قسم: أمراض الدراجين
كلية: الطب البيطري - جامعة أسيوط
رئيس القسم: د. مصطفى عبد المطلب شحاته

تقييم الاستجابة المناعية والضراوة للقاحات مرض الجيوبورو الموجودة في مصر

صلاح موسى، عادل سليمان، ناهد جاد،
ابراهيم سكر، عبد اللطيف بيومي

تم تقسيم خمسة من أنواع لقاح مرض الجيوبورو الموجودة بجمهورية مصر العربية إلى أقسام تحدد مدى ضرورتها لدورة غاريس باي تلف، كذلك تحديد فعالية اللقاح في أحداث مناعة ضد المرض وكذلك احتمالات تثبيط المناعة ضد مرض السيوكاس.

تم عمل الدراسة في كتاكير تحتوي أجسام مضادة من الأم داعية لتجديد أجسام مضادة.

وبناء على هذه الدراسة تم تقسيم اللقاحات إلى مجموعتين تشمل الأولي:

لقاحات (بيجيوبورو، سيفا، فنلاند، يونيداكس) وهي لقاحات ضعيفة الضرويرة تمكنت من أحداث مناعة في الكتاكير الخالية من الأجسام المناعية ولكنها فشلت في إحداث المناعة العضوية في الكتاكير التي تحتوي أجسام مضادة للمرض.

وشملت المجموعة الثانية لقاح انترفيت، ومتوسط الضرويرة الذي أمكنه أحداث مناعة عالية في كل المجموعتين التي بها مناعة والخالية من المناعة، وبالرغم من حدوث آفات ميوكوبكية في حولة فابريس بعد التحقيق إلا أن هذه الآفات لم يكن له تأثير تثبيط المناعة ضد مرض السيوكاس.

__________________________________________________________
قسم البيانولوجيا - كلية الطب البيطري جامعة أسيوط
Immune Response and Pathogenicity of Commercially Available Infectious Bursal Disease Vaccines
(With 4 Tables)

By
S. MOUSA; A. SOLIMAN; N. GAD; I. SOKKAR and A. BAYOUMI
(Received at 21/11/1987)

Summary

Five commercially used infectious bursal disease virus (IBDV) vaccines in Egypt were subjected to characterization depending on the criteria of safety, efficacy, and immunosuppressive effects. Vaccines varied in their virulence and invasiveness to the bursa of Fabricius. Vaccines were classified into two groups, the first (Bigumboro, CEVA, vineland and univax) was efficiently immunogenic in birds possessing no detectable maternal immunity, but their immune response was not sufficient in chicks with maternal immunity. The second group (Intervet-D 78) produced moderate bursal lesions, was not immunosuppressive and highly immunogenic in both immune and susceptible chicks.

Introduction

Infectious bursal disease (IBD) a virus-caused disease of young chickens causes lymphoid depletion, degeneration of the bursa of Fabricius (BF) and suppression of humoral immune response (COSGROVE, 1962).

Currently, numerous IBD vaccines are available and represent numerous virus strains with various characteristics when applied to chickens. Commercial vaccines now available can be grouped by pathogenicity as mildly or moderately pathogenic (WINTERFIELD & THACKER, 1978).

Comparison of different vaccines in the United Kingdom (THORNTON and PATTISON, 1975) and U.S.A. (WINTERFIELD and THACKER, 1978) showed significant variation in their safety, efficacy and immunosuppressive effect.

An IBD vaccine should initiate a long lasting protective immunity against virulent strains, with a concomitant lack of injury to the immune system (NAGI, et al. 1979).

This study aimed the characterization of some vaccinal strains of IBD used in Egypt by the criteria of safety, efficacy, and immunosuppressive effects.

Material and Methods

Chickens

Hubbard chicks were obtained as one-day-old from a commercial flock, which possessed detectable antibodies against IBDV till 17 days of age. All chicks were reared in isolation and separated into their respective groups at the beginning of each experiment.

