

# Histopathological And Immune Response Against Infectious Bursal Disease In Chickens Vaccinated Against Newcastle Disease

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## Abstract

Two different vaccination programs against chicken infectious bursal disease (IBD) were compared. Results showed the first program including IBD vaccination at 8 and 16<sup>th</sup> day old as well as ND vaccination (live attenuated and inactivated types) give high antibody titers at 21 days post vaccination with significantly difference ( $P \leq 0.0005$ ) in comparison with the second program including only IBD vaccine. Serological antibodies titer were determined to study the correlation between two different programs using ELISA test. Pathological changes in vaccinated groups reveals mild & moderate lesions appear in liver, spleen and bursa of fabricius

Key word : IBD, ND, vaccination, ELISA test, Broiler, histopathology.

## Introduction

Infectious bursal disease (IBD) is an acute and highly contagious viral disease affecting young chickens and is characterized by massive damage of bursa of fabricius and immunosuppression (1,2,3). The infectious bursal disease virus (IBDV) belongs to the family Birnaviridae its genome composed of two segments of double-stranded non-enveloped RNA (2,4,5,6), its highly importance problem in poultry industry. Single or multiple IBD vaccines used in commercial flocks to induce vigorous antibody responses and obtain a high and long-lasting immunological response (2,7) the using of another type of vaccine as Newcastle disease

vaccine NDV effect on protection against (IBD), ND is one of most important viral disease of poultry. Control is possible but require an efficient application of vaccines. In order to prevent both IBD and ND inactivated and activated vaccine have been used to cause significant decrease in incidence of both infection also antigenic interference between two viral vaccines which depend on the type of vaccine, age and immune state, may effect on histological and immune protection in chicks (8,9,10). The objective of the study presented here was to investigate the histological and immune response of two different vaccinal programs against IBD.

## Materials and methods

Experimental design :- total 45 one day old broiler chicks housed and kept ad libitum feed on concentrated feed. All chicks is not treated with antibiotic or vaccinated previously, and divided into three groups each having 15 birds. First group chicks were vaccinated 1,7,14<sup>th</sup> day old with 0.1 ml live ND vaccine orally, 3<sup>rd</sup> day old with 0.1 ml inactivated ND vaccine subcutaneously and 8,16<sup>th</sup> day old with 0.1 ml live IBD vaccine orally. Second group chicks were vaccinated 8,16<sup>th</sup> days old with 0.1 ml live IBD vaccine orally. Third group

serves as control group and remain without any vaccination

### Blood collection and serological test :-

Blood serum samples from all groups were collected at 21 days of age. Serum samples were analyzed by indirect ELISA (Enzyme Linked Immunosorbent Assay) to detect antibodies against IBD (6,8,11,12).

### Macroscopic and histopathological study:

Observation for gross lesion was performed after postmortem on different organs (liver spleen, bursa of fabricius) and pathological changes were reported semi-quantitatively. Tissue

samples were taken for study of pathological changes at 21 days post vaccination from bursa of fibricius , liver and spleen from animals of all groups of experimental chicks .The organs were fixed with 10 neutral

buffer formalin and processed for paraffin embedding for preparation of 4-6 $\mu$ m histopathological section and stained with heamatoxylin and eosin(13)

## Results

Result of titer antibody IBD in different groups are shown in table 1 .significant difference was found between the antibody titer of vaccinated groups at 21 days post vaccination and significant difference was found between vaccinated

groups compared with control group in 21 days, Postmortem changes in vaccinated groups show moderate conjection with inflammation in group 2 comparing with group1 in different organs and no changes appear in group 3 table 2 .

Table 1 :ELISA antibody titer against IBDV in experimental group

Group no.	IBD antibody titer mean $\pm$ SD	
G1	13.542 $\pm$ 2.606	A
G2	10.125 $\pm$ 1.951	B
G3	2.433 $\pm$ 2.843	C

A-C values with a column followed by different letters are significantly different (P< 0.0005).

