Veterinary Pharmacy in Africa
Pharmaceutical Industry and Import
The legal Aspects
The Sudanese Experience

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**Veterinary Supplies General Corporation
Khartoum – Sudan.
Short Communication

A Study of Two Routes of Administering Newcastle Disease Vaccine
at Different Environmental Conditions

By
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Summary

The study was a comparison of two routes for Newcastle disease (ND) vaccination, the intranasal (IN) and drinking water (DW) at hot and cold seasons (Summer/Winter). Using the intranasal route, no marked difference in serological immune response was observed due to difference in environmental temperatures. Yet mortality rate after challenge of vaccinated chicks was higher in Summer (15 and 20%) and was 100% among the controls.

In case of DW vaccination, there was a better immune response after initial vaccination in Summer. Apart from this, the response was comparable for both groups of chicks in all circumstances. Comparing the two routes, intranasal vaccination resulted in a better immune response under both environmental conditions. The mean HI titre (log2) were 7.0; 6.7 for the groups vaccinated by the IN route during Winter and Summer, the corresponding titres for the DW groups were 5.7 and 5.5.

Introduction

The control of Newcastle disease within a country depends on many factors. These include the virulence and diffusibility of the field virus, the density of the poultry population and management practices, the laboratory facilities available for monitoring the control programs and conducting research studies and, the provision of correct information to farmers about the use of ND vaccines (Lancaster, 1981a).
Group 3 and 4: Each of twenty chicks, which were left as unvaccinated control groups. They were challenged with the rest of chicks by Heratitis strain.

Experiment 2: The same experiment plan was repeated during summer season.

The immune response of chicks was assayed by serological response, mortality % after challenge and post challenge virus isolation from various tissues.

Post challenge and vaccination virus isolation: Swabs were taken four days post vaccination and challenge from the upper respiratory tract. Tissues were taken from the nose, trachea, kidneys, spleen, brain, long bone marrow and cecal tonsils. 10% suspensions in normal saline were prepared from all tissues and inoculated in 9-day-old embryonated chicken eggs. Presence of haemagglutinin was detected by the HA test.

Results

Intranasal vaccination: Serological response and protection during Winter and Summer was shown in Table 1.

During Winter, the mean HI antibody titer (log2) before initial vaccination, three weeks after it, two weeks post third revaccination and two weeks after challenge were 4.0, 5.5, 7.0 and 8.3 respectively. The corresponding means among the controls were 4.0, 2.2 and 0.9. All the chicks in this group died on day 5 and 6 post challenge while mortality rate among vaccinated chicks was 20%.

During Summer, the mean HI titer were 3.9, 5.20, 6.7 and 8.2. Those of the controls were 4.3, 2.1 and 0.89. Mortality rate was 100% and 15% among the controls and vaccinated chicks.

The virus could be recovered from all tissues 4 days post vaccination and challenge.

Drinking water vaccination: The serological response and protection during Winter and Summer was shown in Table 2.
water routes were the methods used for mass vaccination of young chicks in many parts of the world. On the other hand, the intranasal method was the route of choice for individual ND live vaccine administration in some places. Hence this study of comparing a mass (DW) and individual (IN) methods of vaccination was initiated.

Table 2. The serological immune response and mortality rates after D/W vaccination and challenge of chicks during winter and summer seasons

<table>
<thead>
<tr>
<th>Time at blood sampling</th>
<th>Type of vaccine and challenge strain</th>
<th>The mean HI antibody titre (log.) and SD</th>
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<tbody>
<tr>
<td>One day before initial vaccination</td>
<td>LaSota</td>
<td>season</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Winter</td>
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<td></td>
<td></td>
<td>Summer</td>
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<tr>
<td>One day before second vaccination (2 weeks post initial vaccination)</td>
<td>LaSota</td>
<td>Winter</td>
</tr>
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<td></td>
<td></td>
<td>Summer</td>
</tr>
<tr>
<td>One day before third vaccination</td>
<td>LaSota</td>
<td>Winter</td>
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<td></td>
<td></td>
<td>Summer</td>
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<tr>
<td>One day before challenge</td>
<td>Herts</td>
<td>Winter</td>
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<tr>
<td></td>
<td></td>
<td>Summer</td>
</tr>
<tr>
<td>Two weeks after challenge</td>
<td></td>
<td>Winter</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Summer</td>
</tr>
</tbody>
</table>

Table 1 showed the serological response to intranasal vaccination of chicks during Winter and Summer seasons. As seen the level of the mean maternal immunity at initial vaccination was almost similar (3.9 and 4.0) in the two groups and the controls. No marked differences were recorded among the vaccinated birds during both seasons. However, the mortality rate after challenge was 20% and 15% during Winter and Summer respectively and was 100% among the controls.
RNA Genome Profiles of Sudanese Isolates of Palyam Virus by Serogroup Using PAGE and Agarose-gel Electrophoresis

