Laboratory Clinical Study

Anatomopathological analysis of lymphoid organs and serological analysis of chickens vaccinated with a turkey Herpesvirus vectored vaccine containing the VP2 gene of the IBD virus (VAXXITEK® HVT+IBD)

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Summary

The purpose of this trial was to evaluate macroscopically and microscopically the bursa, and antibodies against IBD in commercial broilers, when vaccinated at 18 days of embryonation or hatched, with vectored commercial vaccine. All groups at 18 days were challenged with IBD intermediate strain. Mortality, gross and microscopic lesion, bursal index, clinical signs and immune response (ELISA) were evaluated. Some morphological characteristics and benefits were founded inherent to vaccination.
Introduction

The IBD virus infects the lymphocytes of the cloacal bursa producing immunosuppression. The live vaccines against the IBD replicate in the cloacal bursa producing macroscopic and histological lesions, as well as serological response. The HVT virus permanently infects the bursal lymphocytes. Therefore, the HVT virus, containing the VP2 gene, presents the antigen of IBD, without causing bursal lesions.

The objective of this study is to evaluate the serological response and the macroscopic and histological integrity of the bursa in birds vaccinated with a HVT vectored IBD vaccine, administered both in ovo and subcutaneously, and challenged with an IBD virus of intermediate virulence at 18 days of age.

Methods and material

150 embryonated chicken eggs and 150 one day-old broiler chickens were divided into three groups respectively. The birds were vaccinated with a vectored vaccine or bivalent vaccines in ovo at 18 days of embryonation or at one day of age by subcutaneous route.

Turkey herpesvirus vectored vaccine contains the VP2 gene of IBD virus (VAXXITEK® HVT + IBD) (Merial Limited). Bivalent Vaccine is composed of HVT and IBD (Lukert strain) (Merial Limited).

BURSA-VAC® (Schering-Plough Animal Health, Millsboro, Delaware, USA); an IBD vaccine strain of

similar intermediate virulence to the field strains in Mexico, with a titre EID 50% = 10^{4.5} was used as the challenge virus.

Serums for analysis were taken for ELISA. The morphometric index (MI) was determined by dividing the weight of the cloacal bursa by the weight of the bird (Table 2). The histological study was done and the diameter of the lymphoid follicles of cloacal bursa was measured.

Results

The ELISA titers (Figure 1) at 23 and 31 days of age, the morphometric index (Figure 2) and the diameter of the lymphoid bursa follicles (Figure 3) at 31 and 43 days of age were higher in the birds vaccinated with the vectored vaccine (P<0.05). At 43 days of age, the birds vaccinated with bivalent vaccine in ovo had higher titers (P<0.05) (Figure 1).

Conclusions

Maternal antibodies did not influence the serological response produced by the vectored vaccine or the bivalent vaccine. In the face of the challenge, the vectored vaccine had a better serological response than the bivalent vaccine. Also, the vectored vaccine resulted in better bursal integrity both macroscopically and histologically.

References


Morales O. & Boclaar W., 1993, Morphometric relations Bursa/Spleen in Infectious Bursal Disease, 42nd WPDC, Sacramento, CA, United States.

Table 1. Treatments by age, type of vaccine and vaccination route.

<table>
<thead>
<tr>
<th>Group</th>
<th>Date of vaccination</th>
<th>Vaccine</th>
<th>Dose Bird / age</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Day old</td>
<td>HVT + IBD (bivalent)</td>
<td>0.2 mL</td>
</tr>
<tr>
<td>B</td>
<td>Day old</td>
<td>HVT + IBD (vectored vaccine)</td>
<td>0.2 mL</td>
</tr>
<tr>
<td>C</td>
<td>Day old</td>
<td>Marek vaccine diluent</td>
<td>0.2 mL</td>
</tr>
<tr>
<td>D</td>
<td>18.5 incubation days</td>
<td>HVT + IBD (bivalent)</td>
<td>0.05 mL</td>
</tr>
<tr>
<td>E</td>
<td>18.5 incubation days</td>
<td>HVT + IBD (vectored vaccine)</td>
<td>0.05 mL</td>
</tr>
<tr>
<td>F</td>
<td>18.5 incubation days</td>
<td>Marek vaccine diluent</td>
<td>0.05 mL</td>
</tr>
</tbody>
</table>
Table 2: Analysis of histopathology and serology of vaccinated broiler chickens by in ovo and sub-cutaneous routes.

<table>
<thead>
<tr>
<th>Evaluation</th>
<th>Samples</th>
<th>Quantity</th>
<th>Age (days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serology</td>
<td>Serum</td>
<td>10</td>
<td>3, 12, 23, 31, and 43</td>
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<tr>
<td>Morphometric index</td>
<td>Cloacal bursa, thymus, and spleen</td>
<td>5</td>
<td>12, 24, 32 and 43</td>
</tr>
<tr>
<td>Histopathological examination</td>
<td>Cloacal bursa, thymus and spleen</td>
<td>5</td>
<td>3, 12, 23, 31, and 43</td>
</tr>
</tbody>
</table>

Figure 1. Titres of ELISA of immunized birds in ovo and sub-cutaneous routes with vectored and bivalent vaccines, challenged at 18 days with virus of IBD.

Bars with different letters show statistical differences (P<0.05).
Blue: Bivalent vaccine.
Red: Vectored vaccine.
Green: Control.

Figure 2. Morphometric index of immunized birds in ovo and sub-cutaneous routes with vectored and bivalent vaccines, challenged at 18 days with virus of IBD.

Bars with different letters show statistical differences (P<0.05).
Blue: Bivalent vaccine.
Red: Vectored vaccine.
Green: Control.
Figure 3: Diameter of the lymphoid bursa follicles of immunized birds *in ovo* and sub-cutaneous routes with vectored and bivalent vaccines, challenged at 18 days with virus of IBD.

Bars with different letters show statistical differences (P<0.05).
Blue: Bivalent vaccine.
Red: Vectored vaccine.
Green: Control.