

Efficacy of a live Newcastle disease vaccine against a genotype VII velogenic viscerotropic Newcastle disease challenge

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This study evaluates the efficacy of a live Newcastle disease vaccine (AVINEW) applied alone or in conjunction with an inactivated Newcastle disease vaccine (GALLIMUNE® ND) against a genotype VII velogenic viscerotropic Newcastle disease (vvND) virus isolated from an outbreak in a broiler farm experiencing almost 100% mortality in vaccinated flocks. The live vaccine strain, a genotype II ND virus, is avirulent and has both enteric and respiratory tropisms in chickens where it is used commercially as a live vaccine. The inactivated vaccine is derived from the Ulster 2C strain which is classified as a genotype I virus.

Material & methods

SPF birds were divided into 6 treatment groups (Table 1). Group 1 received a single dose of live ND vaccine at day old by coarse spray. Group 2 received a day old vaccination similar to Group 1 but this was followed by a second single dose of live ND vaccine at day 11 by eye drop. Group 3 at day old was given a one third dose (0.1mL) of the inactivated oil vaccine, subcutaneously together with a single dose of live ND vaccine by coarse spray. Group 4 had an identical day old vaccination as the Group 3 but in addition was given a booster single dose of live ND vaccine at 11 days of age via the eye drop route. Group 5 received a single dose of live ND vaccine at day old by coarse spray. This was followed by a one third dose (0.1mL) of the inactivated oil vaccine given subcutaneously at day 5. At day 11, the birds received a booster single dose of live ND vaccine via eye drop. The sixth and final group was designated as positive unvaccinated controls.

Results / Discussion

Serology by haemagglutination inhibition test showed seroconversion in all vaccinated groups before challenge (Table 2). At day 21, all the groups were infected with the challenge virus at $10^{5.0}$ EID₅₀ per bird and observed for 14 days. The positive controls birds died began to show manifest clinical signs and mortality 3 days post challenge. By the fourth day all the control birds has died (Figure 1). All the vaccinated groups (G1-G5) showed 100% protection against the challenge (Table 3). None of the birds in the vaccinated groups exhibited any clinical signs or died during the 14 days observation period post challenge. Therefore, this study demonstrated that AVINEW, a

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live Newcastle disease vaccine, with or without an inactivated vaccine, GALLIMUNE ND, was efficacious against a genotype VII vND challenge.

Key words

Newcastle disease, genotype VII, live vaccine.

Table 1: Groups of study.

Group	Day-old vaccination program	D5	D11	Number of ND challenged chickens
G1	AVINEW (CS*)	-	-	20
G2	AVINEW (CS)	-	AVINEW (ED***)	20
G3	AVINEW (CS) + GALLIMUNE ND (SC**)	-	-	20
G4	AVINEW (CS) + GALLIMUNE ND (SC)	-	AVINEW (ED)	20
G5	AVINEW (CS)	GALLIMUNE (SC)	AVINEW (ED)	20
G6 (control)	-	-	-	10

*CS = coarse spray; **SC = subcutaneous; ***ED = eye drop.

Table 2: Serological monitoring.

Group	Day-old vaccination program	D5	D11	Mean HI* titres (log ₂)		
				D1	D11	D21
G1	AVINEW (CS)	-	-	-	7.12	8.80
G2	AVINEW (CS)	-	AVINEW (ED)	-	6.08	7.79
G3	AVINEW (CS) + GALLIMUNE ND (SC)	-	-	-	6.40	9.76
G4	AVINEW (CS) + GALLIMUNE ND (SC)	-	AVINEW (ED)	-	6.29	9.92
G5	AVINEW (CS)	GALLIMUNE (SC)	AVINEW (ED)	-	5.36	10.28
G6 (control)	-	-	-	1.40	1.40	1.27

*Hemagglutination inhibition.

Table 3: Post-ND challenge results.

Group	Day-old vaccination program	D5	D11	Post-ND challenge	
				Clinical signs or mortality / challenged	% of protection
G1	AVINEW (CS*)	-	-	0/20	100%
G2	AVINEW (CS)	-	AVINEW (ED***)	0/20	100%
G3	AVINEW (CS) + GALLIMUNE ND (SC**)	-	-	0/20	100%
G4	AVINEW (CS) + GALLIMUNE ND (SC)	-	AVINEW (ED)	0/20	100%
G5	AVINEW (CS)	GALLIMUNE (SC)	AVINEW (ED)	0/20	100%
G6 (control)	-	-	-	10/10	0%

*CS = coarse spray; **SC = subcutaneous; ***ED = eye drop.

Figure 1: Cumulative mortality (%) monitoring.