By


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Summary

The double stranded (ds) RNA (dsRNA) genome segments of the Sudanese isolates of Palyam virus serogroup were analysed by agarose gel electrophoresis and polyacrylamide gel electrophoresis (PAGE). The genome segments profiles were compared with genomes of five others palyam virus serogroup members. Both systems (PAGE and agarose gel) showed 10 dsRNA, characteristic patterns of Orbivirus serogroup. The agarose gel system showed identical profiles for all viruses within the palyam virus serogroups. However, the PAGE system was able to detect variations between different viruses within the member of the palyam virus serogroup.

The results of this study suggest that the agarose system could be used as a supportive or a complementary to facilitate tentative diagnosis of palyam virus infection in susceptible animal population. Molecular biological techniques for detection of palyam virus serogroup are yet to be developed.

Introduction

Palyam virus serogroup is a member of the Orbivirus genus in the family Reoviridae (Borden et al., 1971). The virus has a genome composed of 10 double-stranded (ds) RNA (dsRNA) segments. The genome segments code for the viral proteins (VP). Three nonstructural and seven structural VP are incorporated into the double layer protein
Short Communication

Response of 7 Day Old Chicks to Vaccination with a Mesogenic and a Lentogenic Strain of Newcastle Disease Vaccine in Drinking Water

By

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Summary

Repeated vaccination of 7-day-old chick using lentogenic and mesogenic strains of NDV vaccines in drinking water was studied. Three vaccine doses were administered at 2-week intervals followed by challenge after the last vaccine dose. No clinical signs or deaths among vaccinated birds within the two groups were observed after challenge.

The morbidity and mortality rates among the controls were 100% and 88.9% respectively with the rest of chicks showing severe signs of ND. The response to both vaccines was comparable after the first two doses while a better response was observed after the third vaccine dose of the mesogenic type.

Introduction

Most vaccination programs are designed to protect chickens against Newcastle disease (ND) from the early days of life. The frequency with which ND occurs in many concentrated poultry producing areas requires early vaccination. The latter does not give a long lasting protection, hence revaccination is a common practice to stimulate higher and more durable levels of immunity (Aini, 1990). Early vaccination is usually practiced by a mild strain while for revaccination a mesogenic strain such as Komarov strain can be used.

Several ND vaccines are available commercially, they are either attenuated living or inactivated living vaccines consisted of virulent, lentogenic and mesogenic strains. Examples of the most widely used, a
Source of vaccines:
The Komarov strain: The seed was obtained from Fannar Labs at Lebanon. It underwent 9 passages in embryonated chicken eggs in the Veterinary Research Laboratories at (Soba) Khartoum.
The LaSota vaccine strain: It was also obtained from Fannar Labs in 1976. It was passaged once in embryonated chicken eggs in Soba and freeze-dried as a seed.
The challenge strain (Herts strain): A virulent strain used in quality control experiments of Newcastle disease vaccine production.

The chicks were vaccinated at 7, 21, 42, 35 and 49 day old and challenged with the controls 2 weeks post last vaccine dose. Blood for serum was collected one day before each vaccination and two weeks after challenge. The haemagglutination- inhibiting (HI) antibody levels were recorded for all sera collected. Mortality rate was also determined for all groups of chicks (Table 1).

Post challenge virus isolation from tissues: Specimens were taken from the brain, nasal cavity, trachea, lung, spleen, long bone marrow and coecal tonsils of all vaccinated and living chicks four days after challenge. 10% suspension in normal saline was prepared from each specimen. 9-10 day old embryonated eggs were inoculated with 0.1 ml of the suspension and incubated at 37°C for 2-5 days. The allantoic fluid was then harvested and tested for the presence of the virus by the haemagglutination test (HA) (Table 2).

Results
The chickens in the two vaccinated groups showed no disease signs, no mortality and all seemed to be in good condition up to the end of the experiment.

Five days post challenge, five of the control in group 3 chickens died and another 4 were badly sick, showing typical ND signs. Three of the latter died the following day. By the 10th day post challenge only one
Discussion

The most widely known lentogenic strains used as ND vaccines include F, B1, LaSota and Ulster. Of these, LaSota vaccine has shown a greater spreading potential than B1 or F vaccines in many of its properties (Lancaster, 1966). It showed more post vaccination respiratory symptoms (Winterfield and Seadle, 1957) and is more heterogeneous (Borland and Allan, 1980). Hence the LaSota is more detrimental to the respiratory epithelium than B1 or F strain which is associated with a better immune response (Borland et al, 1980).

