Vet Serum and Vaccine Res. Inst. Abbassia, Cairo Egypt
Director Prof. Dr. A. Dawood

RELATIONSHIP BETWEEN THE VACCINATION OF CHICKS WITH AN INFECTIOUS BURSAL DISEASE VACCINE AND SOME LIVE NEWCASTLE DISEASE VACCINES

(With 3 Tables)

By

ABOU-ZEID, A. ABOU-ZEID; AHMED, A. EL-SAYED; AHMED BAKER; ENSAF, M. KHASHABAH; F.EL-BORDINY and S.EL-ASILY

(Received at 8/3/1995)

العلاقة بين تحصين الكتاكيت بلقاح مرض الجامبزرو وبعض اللقاحات الحية لمرض النيوكاسل

أبوزيد أحمد ، أحمد السيد ، أحمد بكر، انصاف خشبة ، فكرية البردينى ، سلوى الاصيلى

تم اجراء بعض التجارب الاولية المعملية على لقاح مرض الجامبزرو السابق تحضيره بمعهد بحوث اللقاحات البيطرية بالقاهرة من عترة (بيرسافاكام) المستوردة وقد أثبتت نجاحا كبيرا فى صد هذا اللقاح لمرض الجامبورو متمثلا فى ارتفاع النسبة المئوية احماية الكتاكيت المحصنة بهذا اللقاح عندما تم اجراء اختبار تحدى المناعة عليها حيث بلغت ٣ر٩٧٪. كذلك اثبتت التجارب المعملية عدم تثبيط مستوى المناعة ضد مرض النيوكاسل فى الكتاكيت المحصنة بلقاح "بيرسافاك ا م" والتى سبق تحصينها ببعض اللقاحات الحية لمرض النيوكاسل. وقد تم التأكد من صحة هذه النتائج المعملية الاولية عندما تم تطبيق ذلك فى بعض مزارع دجاج التسمين الخاصة حيث اعطت نفس النتائج. مما سبق نستطيع ان نستنتج ان لقاح مرض الجامبور السابق تحضيره والمحضر من عترة (بيرسافاك ا م) له القدرة على صد مرض الجامبورو بنسبة عالية وان ليس لهذا اللقاح تأثير مثبط للمناعة ضد مرض النيوكاسل عند تحصين الكتاكيت بهذا اللقاح بعد تحصينها ببعض اللقاحات الحية لمرض النيوكاسل.

SUMMARY

Primary laboratory experiments were carried out to reveal the immunogenic effect of a locally already produced Gumboro disease vaccine prepared from the imported attenuated (Burse Vac M) strain, on chicks either previously vaccinated with some live Newcastle disease vaccines or not. These primary laboratory experiments that the usedGumboro disease vaccine gave high protection percentage against Guboro disease as shown out after challenge test, also it was shown that this vaccine has no

immunosuppressive effect on the birds vaccinated by Newcastle disease live vaccine. This was indicated the rise of the immunity level in the birds previously vaccinated against Newcastle disease. After obtaining these primary laboratory results; 10.000 chicks in different private broiler farms were vaccinated with the mentioned Gumboro disease vaccine after being vaccinated with Newcastle disease vaccines according to the special vaccination programms of each farm. The results obtained from the laboratory experiments were identical with those obtained from the field ones. It was concluded that the locally prepared Gumboro disease vaccine (Bursa Vac. M) strain was safe and effecient in protecting the vaccinated birds against Gumboro disease; also it was proved that this vaccine has no immunosuppressive effect on chicks previously vaccinated with live Newcastle disease vaccines.

