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Evaluation of Two Different Vaccination Programs Against Newcastle Disease in Nineveh Province

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Abstract: Two different vaccination programs against Newcastle Disease (ND) in Nineveh province was studied. Results showed that the first group, which vaccinated (live and inactivated) NDV with interval days was give high antibody titres at 18th days post vaccination with significantly difference ($p<0.05$), in comparison with the second vaccinated group that has NDV (live and inactivated) as well as live IBDV the antibody titres was significantly difference ($p<0.05$) at 28th days post vaccination. Serological antibody titres were determined to study the correlation between the 2 different vaccinated groups using ELISA test. It was concluded that the 2 different vaccinated programs show different immune response to ND.

Key words: ND, vaccination, vaccine efficacy, ELISA test, broiler, IBVD

INTRODUCTION

Newcastle disease is world wide regarded as one of the most important diseases of poultry and other birds (Dashab *et al*., 2007; Hassanzadeh and Bozorgmerifard, 2004) the incubation period of ND after natural exposure has been reported to vary from 2-15 days. The time for appearance of the symptoms varies, according to virulence of infected ND virus, host species, age, immune status, infection with other organisms, environmental condition and the route of exposure (Alexander, 2003). ND is enzootic in some areas of the worlds, however especially where rural chicken breeding is dominant ND has become endemic, control is possible but requires an efficient application of vaccines (Hassanzadeh and Bozorgmerifard, 2004; Chandana *et al*., 2007; Rahman *et al*., 2002; Osman and Ucan, 2003). The immune system of poultry is a complex network of different cell types and soluble factors that give rise to an effective response to pathogenic challenges. Proper and efficient function of the immune system is directly associated with poultry health (Sarker *et al*., 2000). Vaccination programs should include the sequential use of progressively more virulent live vaccine strains or live vaccine followed by inactivated vaccines (Alexander, 2003; Sarker *et al*., 2000; Marangon and Busan, 2006; Adwar and Lukesova, 2008).

The using of another type of viral vaccine as Infectious Bursal Disease Vaccine (IBDV) effect on protection against ND. IBDV is an acute contagious viral disease affecting young chickens and is characterized by massive damage to the bursa of fabrics and by immuno suppression (Zaheer and Akhter, 2003; Cardoso *et al*., 2006). This antigenic variation can include failures on the vaccination processes due to the antigenic structure between vaccinal and wild viruses (Cardoso *et al*., 2006; Kulikova *et al*., 2004; Quang *et al*., 2002).

The objective of the study presented here was to investigate the immunefficacy of 2 different vaccinal programmes against ND which applicated in some farms of Nineveh Province.

MATERIALS AND METHODS

Total of 120 days old broiler chicks were housed and kept adlbidu feed on concentrated feed. These chicks were not given any types of antibiotics or vaccine and were divided into three groups each having 40 birds.

First group, 40 chicks were vaccinated at one day, 10, 16 and 21th days old with 0.1 mL ND vaccine orally and 3 day old with 0.1 mL inactivated ND vaccine subcutaneously.

Second group, 40 chicks were vaccinated at 1 day, 11 and 21th days old with ND vaccine orally and in 3 day with inactivated ND vaccine s/c and this group has another type of vaccine that live infectious bursal viral disease vaccine IBVDV in 8 and 16th days of old.

Third group, 40 chicks remain as control group without any vaccination.

Blood collection and serological test: Blood serum samples from all groups were collected at 1st, 8th, 18th and 28th days of age. The serum samples were stored at -20°C. The serum samples were analyzed by indirect ELISA (Enzyme Linked Immunosorbent Assay) to detection antibodies against ND (Cardoso *et al*., 2006; Kulikova *et al*., 2004; Al-Shahery *et al*., 2008).

Challenge test: All groups were challenged with virulent ND virus ($2\times10^{6.5}$ EID_{50}/0.2 mL) orally at the age of 3 weeks.

Protection: Was evaluated by the calculation of percent protected chickens after challenging?

Post mortem: Observation the gross examination changes after PM was performed on different organs (spleen, Proventriculus, Duodenum, Cecal tonsil and Trachea) and the pathological changes were reported using semi quantity.

Statistical analysis: Data of all experiments were expressed as mean±SD. Data were compared by two way analysis of variance. Significant differences determined by Duncan's multiple range test. All statistical analysis performed by sigma stat (Jandel scientific software V 3.1). $p<0.05$ was considered as statistically significant.