The Komarov strain (K) is mesogenic and is usually administered through the parental route in a dose of $10^3-10^6 50\text{ID}_5/5/\text{birds}$. It is not recommended for immunization of chickens not previously vaccinated. It is commonly used as a booster vaccine particularly in areas where the virulent type of NDV exists. It provides a long lasting immunity if properly used (Allan et al, 1978).

In places where the field virus is mild the B1 type of vaccine is used in drinking water giving immunity sufficient to protect against the natural disease. But when the field virus is more virulent and high levels of immunity are required, the mesogenic K strain is used for mature birds (Allan et al., 1978).

In the present study the LaSota and the Komarov strains were chosen for comparative vaccination of one-week-old chicks in drinking water. The results revealed that the mean HI antibody titres ($\log_2$) were 2.8, 3.1, 4.6, 7.0 and 6.8 for maternally derived antibody, 2 weeks after first, second and third vaccination with K strain and challenged, 2 weeks after last vaccination respectively. The parallel mean HI titers for chicks vaccinated with LaSota strain in DW were 2.8, 3.3, 5.0, 5.7 and 5.3. The mortality rates 5 days after challenge were 88.9% and 100% among chicks in the two control groups. Death rates were among the two vaccinated groups were 15% and 29% for chicks vaccinated with Komarov and LaSota vaccine strains respectively.


OHAWA: Health of Animals Branch, Canada Dept of Agriculture, Monograph No.3.

Short Communication

The Immune Response of Baby Chicks to LaSota Newcastle Disease Vaccine Administered at Different Concentrations in Drinking Water

By

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Summary

The response of chicks to different LaSota NDV vaccine concentrations in drinking water was studied. Immunity produced by the two higher concentrations of virus in drinking water (4 and 2 liters) was satisfactory in that complete protection against challenge was obtained compared to 0.3% and 90% mortality rates in the third and control groups respectively.

Introduction

An adequate virus titer is necessary for producing good immune response when live virus is used. It was stated by Winterfield and Seadle (1957) that a minimum titer of $10^{4.5} - 10^5$ EID$_{50}$/ml drinking water is needed when the B$_1$ and F strains of ND were used for vaccination. A titer of $10^{3.4}$ EID$_{50}$/ml was considered enough when LaSota strain was used due to the increased diffusibility of this strain into tissues. Yet, higher doses as high as $10^7$ EID$_{50}$/ml were suggested by many workers including Samberg et al (1977).


Higher virus titer was found necessary in drinking water application to compensate for loss of virus due to the effect of gastric enzymes. Shuaib, et al., (1985) reported that the oral infusion technique when applied for vaccination of chickens with NDV vaccine resulted in a high HI response when a high amount of virus was administered while doses as low as $10^2$ EID$_{50}$/ml rarely induced HI response. The investi-
Blood for serum was collected from all chicks one day prior to vaccination and at two weeks after challenge from the survivors.

**Results And Discussion**

The serological immune response was assayed by the haemagglutination-inhibition (HI) test. Results were shown in Table 1.

**Table 1:** The serological immune response of chicks vaccinated with different concentrations of LaSota NDV vaccine in drinking water.

<table>
<thead>
<tr>
<th>Time at serum sampling</th>
<th>Mean HI antibody titer (log₂)</th>
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<tbody>
<tr>
<td></td>
<td>Vaccine concentration (10⁷ EID₅₀/mL)</td>
</tr>
<tr>
<td></td>
<td>In 8 liters group 1</td>
</tr>
<tr>
<td>One day before first vaccination</td>
<td>4.2</td>
</tr>
<tr>
<td>One day before second vaccination</td>
<td>5.33</td>
</tr>
<tr>
<td>One day before third vaccination</td>
<td>3.93</td>
</tr>
<tr>
<td>One day before challenge</td>
<td>6.47</td>
</tr>
<tr>
<td>2 weeks after challenge</td>
<td>5.67</td>
</tr>
<tr>
<td>Percent mortality after challenge</td>
<td>0.3%</td>
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</tbody>
</table>

Table 1 shows that the best immune response was attained among chicks vaccinated with the highest vaccine concentration (mean 8.71 log₂). But this high titer dropped to 2.36 when a second dose of vaccine was given, which was again raised to 6.21 log₂, when another vaccine dose was administered. This result clearly confirms the fact that high residual immunity interferes with active vaccination by reducing the antibody titer in vaccinated chickens while a better response is attained when this residual immunity is low. Hence sero-monitoring to assess the immune status of chicks before vaccination is important for attaining adequate vaccine response.
References


