Newcastle Disease Vaccine (Komarov) by Aerosol Method

By

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Summary

Seven days old Hisex chicks were vaccinated with half dose of Komarov vaccine strain against Newcastle disease via the aerosol route. Higher antibody titre was observed by aerosol than those with the same dose via the intranasal route vaccination as tested by haemagglutination inhibition (HI) test 21 days later. Furthermore, 80% of the first group survived virulent ND virus challenge while only 60% of the second group withstood the challenge.

Introduction

Newcastle disease (ND) still constitutes a major hazard to the poultry industry in the Sudan. Yet, little attention has been given to improve vaccination techniques.

The conventional, intranasal and drinking water techniques of vaccination were not suitable to cope with the massive poultry production, because they were more expensive, time consuming and laborious to guarantee success. Partadiredja, et al., (1978), found that aerosol vaccination induce higher serologic response than drinking water and intratracheal vaccination, as well as giving the highest level of protection against challenge. This paper reports a trial for vaccinating chicks at 7-days old with Komarov strain by aerosol.
Materials And Methods

**Chickens:** Hisex layer chicks obtained from parent stock reared at the African Poultry Farm, Khartoum.

**Vaccine:** Newcastle disease vaccine of the Komarov strain produced in the Central Veterinary Research Laboratory (CVRL), Khartoum was used. Vaccine was titrated to contain $10^7$ EID$_{50}$/ml. Each lyophilized ampoule contained approximately 400 field doses of vaccine.

**Experimental design:** One hundred and fifty 7-days old chicks were divided into 3 equal groups. At 7 days of age the chicks in each group were vaccinated with ($\frac{1}{2}$) half dosage (Komarov) of ND vaccine. Group 1 chicks received the vaccine Komarov by the aerosol route, where one ampoule was reconstituted in 400-ml sterile distilled water and the chicks were placed in cardboard (70 x 80 x 150 cm) for 40 sec. using an aerosol generator apparatus (Black and Decker Model 8102, Switzerland). This apparatus has a nozzle with a diameter of 1-mm discharges a flow rate of 2.5 ml/sec. and gives approximately particles with a diameter of 1.30 mm as measured in water sensitive paper. Group 2 chicks was vaccinated by intranasal route where one ampoule of vaccine was diluted in 20 ml sterile normal saline and each bird received one drop (0.025 ml). Group 3 chicks was unvaccinated and left as control.

**Challenge test:** This was conducted in quarantine room at the Vaccine Production Unit at (CVRL).

The virus: Newcastle disease virus isolated from an outbreak (El-Obied 1974), supplied by Virology Department in a lyophilized form used in this test. 0.1 ml of $10^6$ IED$_{50}$/ml was given intramuscularly into each of 15 unvaccinated birds. 5 challenge chicks were placed in contact with 10 birds from each of the 3 groups and observed for 10 days for clinical signs and death.

**Haemagglutination inhibition (HI) test:** Antibodies were assessed for HI in groups 1, 2, and 3, 3 weeks post vaccination. Dried blood samples were collected on filter paper and processed as described by Burgh and Beard (1980). Blood samples were collected from the wing vein of birds in
groups 1, 2, and 3, and the harvested serum was stored at 4°C until used.
The (HI) test was conducted as described by Allan and Cough (1974).

Statistical analysis: The analytical technique used in the experiment was a simple randomized design, for testing the difference among the means, using methods described by Steel et al. (1960).

Results

Haemagglutination inhibition (HI): The average HI titre of sera collected from group 1 (10 sample), group 2 (10 sample) and group 3 (5 sample) of chicks 21 days post vaccination was \((5.1) \log_2\) (4) \log_2\ and birds (3.2) \log_2\ respectively. The results obtained from chicks vaccinated at 7 days old with Komarov strain indicated a significant difference \((P<0.01)\) among the 3 treatment groups (1, 2, and 3).

Challenge test: These are summarized in Table 1.

<table>
<thead>
<tr>
<th>Route of vaccination</th>
<th>No. of chicks tested</th>
<th>Survival chicks</th>
<th>Dead</th>
<th>Mortality %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aerosol</td>
<td>10</td>
<td>8</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td>Intranasal drops</td>
<td>10</td>
<td>6</td>
<td>4</td>
<td>40</td>
</tr>
<tr>
<td>Contact control</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>66.6</td>
</tr>
<tr>
<td>Non-contact control</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>100</td>
</tr>
</tbody>
</table>

Discussion

All ND vaccine virus strain, when administered to chickens and other animals such as rabbits provoke immune response (Beard and Hanson, 1984). The haemagglutination inhibition titre of sera collected from inoculated birds are indicative of protective immunity (Winterfield and Seadale, 1957).

In this experiment, the average (HI) titre of aerosol vaccination is high \((5.1) \log_2\) when half dose of Komarov strain was used at 7 days of
Rageswar and Masillamony (1993) applied aerosol vaccination with Lasota or B1 to 7 day old chicks, and found that both vaccines gave protection up to 45 days. It was indicated that this vaccine could be given with dose level lower than the usual dose and at early age without side effect and with a good immunity.

In the present study the average HI titre of sera at chicks vaccinated by aerosol method is greater than those vaccinated by intranasal method, although both methods involve the respiratory route. This might be due to the fact that the vaccine virus penetrate deeper in the respiratory system (Beard and Easter, 1967).

The mortality recorded among vaccinated chickens may be due to stress factors such as high temperature and/or dust which should be taken in consideration when administrating vaccine.

The present study concluded that Komarov strain vaccine can be used for young chicks at half dose by aerosol method.

References


