

## **EVALLUTION OF TWO VACCINATION SCHEDULES FOR NEWCASTLE AND INFECTIOUS BURSAL DISEASE**

Ali, A.S.AL-Mayah; Harith ,A.N-ALTaher; Qasire, A.K.; Nadim, A.S.;  
Dina, H.S. and Ehsan, A.H

Department of Pathology and Poultry Diseases Collage of Veterinary Medicine,  
Basrah University, Basrah,Iraq.

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### **ABSTRACT**

The aim of this study was to determine the interaction between the Newcastle disease and Infectious bursal disease vaccines commonly used in the field to control these two important viral diseases. Haemagglutination inhibition (HI) test was employed to measure the antibody titers in chicks sera to ND.IBD vaccine was showed to have adverse effect on the ND vaccine were as the reverse was not true. The results obtained also revealed that better antibody response against ND vaccine was detected when ND vaccine was administered before IBD vaccine. The deleterious effect of IBD vaccine on antibody levels against ND vaccine was low when IBD vaccine was administered at 14 days of age as compared to 7 days of chicken age. No great variation in the antibody titers when chicks were administered ND vaccine containing LaSota or Hitchner B1strain of the virus were observed, although slight better antibody responses were noted for LaSota over HitchnerB1 strain. Vaccination of chicks with ND vaccine of LaSota strain at 7 days followed by vaccination with IBD vaccine at 14 days yielded better antibody titers than Hitchner B1.

### **INTRODUCTION**

Infectious bursal disease (IBD) mediated by infectious bursal disease virus (IBDV), causes significant losses to the poultry industry .IBDV multiplies rapidly in developing B lymphocytes in the bursa of fabricius, leading to immunosuppression and increased susceptibility to other diseases. Classical virulent strains cause bursal inflammation and sever lymphoid necrosis in infected chickens, resulting in immunodeficiency and mortality (Boon-leong, *et al.*,1999).

The virus has a predilection for lymphoid tissue, especially the bursa of fabricius. Its most important effect is to cause a severe, prolonged immunosuppression of chickens infected at an early age. (Goddard *et al.*1994).

IBD is an acute highly contagious and immunosuppressive disease in young chickens caused by IBDV. The target cell of IBDV is a developing B-lymphocyte located within the bursa of fabricius (Lukert and Saif, 1997). IBD causes significant economic losses to the poultry industries due to high mortality and immunosuppression (Van den Berg, 2000). Severe and prolonged immunosuppression induced by the virus leads to concurrent viral and bacterial infections along with vaccination failure (Bhatia *et al.* 2003). The

immunosuppression enhances the susceptibility of chickens to other infections and interferes with effective vaccinations against other diseases. (Phong *et al.*, 2003).

The immunosuppressive effects of IBDV had previously been reported to adversely affect vaccination against ND (Allan *et al.*, 1972; Faragher *et al.* 1974; Giamborone *et al.*, 1976) as well as other viral infections (Li-Weijen and Cho, 1980; Yuasa *et al.*, 1980). The objective of the present study is to determine the interaction between ND and IBD vaccines usually applied in the field to control these diseases using different vaccination schedules.

## MATERIALS AND METHODS

Fifty broiler chicks of one day old were obtained from a local hatchery. They were reared on floor in the experimental house at the Collage of Veterinary Medicine, Basrah University. These birds were divided into 5 equal groups A, B, C, D and E. Two live attenuated lentogenic ND vaccines were used. LaSota (0.4 ICPI) and B1 (0.2 ICPI) were administered via drinking water route. Live IBDV vaccine D78 intermediate strain was also used. All these vaccines were available in the market and they were purchased from the Veterinary Clinic in Basrah province. For vaccination of chickens, water was withheld from the birds for about 3 hours before the vaccine application. The ND (B1 and LaSota) and IBD vaccines were given to the birds in a fresh distilled water at a concentration carefully calculated to give each birds a sufficient dose according to the manufacturers instruction. The design of the study is shown in table 1:

Table 1: Design of the study

Chicken age in day at vaccination	Vaccination schedule for each group				
	A	B	C	D	E
7	ND B1	ND LaSota	IBD	IBD	<b>CONTROL</b>
10	_____	_____	ND B1	ND LaSota	
14	IBD	IBD	_____	_____	

All the vaccines were received in a freeze dried state and dehydrated just prior to use as recommended by the manufacturer. (Ali *et al* 2004).