Table2:postmortem changes of different organs

Group no.	spleen	Liver	Bursa of fabricius
G1	+	+	+
G2	++	+	++
G3	-	-	-

(-) no change

(+) mild conjection

(++) moderate conjection with enlargement

The post-vaccinal reactions gross and histopathological lesions observed in birds following ND and IBD vaccines. At 21 of age abnormal gross findings were detected in both G1 and G2, the lesions were characterized by mild congestion of spleen, liver and bursa of Fabricius in G1, while in G2 at 21 age lesions were characterized by moderate congestion with mild enlargement in spleen and bursa of Fabricius, and moderate congestion in liver. At 21 of age histopathological lesions were detected in both groups, sections from bursa of Fabricius in G1 showed mild lymphocyte depletion from bursal follicles,while in G2 showed mild lymphocyte depletion from

bursal follicles, congestion of blood vessels, edema and infiltration of mononuclear cells in interfollicular spaces (Fig.1 A,B). Sections of spleen in G1 revealed mild lymphocyte depletion in splenic lymphoid follicles, but in G2 sections revealed mild lymphocyte depletion in splenic lymphoid follicles was the most prominent lesion found, the lymphocyte depletion was characterized by fewer lymphocytes than normal, in addition, in G2 there were thickening of splenic arterial wall (Fig.1C,D). In both groups, livers showed vacuolar degeneration in hepatocytes, congestion and cuffing of blood vessels.

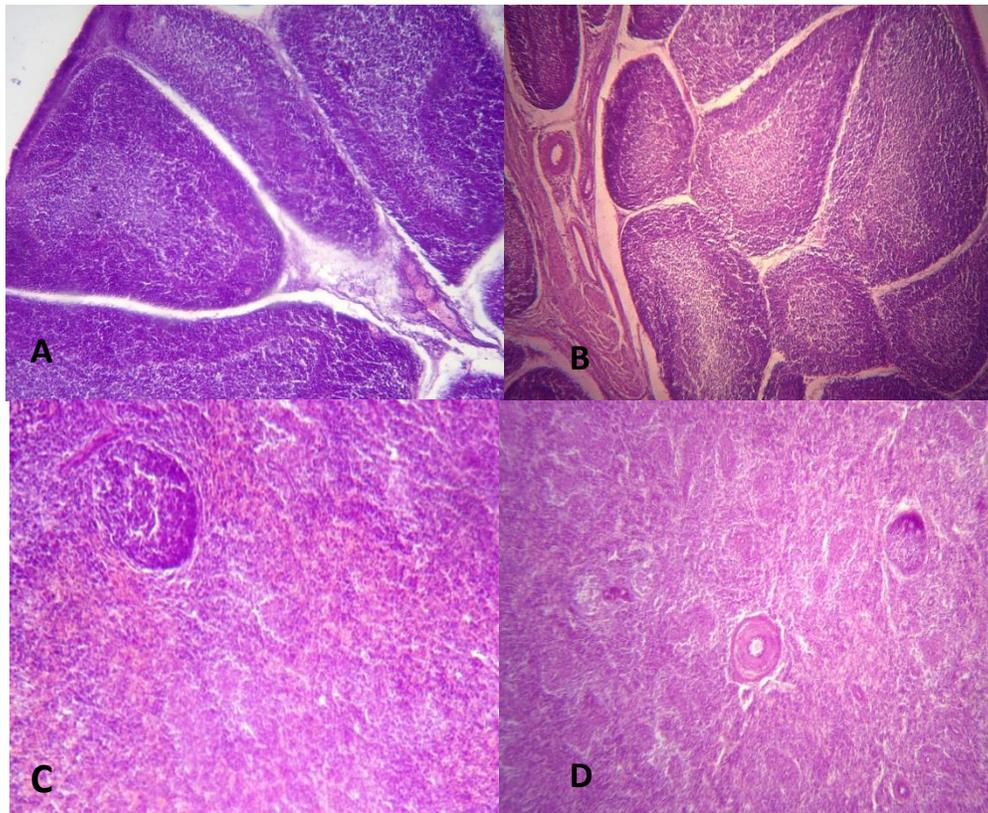


Fig.1 A: section of the bursa of Fabricius from G1 showed mild lymphocyte depletion from bursal follicles. H&E.(165X).

