Efficacy of a bivalent Newcastle disease and infectious bronchitis vaccine against a challenge of genotype VII Newcastle disease virus

Sheau W.T.[1], Rahman O.A.[1], Yip K.[2], Lee M.[3] & Lemiere S.[4]

[1] *Universiti Putra, 43400 UPM Serdang Malaysia*
[2] *Rhone Ma Malaysia Sdn. Bhd., 46100 Petaling Jaya Malaysia*
[3] *Merial Asia Pte. Ltd., 46100 Petaling Jaya Malaysia*
[4] *Merial S.A.S., 69007 Lyon France*

An increase in the incidence of velogenic viscerotropic Newcastle disease (ND) in Malaysia involving high morbidity and mortality even in routinely vaccinated flocks was observed beginning from 2009. The causative ND virus was identified to belong to the genotype VII group. These raised doubts on the protection provided by current existing live ND vaccines against the prevalent genotype VII field virus.

Material & methods

This trial investigates the efficacy of a live bivalent ND and infectious bronchitis (IB) vaccine (AVINEW+H120) against the current genotype VII field virus in Malaysia. The ND component of this bivalent vaccine is derived from the VGGA strain which is a genotype II ND virus. This strain is avirulent and has both enteric and respiratory tropisms in chickens. The IB component of this bivalent vaccine is derived from the H120 strain. The challenge virus, NDV IBS002/2011, was isolated from an outbreak in Malaysia in 2011 and is classified as velogenic NDV with two pairs of basic amino-acids, lysine (K) or arginine (R), at the fusion (F) cleavage site at residues 112 to 113 and 115 to 116, as well as a phenylalanine at residue 117 (GenBank accession no: JQ809695). The experimental design included 3 groups of SPF birds (G1-G3). Group G3 was bled and euthanized at day old for serological purposes. Group G1 was vaccinated at day old with a single dose of AVINEW+H120 via eye drop. The last group, G2, was left unvaccinated as positive controls. At day 21, G1 and G2 were challenged via the intra-ocular route with 10^5 EID_{50} of the challenge virus. The birds were then monitored daily for clinical signs and mortality up to 10 days post-challenge (Table 1).

Results / Discussion

Only 1 out of 20 birds in G1 exhibited transient mild depression starting from day 2 post challenge which lasted for 3 days. This bird recovered at day 5 and remained clinically normal until the end of the 10 days observation period. No mortality was observed in G1 by the end of the observation period. In contrast, all the birds in G2 displayed severe depression starting from day 2 post challenge. 100% mortality was recorded by day 5 post challenge (Table 2) (Figure 1). Therefore, this trial demonstrated that AVINEW+H120 provided good heterologous protection against a velogenic genotype VII challenge.

Key words

Newcastle disease, infectious bronchitis, live combined vaccine.

Table 1: Groups of study.

Group	Vaccination at day old	Route	Number of chickens challenged at D21
G1	AVINEW + H120	Eye drop	20
G2	Unvaccinated controls	Not applicable	15

Table 2: Post-ND challenge results.

Group	Vaccination at day old	Number of chickens challenged at D21	Clinical signs	Mortality	Protection
G1	AVINEW + H120 (eye drop)	20	1/20 (5%)	0/20 (0%)	19/20 (95%)
G2	Unvaccinated controls	15	15/15 (100%)	15/15 (100%)	0/15 (0%)

Figure 1: Cumulative mortality (%) monitoring.