The blood was collected at 14 days after last vaccination. The samples were taken from the wing vein using 5 ml disposable syringe. Collected blood then separated by centrifugation. The sera after separation were stored at - 20 c° till needed. The HI test was carried out according to the well-established principles and protocol of Allan *et*

*al.*(1978). Two-fold serial dilution of serum samples were made with normal saline in micro titer plates. volumes of 0.25 ml of NDV antigen (LaSota live vaccine of one-thousand vial dissolved in 5 ml normal saline) containing 4H units were added in each well of the plate. Tow rows of wells were left as controls , the first row contained NDV antigen without serum (negative control) and the second row contained normal saline with RBC<sub>s</sub> (reagent control ). The plate was shaken and left for 30 minutes at room temperature before 0.25 ml of chicken RBC<sub>s</sub> to each well was added. The plate was then rotated and left for 20 minutes or till of H Aappeared. HI titers were expressed as the reciprocal of the highest dilution that causes 50% inhibition of agglutination. The base two logarithmic titer was then calculated as the mean of 5 birds for each group.

## RESULTS AND DISSCUSSION

The antibody titers was detected by HI test in all groups of chicks following vaccination with ND & IBD at different ages are demonstrated in table 2. The results of HI test are presented in table 2. The chicks of the control group contained 2<sup>0.2</sup> antibody titer at 28 days of age. This result was in

agreement with that of Rhman *et al.*(2002) who stated that chicks from vaccinated parent stock contained high level of maternally derived antibody (MDA) at day old and then declined gradually below protection level within 15-20 days after hatching. Saeed *et al.* (1988) reported that maternally derived antibody level declined to zero at day 25. High level of maternal antibody in-day old chicks was also reported by Balla (1986). The rate of declination of maternally derived antibody was also reported by Allan *et al.* (1978).

**Table 2: Humeral immune response after vaccination**

Group	ND		IBD	HI (log2)
	Type	age	age	
A	B1	7 <sup>th</sup>	14 <sup>th</sup>	2 <sup>5</sup>
B	LaSota	7 <sup>th</sup>	14 <sup>th</sup>	2 <sup>5.5</sup>
C	B1	10 <sup>th</sup>	7 <sup>th</sup>	2 <sup>3.5</sup>
D	LaSota	10 <sup>th</sup>	7 <sup>th</sup>	2 <sup>4</sup>
E	CONTROL FOR DETECTION MDA			2 <sup>0.2</sup>

. Antibody titers in chickens of group A and B were increased following primary vaccination with ND Hitchner B1 and LaSota vaccines, but the titers were decreased

after IBD vaccination as shown in group C and D. Although there were a numerical differences between all these groups but the differences are not significant.

This slight reversed result indicating the influence of IBD vaccine on antibody response to ND vaccine. The results obtained indicated the lower effect of IBD. Vaccine on antibody response to ND vaccine when administered at 14<sup>th</sup> day compared to 7<sup>th</sup> day old. Comparable results of group B and D of chickens were observed. These slightly better antibody response which were noted when birds given ND –LaSota as a primary vaccination was due to the type of ND vaccine which was considered to be more virulent than HitchnerB1.

These results were in agreement with those of Ali *et al* (2004) and Rahman *et al* (2002) who reported that IBD vaccine was shown to have adverse effect on the ND vaccine whereas the reverse was not true, and better antibody responses against ND vaccine were detected when ND vaccine was administered before IBD vaccine. The deleterious effect of IBD vaccine on antibody levels against ND vaccines was slightly low when IBD vaccine was administered at 14 days as compared to 7 days of chicken age.

Newcastle disease (ND) and infectious bursal disease (IBD) pose great hazard threatening effect on poultry industry in many parts of the world. This study was determined the interaction between the most commonly used vaccines in the field against these disease and its role in vaccination failure. It was well established that maternally derived antibodies were protective against ND (Allan *et al*, 1978), although at the end of the experiment signs and lesions of ND were observed on the chickens of control group due to the gradual decreasing of these antibodies which indicated that the chicks used in the present study were laid by hens with a history of vaccination, hence an amount of antibody were detected in control group.