* Dept. of Pathology, Fac. of Vet. Med., Ain Shams University.
IBDV vaccines

Five commercial vaccines originated from:
1. Biogombo
2. CEVA
3. Vineyard
4. Univar
5. Interbet - D 78

Were administered in drinking water according to manufacturer’s recommendations. Newcastle disease virus (NDV) vaccine, Hinchliffe B1, NDV vaccine was used in drinking water according to manufacturer’s recommendations.

Field virus (FV)

IBD - FV was the Cu-1 pathogenic strain. Chickens were challenged with $10^{3.5}$ EID$_{50}$ (100 chicken infective dose) intracocularly.

ND - Fv was a viscerotropic velogenic NDV. Chickens were challenged with $10^{4}$ EID$_{50}$ intramuscularly.

Titration:

Titration of IBDV were done in 10-day-old chicken embryos by the CAM. The embryos were held up to 7 days postinoculation, and the deaths were recorded. Titers were determined (Reed & Muench, 1938).

SEROLOGY

Sterile inactivated serum samples were kept frozen at -20ºC until used. To assay IBDV antibodies, an agar-gel precipitin (AGP) test was carried out according to HITCHNER et al. (1975). Virus-neutralization (VN) tests were done with tenfold dilutions of virus suspensions, each dilution was mixed 1:1 with serum (pooled samples) and incubated 30 minutes at room temperature. Virus and virus-serum mixtures were inoculated in chicken embryos and the indices were determined (Reed & Muench, 1938). Antibody response to ND vaccination was evaluated by a micro hemagglutination-inhibition (HI) test (HITCHNER et al. 1975).

a) Biogombo (strain 1/65/pv)
Bio-pharmaceutical research & production lab.
Chigniolo Po-Pavia-Italy.

b) CEVA lab. Inc.
Overland park, KS 66212, France.

c) Vineyard lab.
div. of Medgate Inc.
Ni. 08160, USA.

d) Univar - BD
American scientific lab. Denver, Nebrasca 68101, USA.

(e) Interbet international B.V.
Bergem - Holland.
IBD VACCINES

Gross and histopathological evaluation of bursal lesions

Bursae were examined for gross and histopathologic lesions. Bursae were processed and stained with hematoxylin and eosin (H&E) and microscopic lesions scored from 0 to 4 based on increasing severity (SKULES, et al. 1978).

Experimental design

The study was divided into four experiments. In the first experiment, there were six groups of 20 birds each, representing two replicates of ten birds each. The first five groups received either of the used IBD vaccines at one day of age. The sixth group was unvaccinated. At 21 days, ten birds were killed, sera were subjected to AGP and VN tests to assay IBDV antibodies and bursae were subjected to histopathological examination. The other ten birds were challenged with IBD-Fv. At 3 days post-challenge (PC), all birds were killed, and necropsied, and the bursae were taken for pathological examination.

In the second experiment, seven groups were used. Birds were vaccinated as in exp. I. At 2 weeks of age, birds of the first six groups were vaccinated against ND. At 4 weeks of age, ten birds were bled and sera were subjected to HI test and the other ten birds were challenged with ND-Fv.

In the third experiment, five groups received the IBD vaccines at 3 weeks of age and the sixth group remained as unvaccinated control. At 6 weeks of age, ten birds were killed, IBDV antibodies were assayed in sera, bursae were examined histopathologically, and the other ten birds were killed, necropsied, bursae were examined histopathologically.

In the fourth experiment, seven groups were used. Birds of the first 5 groups were vaccinated at 3 weeks of age against IBDV. At 5 weeks of age, birds of the first 6 groups were vaccinated against ND. At 7 weeks of age, ten birds were bled and HI antibodies were determined, while the other ten birds were challenged with ND-Fv.

RESULTS

Exp. I.

All five IBD vaccines were not equally capable of producing sufficient protection against IBD challenge. D-78 vaccine was superior in protection as evidenced by higher antibody titers and minimal gross and histopathologic lesions in the bursae of challenged birds (Table 1).