Keywords: *Relationship, Vaccination, Chicks, infectious bursal disease vaccine.*

INTRODUCTION

Infection of chicks with infectious Bursal Disease (I.B.D.) virus was proved to suppress the immune response to other poultry vaccines such as Newcastle disease (ND) vaccines, infectious bronchitis (i.B.) vaccine and Marek's disease vaccine *(HIRAI et al. 1974 and ROSENBERGAR et al. 1975)*. Also, the disease lowers the resistance of the infected chicks to some pathogenes as E. coli and Mycoplasma gallisepticum *(GIAMBRONE et al.1977)*. Economically, the infection with I.B.D. virus, lowers the performance due to loss of weight of the infected birds as a result of decreased feed conversion, increased morbidity and low resistance to other infections *(NAGI et al. 1982)*. *Mousa et al. (1984)* found that from 4-8weeks infected chicks; 90% showed clinical symptoms, 40% of which, died by the disease. El -Batrawi (1990) observed severe outbreaks of GD in summer of 1989 among chicken flocks in Egypt.

The aim of this research is:-

1- To explore the immunogenic and protection effects of a locally prepared GD vaccine (imported attenuatted Bursa Vac M) strain on chicks against GD.

2- To reveal the effect of this vaccine on the level of immunity that acquired in chicks as a result of ND vaccines.

3- Field application of this vaccine.

MATERIAL and METHODS

Material:-

I- Virus:-

a) Vaccine strains:-

1- Bursa Vac M strain of I.B.D. virus, an attenuated strain that was kindly provided by the college of Agricultural Sciences, Delware University, Newyork, U.S.A. Its titer was $10^{>.>}$/ml. It was used for the preparation and testing a batch of

Gumboro vaccine *(El-BORDING et al. 1993)*.

2- "F" strain of NDV vaccine which is a locally prepared vaccine. Its EID_{50} was $10^{9.3}$/ml.

3- "LaSota" strain of NDV vaccine was imported by a commercial Company. Its EID_{50} was 10^{9}ml.

b) Virulent strains:-

1- Velogenic vescerotropic NDV (VVNDV) strain was locally isolated and identified by *SHEBLE and REDA (1978)*. Its titre was. 10^{5}/ml.

2- Virulant I.B.D. virus strain was provided by the colloge of Agricultural Sciences, Delware University, Newyork, U.S.A> Its titre was $10^{5.3}$/ml.

II- Chicks:-

1- Laboratory experiments:-

300 one day old chicks were supplied by the United Company for Poultry Production (UCPP) and kept in isolation to be used as susceptible chickens.

2- Field experiments:-

10.000 chicks were used at different private broiler poultry farms in different governorates.

Methods:-

1-Haemagglutination inhibition (H.I.) test:-

Using beta procedure as described in "Methods for examination of Poultry Biologics, 1971".

2- Passive heamagglutination test (PHAT):

Was carried out according to *(TRIPATHY et al. 1970)*.

3- Challenge tests against both ND and GD:

Were carried out in the isolation unit of the laboratory.

RESULTS

I- Laboratory experiments:-

a) Evaluation of the immunogenicity of "Bursa Vac M" strain of gumboro vaccine:-

100 one day old chicks were used. 30 random serum samples were obtained from these chicks at 2, 6, 10 and 14 days old and tested by PHAT to evaluate the maternal antibodies against GD. They were proved to be negative at 14 days old. At the age of 15 days old, 75 from these chicks were vaccinated with the locally prepared Gumboro vaccine via dronking water, while the remained 25 chicks were isolated as non-vaccinated controls.

At 7, 14, 21, 28 and 35 days post vaccination; 30 random serum samples from the vaccinated chicks and 10 serum samples from the controls, were tested for GD antibody titers using PHAT.

The results were shown in Table (1).

35 days post vaccination, all vaccinated and control birds were challenged with the virulent I.B.D. virus intraocularly, then kept under observation for 14 days post challenge. Symptoms, lesions and mortalities were observed.

Results indicated that the protection percentage was 97.3% for the vaccinated chicks and 48% for the controls.

b) Efficacy of "Bursa Vac M" GD vaccine on the immunity level resulted

from vaccination with some live NDV vaccines:

200 one day old chicks were devided into 3 groups: Group I: Consists of 75 chicks were vaccinated with "F" strain of NDV vaccine at 3 days via eye drop route. At age of 18 and 35 days old, they were vaccinated with "LaSota" strain of NDV vaccine via drinking water, and was repeated every 21 days all over the course of the experiment.