This MDA detected is also found to protect chicks against residual effect of ND LaSota vaccine when employed during primary vaccination which previously to have some pathogenic effects in vaccinated chicks (Murphy *et al.*, 1999)

The results obtained in this study also showed (Table2) that higher antibody levels against ND vaccine as detected by HI test were observed when ND vaccines was applied before IBD vaccine as demonstrated in group A and B, but the reverse as true for antibody titers obtained following vaccination with IBD vaccine as shown in group C and D. This suggests the immunosuppressive effect of live IBD vaccine on ND vaccine due to the slight damage in the bursa of fabricius (Allan *et al.*, 1972; Faragher *et al.*, 1974; Giambrone *et al.*, 1976).

The immunosuppressive effect of IBD vaccine on vaccination against ND was detected to has less effect when chicks vaccinated with IBD vaccine at 14<sup>th</sup> days of age compared to 7<sup>th</sup> days of chicks age. This is may be due to the fact that bursa fabricius is still underdevelopment during the first few days of age. This result was in disagreement with that of lukert and Mazariegos (1985) who stated that the intermediate strain of IBD vaccine can induce bursal atrophy and immunosuppressant in three weeks old chicks more than that produced at two weeks of age .

Persons in charge of vaccination are likely to believe that the chicken flocks will be protected after vaccination. But apparent ideal ND vaccination programs with either vaccines do not always guarantee protection of chickens flocks against ND due to incautious handling of vaccines, route of administration, vaccination programs and so on. so, seromonitoring of humeral immune response in vaccinated chicken flocks is necessary for controlling the Newcastle disease.

It was concluded that vaccination of chicks with ND vaccine containing either Hitchner B1 or LaSota strain of the virus adversely affected by live IBD vaccine when

administered first. The vaccination programme employed in group B of chickens is recommended for use under field conditions since good antibody titers of the vaccine was obtained.

### تقييم لقاحين مجدولة لمرض النيوكاسل ومرض التهاب غدة فايبريشيا

علي عبد سهم المياحي ، حارث عبد الله نجم ، قيصر علي كريدي ،ناظم عزيز شيحان ، احسان علي الجزائري و دينا حامد.

فرع الأمراض والدواجن . كلية الطب البيطري ، جامعة البصرة ، البصرة ، العراق

#### الخلاصة

الهدف من هذه الدراسة لتحديد التداخل بين لقاح مرض نيوكاسل ولقاح التهاب غدة فايبريشيا الذي عادة يستخدم حقلياً للسيطرة على هذان المرضان الفايروسيان المهمان . اختبار تثبيط التلازن ووضف لقياس مستوى الأجسام المناعية لمرض النيوكاسل في مصل الأفراخ . لقاح مرض التهاب غدة فايبريشيا كان يظهر تأثير مضاد على لقاح مرض النيوكاسل والعكس غير صحيح . النتائج بينت إن مستوى الاستجابة المناعية الأفضل للقاح مرض نيوكاسل عندما يعطى هذا الأخير قبل لقاح التهاب غدة فايبريشيا . التأثير المؤذي للقاح التهاب غدة فايبريشيا على مستوى الأجسام المناعية للقاح مرض نيوكاسل كان منخفض عندما اعطي لقاح التهاب غدة فايبريشيا في اليوم 14 من العمر مقارنة مع اليوم 7 . لم تلاحظ اختلافات كبيرة في مستوى الأجسام المناعية عندما أعطي الدجاج لقاح مرض نيوكاسل الحاوي على عترة LaSota او عترة Hitchner B1 ، بالرغم من الأفضلية القليلة للاستجابة المناعية لعترة LaSota اكثر من عترة Hitchner B1 . أن تلقيح أفراخ الدجاج بلقاح مرض نيوكاسل عترة LaSota بعمر 7 أيام وبتبعية التلقيح بلقاح بلقاح مرض التهاب غدة فايبريشيا في اليوم 14 يحدث استجابة أكثر في مستوى الأجسام المناعية مقارنة مع عترة Hitchner B1 .

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