B:A section of the bursa of Fabricius from G2 showed mild lymphocyte depletion from bursal follicles, congestion of blood vessels, edema and infiltration of mononuclear cells in interfollicular spaces. H&E.(165X).

C: A section of the spleen from G1 showed mild lymphocyte depletion in splenic lymphoid follicles. H&E.(145X).

D: A section of the spleen from G2 showed moderate lymphocyte depletion in splenic lymphoid follicles, thickening of splenic arterial wall. H&E.(100X).

## Discussion

The basic for infectious bursal disease prevention is specific immunoprophylaxis (1,14) the protective efficacy of vaccine depends on its capability to induced a vigorous and long lasting response in the immune system , ELISA is a routine test for diagnosis of IBDV in the field conditions and for titration of serum antibodies (3,7).the result from the present study showed that the first program is more protective than second program depending on ELISA antibody titers refers to efficacy of immunization is

closely related to the type of vaccine used as well as the present study considered that sufficient production against IBD could be achieved by early vaccination of the birds and this suggested in the similar work with (10,15,16 ) also the oil based vaccine make a depot at the inoculation site and released slowly through antigen processing cell for cytokine production and plasma cell for antibody secretion and the application of live and inactivated vaccine cause immediate local tissue immunity and dispense antigen

slowly providing progressive stimulation of immunity while acquired material immunity is decline (9,17,18,) and this give high titer of antibody against ND program only in the first part of this study and program of vaccination against ND and IBD give the second degree of protection in comparison with the program of vaccination against IBD only (8) as well as vaccination against IBD is more stress to the chicks in small days of old(7) . The maternal derived antibodies

against IBD in 21 dayold of third group (control group)was lower in comparison with other groups depending on ELISA antibody titer agreeing with (2,6,18). the histopathological changes in liver ,spleen and bursa of fabricius as sequel of post vaccinal reactions but the pathological changes are more characteristic in the mild depletion of lymphocyte from the follicles of fabricius result from necrosis of these cells by live vaccine(19).

### Conclusion

Our study revealed that early vaccination of broiler chicks against IBDwith the ND in both types (attenuated

and inactivated) give good antibody response in 21 dayes of age post vaccination.

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## دراسة الاستجابة المناعية والمرضية النسجية ضد مرض التهاب كيس فابريشيا الخمجي في الدجاج الملقح ضد مرض النيوكاسل

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### الخلاصة

تم مقارنة برنامجي تحصين ضد مرض التهاب كيس فابريشيا الخمجي في الدواجن .اظهرت النتائج ان البرنامج الاول والذي يقيم التحصين ضد مرض التهاب كيس فابريشيا الخمجي بالاعمار ثمانية وستة عشر يوم على التوالي اضافة الى التحصين ضد مرض النيوكاسل باللقاح الحي المضعف والزيتي قد اعطى معيار عالي من الاضداد بعمر 21 يوم بعد التحصين مع اختلاف معنوي  $P \leq 0.005$  مقارنة مع البرنامج الثاني الذي يقيم التحصين ضد مرض التهاب كيس فابريشيا الخمجي فقط . وذلك بالاعتماد على نتائج اختبار الاليزا لقياس معيار الاضداد المصلية لكلا البرنامجين. كما ان نتائج دراسة التغيرات المرضية اشارت الى وجود افات بسيطة وطفيفة في المجاميع الملقحة لعينات الكبد ، الطحال وكيس فابريشيا .

**الكلمات المفتاحية:** التهاب كيس فابريشيا الخمجي ، مرض النيوكاسل ، تلقيح ، اختبار الاليزا ، الدواجن ، التغيرات المرضية النسجية