Safety and Efficacy Comparison of an Immune Complex IBD Strain V877 Versus Live Intermediate IBD and RHVT–IBD Vaccines Against a Local Isolate of vvIBDV

M.H.B. Bejo[1], D.W. Choe[2], K. Yip[3], CK Mah[4]
[1]Faculty of Veterinary Medicine, Universiti Putra Malaysia, Malaysia
[2]WVPA MALAYSIA BRANCH
[3]Rhone Ma Malaysia Sdn Bhd
[4]Zoetis (Thailand) Limited

Gumboro Immune Complex vaccines were developed by combining a live Infectious Bursal Diseases (IBD) vaccine strain with IBD Virus (IBDV)-specific antibodies. Gumboro disease is an endemic poultry disease in Malaysia. Therefore, it is imperative to understand the efficacy of a vaccination programme using Gumboro Immune Complex vaccines to protect layer-type/leghorn pullets against challenges by very virulent IBDV local isolates. The main objective was to evaluate the safety and efficacy of an immune-complex IBD V877 vaccine* in comparison with live IBD vaccines and an HVT-IBD vector vaccine against a challenge from a vvIBDV Malaysian isolate (UPM0081) amongst specific pathogen free (SPF) layer pullets.

340 day old SPF birds were randomly divided into eight groups namely A, ACH, B, BCH, C, CCH, D and DCH. Group A and ACH were vaccinated with 1 dose of immune-complex IBD strain V877 via the subcutaneous route at day old. Groups B and BCH were vaccinated twice with a live IBD vaccine via drinking water: Bursine®-2 (intermediate) at 8 days old and Bursa® F (intermediate plus) at 14 days old. Group C and CH were vaccinated with 1 dose of HVT-IBD via subcutaneous route at day old. Group D and DCH did not receive any IBD vaccine and acted as the non-vaccinated control groups. At 28 days of age, 20 chickens were randomly selected from ACH, BCH, CCH and DCH to be orally challenged with the local vvIBDV field isolate at the approximate dose of 10^5 EID_{50}/1.0mL (Nafi'u et al., 2017). To address the study objective, parameters such as (1) signs of infection, mortality and morbidity, (2) bursal of Fabricius weight (3) histological lesion scoring of the bursa and (4) serology pattern using conventional and VP2 targeted ELISA kit were routinely monitored and recorded.

Signs of infection, mortality and morbidity: Against vvIBDV (UPM0081) challenged at 28 days of age, all the vaccinated groups showed full protection (100% or 20/20) with the absence of clinical signs nor mortality. However, all the birds in the non-vaccinated group (DCH) exhibited signs of vvIBDV infection (ruffled feathers, inactive, poor appetite to anorexic, soft feces, diarrhea and recumbent prior to death) with 35% of cumulative mortality.

Bursal of Fabricius weight and histological lesion scoring: The bursal weight in the control Group (D) was significantly higher ($p<0.05$) at day 14 when compared to the vaccinated Groups A and C (Table 5; Figure 2). The weight of the organ remained high ($p<0.05$) at days 28 and 38 when compared to the Groups A and B. Overall, the bursa weight in the vaccinated Groups A and B were higher than the Control group (Group DCH) at day 38 or 10 days post vvIBDV challenge, although it was without statistical significance ($p>0.05$), except for Group C.

Histological lesion scoring of the bursa: The bursal lesion scoring in all the vaccinated vvIBDV challenged birds in Groups ACH, BCH and CCH remained mild to moderate or almost normal at 10 days post challenge or 38 days of age. However, the follicles of the Bursa of Fabricius were fully filled with health lymphoid cells. In contrast, severe lesion scoring was recorded in all birds from the non-vaccinated group (DCH). The bursa follicles were severely atrophied and hardly present. The bursa parenchyma was filled with fibrous tissues, and cystic follicles and epithelial cells were commonly observed.

Serology pattern using conventional and VP2 targeted ELISA kit: Using conventional ELISA, SPF chicks vaccinated with immune complex vaccine induced the highest IBD antibody titer at 14 days of age and remained high at days 28 and 38 as those vaccinated with Bursine 2 and Bursa F. The IBD antibody titer in the chickens vaccinated with HVT-IBD remained lower when compared to both other vaccines in the trial. Using the VP2 targeted ELISA kit, the immune complex vaccinated group still showed high IBD antibody titre at 28 and 38 days of age. As for HVT-IBD vaccinated group, the serology pattern was generally higher and representative as compared to conventional ELISA. In summary, findings from the present study have substantiated the safety and efficacy claims of the immune complex IBD strain V877 in all types of poultry even when the MDA level is low. The vaccine is able to induce overall higher IBD antibody titers as compared to HVT-IBD or 2 field IBD program.

*Poulvac® Magniplex™ was registered in AE, AM, BR, EC, ID, LB, MY, PE, PH, TH, UA, VN, and ZA. For updated information about product availability and marketing authorizations, please contact local Zoetis representatives.

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