RESULTS AND DISCUSSION

Results of titers antibody ND in different groups are shown in Table 1. Significant difference was found between the antibody titres of vaccinated groups at 28th days post vaccination and significant difference was found between the vaccinated groups compared with control group in 8, 18 and 28th days of age. In contrast, the antibody titres was significant in first group after 8th days of vaccination and after 18th days post vaccination in second group.

The antibody titres was significantly different among the control in 1st, 8th, 18th and 28th days of age. The challenge with virulent NDV virus gave (100%) highest mortality in the non vaccinated group, the chickens of this group present after PM sever gross lesions in different organs, while the vaccinated group gave high protection rate with mild changes after post mortem. When compare with vaccinated groups the protection rate was higher in first vaccinated group (100%) while second group protection was (70%) (Table 2).

The result of the present study revealed that antibody titres of two different significantly, this variation was due to application of two different antigen types of vaccines (ND and IBD) as a reason for this low level of protection in vaccinated birds. The combination of NDV and IBDV impaired immune competence due to immune-suppressive effect of IBDV on immune response (Rahman *et al*., 2002; Marangon and Busan, 2006; Quang *et al*., 2002) birds are stressed by two types of antigen (Sarker *et al*., 2000; Marangon and Busan, 2006; Cardoso *et al*., 2006; Bouzoubaa *et al*., 2005) and this reduction the chance for stimulation of immunity against NDV (Giambrone and Clay, 1986) also poor quality of vaccine must be always be considered (Quang *et al*., 2002) therefore, sufficiently high antibodies titres were produced from first vaccinated group that give protection against challenging ND virus compared with the second vaccinated group (Rahman *et al*., 2002; Kulikova *et al*., 2004; Al-Shahery *et al*., 2008; Bouzoubaa *et al*., 2005; Giambrone and Clay, 1986) the application of two types of vaccine (live, inactivated) in first vaccinated group lead to highly. Significant antibody titres in 18th age post vaccination.

The availability of different types of vaccines could be one of the major limits to the implementation of effective vaccination programmes (Alexander, 2003; Osman and Ucan, 2003; Adwar and Lukesova, 2008; Bermudez and Stewart, 2003) maternal antibody neutralize the introduced vaccine antigen rendering the vaccine ineffective in first days (Awang *et al*., 1992) then the inactivated vaccines induce high and long lasting immunological response after administration of live vaccine (Osman and Ucan, 2003; Adwar and Lukesova, 2008; Bermudez and Stewart, 2003; Lukert and Saif, 2003; Sharma, 2003) the high level of maternal derived antibody of control group (third group) declined gradually within 1-28th days of age and accepted with there of (Dashab *et al*., 2007; Rahman *et al*., 2002; Sarker *et al*., 2000; Al-Shahery *et al*., 2008; Bouzoubaa *et al*., 2005; Vui *et al*., 2002; Reynolds and Maraqa, 2000; Jennifer *et al*., 2003).

Table 1: ELISA antibody titres against ND virus in experimental groups

	NDV antibody titers (Mean±SD)			
Groups	1st day	8th day old	18th day old	28th day old
1st	1008±38.8aA	1150±86.6aA	1345±79bA	2984±164.2CA
2nd	1012±78BA	1282±21.2aA	1423±35.3aA	2791±198.2CB
3rd	1004±37.8aA	890±74.5 a,bB	789±76.7bB	620±528CC

a-c: Values within a raw followed by different letters are significantly different ($p<0.05$); A-C: Values within a column followed by different letters are significantly different ($p<0.05$)

Table 2: The protection rate and mortality with post mortem lesion indifferent groups

	Organs						
Groups	Spleen	Proventriculus	Duodenum	Cecal tonsils	Trachea	Mortality	Protection (%)
1st	++	-	-	-	+	0/10	100
2nd	++	-	++	++	+	3/10	70
3rd	+++	+++	+++	+++	++	10/10	0

-: No change; ++: Moderate congestion; +: Mild congestion; +++: Sever inflammation with bleeding

CONCLUSION

The level of protection of vaccinated birds was efficacy for immunization when related to the type of vaccine used as well as to the intervals between the route of vaccination to give adequate protection against ND and IBD with reduce mortality and increase stimulate of immune system (Osman and Ucan, 2003; Marangon and Busan, 2006; Bouzoubaa *et al*., 2005). Also vaccines cannot realistically be expected to provide 100% protection for birds, vaccinated under field conditions, disease prevention management technique and hygienic practices at the farm level are of fundamental importance in minimizing the risk of disease introduction and the related economic impact (Osman and Ucan, 2003; Marangon and Busan, 2006; Bouzoubaa *et al*., 2005).

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