Exp. II.

Data presented in table 2 revealed that none of the five IBD vaccines was immunosuppressive. All sera possessed as high as NDV antibody titer and birds were resistant to NDV challenge as birds of group 6 that were vaccinated against ND but not against IBD.

Exp. III.

Susceptible birds vaccinated with IBD vaccines produced detectable titers of antibodies as measured by AGP and VN tests (Table 3). None of the vaccines resulted in gross lesions of the bursa, while D-78 vaccine produced relatively higher microscopic lesions. On challenge with IBD-Fv, birds of all groups showed satisfactory rate of protection as measured by gross and microscopic lesions of bursae.

Exp. IV.

As shown from table 4, birds of all groups vaccinated against ND produced high level of HI antibodies and birds were protected against ND challenge.
From the results of the foregoing experiments, it is suggested that the used IBDV vaccines vary in their virulence and invasiveness to the bursa of Fabricius. Generally, these vaccines could be classified into 2 groups, the first is of lower virulence including (Biogumboro, CEVA, vineland and univax) vaccines of this group in spite of being efficiently immunogenic in susceptible birds, were negated by presence of maternal antibodies. The second group represented by Intervet D-78 vaccine was of higher virulence and invasiveness. Even though this vaccine produced moderate microscopic bursal lesions in susceptible birds, was not immunosuppressive as evidenced by subsequent ND vaccination responses. Similar classification of commercial IBDV vaccines was given by WINTERFIELD & THACKER, 1978 and GIAMBRONE, 1984. It could be concluded that the intermediate IBDV vaccines seem to be the vaccines of choice in commercial flocks. Because nearly all chickens will have some residual maternal antibodies at first days of age, a more invasive, yet nonimmunodepressive vaccine would be needed to overcome maternal antibody (GIAMBRONE & CLAY, 1986).

REFERENCES


Giambrone, J.J. (1984); IBD spray vaccination: If water fails, try it. Brolier Ind. 41: 52-54.


### Table (I)

Evaluation of IBDV vaccines (serologic and challenge results) in chicks with maternal immunity

<table>
<thead>
<tr>
<th>IBDV vaccines</th>
<th>AGP pos./total</th>
<th>VN index</th>
<th>detectable gross bursal lesions/total</th>
<th>Mic. bursal lesions (mean)</th>
<th>vaccinated unchallenged</th>
<th>vaccinated challenged</th>
</tr>
</thead>
<tbody>
<tr>
<td>1- Biogumboro</td>
<td>2/10</td>
<td>0.67⁶</td>
<td>0/10</td>
<td>0.4ᵃ</td>
<td>5/10</td>
<td>2.2ᵇ</td>
</tr>
<tr>
<td>2- CEVA</td>
<td>1/10</td>
<td>0.7⁰ᵇ</td>
<td>0/10</td>
<td>0.2ᵃ</td>
<td>5/10</td>
<td>2.1ᵇ</td>
</tr>
<tr>
<td>3- Vineland</td>
<td>1/10</td>
<td>1.1ᵇ</td>
<td>0/10</td>
<td>0.6ᵃ</td>
<td>3/10</td>
<td>2.3ᵇ</td>
</tr>
<tr>
<td>4- Univax</td>
<td>0/10</td>
<td>1.3⁰ᵇ</td>
<td>0/10</td>
<td>0.3ᵃ</td>
<td>4/10</td>
<td>1.3ᵇ</td>
</tr>
<tr>
<td>5- Intervet. D78</td>
<td>8/10</td>
<td>2.0⁰ᵃ</td>
<td>0/10</td>
<td>0.4ᵃ</td>
<td>0/10</td>
<td>1.1ᵃ</td>
</tr>
<tr>
<td>6- non</td>
<td>0/10</td>
<td>0.3⁰ᵇ</td>
<td>0/10</td>
<td>0ᵇ</td>
<td>10/10</td>
<td>3.1ᶜ</td>
</tr>
</tbody>
</table>

ᵃ,ᵇ,ᶜ Means with different manuscripts with the same column differ significantly (P< .05)

### Table (II)

NDV Serology and challenge

<table>
<thead>
<tr>
<th>IBDV vaccine</th>
<th>ND vaccine</th>
<th>Mean HI titers</th>
<th>NDV ch. dis./total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1- Biogumboro</td>
<td>B₁</td>
<td>23ᵃ</td>
<td>0/10</td>
</tr>
<tr>
<td>2- CEVA</td>
<td>B₁</td>
<td>20ᵃ</td>
<td>0/10</td>
</tr>
<tr>
<td>3- Vineland</td>
<td>B₁</td>
<td>18ᵃ</td>
<td>0/10</td>
</tr>
<tr>
<td>4- Univax</td>
<td>B₁</td>
<td>22ᵃ</td>
<td>0/10</td>
</tr>
<tr>
<td>5- Intervet. D78</td>
<td>B₁</td>
<td>18ᵃ</td>
<td>0/10</td>
</tr>
<tr>
<td>6- Non</td>
<td>B₁</td>
<td>26ᵃ</td>
<td>0/10</td>
</tr>
<tr>
<td>7- Non</td>
<td>No</td>
<td>0ᵇ</td>
<td>10/10</td>
</tr>
</tbody>
</table>

### Table (III)

**Evaluation of IBDV vaccines (serologic and challenge results) in susceptible chicks**

<table>
<thead>
<tr>
<th>IBDV vaccines</th>
<th>Vaccinated unchallenged</th>
<th>Vaccinated challenged</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AGP</td>
<td>VN index</td>
</tr>
<tr>
<td></td>
<td>pos./total</td>
<td></td>
</tr>
<tr>
<td>1- Biogumboro</td>
<td>4/10</td>
<td>1.60</td>
</tr>
<tr>
<td>2- CEVA</td>
<td>6/10</td>
<td>1.5</td>
</tr>
<tr>
<td>3- Vineland</td>
<td>5/10</td>
<td>1.67</td>
</tr>
<tr>
<td>4- Univax</td>
<td>6/10</td>
<td>1.7</td>
</tr>
<tr>
<td>5- Intervet-D78</td>
<td>10/10</td>
<td>2.67</td>
</tr>
<tr>
<td>6- Non</td>
<td>0/10</td>
<td>0.18</td>
</tr>
</tbody>
</table>

### Table (IV)

**NDV serology and challenge**

<table>
<thead>
<tr>
<th>IBDV vaccine</th>
<th>ND vaccine</th>
<th>Mean HI titer</th>
<th>NDV ch. dis./total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1- Biogumboro</td>
<td>Hilchner B&lt;sub&gt;1&lt;/sub&gt;</td>
<td>36&lt;sup&gt;a&lt;/sup&gt;</td>
<td>0/10</td>
</tr>
<tr>
<td>2- CEVA</td>
<td>&quot;</td>
<td>34&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1/10</td>
</tr>
<tr>
<td>3- Vineland</td>
<td>&quot;</td>
<td>32&lt;sup&gt;a&lt;/sup&gt;</td>
<td>0/10</td>
</tr>
<tr>
<td>4- Univax</td>
<td>&quot;</td>
<td>28&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1/10</td>
</tr>
<tr>
<td>5- Intervet-D78</td>
<td>&quot;</td>
<td>31&lt;sup&gt;a&lt;/sup&gt;</td>
<td>0/10</td>
</tr>
<tr>
<td>6- Non</td>
<td>&quot;</td>
<td>39&lt;sup&gt;a&lt;/sup&gt;</td>
<td>0/10</td>
</tr>
<tr>
<td>7- Non</td>
<td>Non</td>
<td>0&lt;sup&gt;c&lt;/sup&gt;</td>
<td>10/10</td>
</tr>
</tbody>
</table>