Group II: 75 chicks were vaccinated against ND as those of group I. At the age of 21 days old, they were vaccinated with the "Bursa Vac M" GD vaccine via drinking water and was repeated at 45 days old by the same route.

Group III: 50 chicks were left as non-vaccinated controls.

20 random serum samples from each group were collected every 10 days after the first vaccination with"LaSota" vaccine during the course of the experiments (60 days) to determine the HI antibody titers. At 48 days old, chicks in all groups were challenged with the VVNDV intramuscularly, 1ml/bird, 10^6 per dose.

Birds were observed 14 days post challenge for symptoms, lesions and mortalities. Protection percentages against ND were calculated and recorded in Table (2).

II- Field experiment:

10.000 chicks in different 10 private broiler farms at five governorates were vaccinated with live ND vaccines (F. strain vaccine via eye drop route at 3 days old; and Lasota strain vaccine via drinking water route at 14, 28 and 42 days old). At the age of 12 and 35 days old, chicks were vaccinated with the "Bursa Vac M" strain vaccine via drinking water route.

From each vaccinated farm, random 30 chicks at the age of 24 and 45 days old were challenged with the VVNDV at the lab, 1ml/bird intramuscular (10^6 per dose). The protection percentages were calculated and compared with that of chicks in group I that was vaccinated at the lab. Results wererecorded in Table 3.

DISCUSSION

The most important means for protection against diseases of poultry are vaccination with the suitable vaccines. Many trials for production of live GD vaccine had been carried out using local attenuated I.B.D. virus strains, while in this study a locally made batch of GD vaccine that was prepared from an imported" Bursa Vac M" I.B.D. virus strain was used to reveal its immunogenic effect against GD and its effect on the immune response of chickens previously vaccinated with some live ND vaccines.

A laboratory experiment was designed to evaluate this vaccine. When the maternal antibodies were proved to be vanished, a group of chicks were vaccinated with GD vaccine via drinking water that was proved to be the best route for GD vaccination *(WYETHH 1980)*. Antibody titers against GD were measured

weekly post vaccination by PHA test till the age of 50 days old. The maximum titer was at the age of 36 days old (21 days post vaccination) then began to decline Table 1.

A protection test for the vaccine was carried out by challenging all the vaccinated and control chicks 35 days post vaccination and remained under observation for 14 days post challenge for symptoms and mortalities. The protection percentage was 97.3% for the vaccinated chicks and 48% for the controls. It can be concluded that the "Bursa Vac M" GD vaccine gave satisfactory primary laboratory results represented in high level of antibodies and great protection percentage in the vaccinated chicks against I.B.D. virus.

Another laboratory experiment was carried out to reveal the effect of vaccination with the GD vaccine on the level of immunity resulting from vaccination with some live ND vaccines.

A group of chicks were vaccinated with "F" strain of ND vaccine via eye drop route and "La Sota" strain vaccine via drinking water.

Another group was vaccinated against both ND and GD; and the last group was left as non-vaccinated controls. At the age of 28 days and regularly every 10 days till the age of 48 days; antibody titers against ND were measured by HI test, and the protection percentage against ND was determined. It was noticed that the locally prepared GD vaccine from the "Bursa Vac M" strain of the I.B.D. virus has no suppressive effect on the immunity level in the chicks vaccinated with ND vaccines, as shown by the HI results and challenge tests (Table 2).

These obtained results agreed with those reported by *VIELITZ and LANDGRAF and ZANELLA* et al. (1977) who reported that live GD vaccines had no effect on the immunity resulted from ND vaccines. Also, the results disagreed with those reported by *THORNTON and PATTISON (1975), ZANELLA et al. (1976), MALIK (1978), Reece et al. (1982) and BASTAMI et al. (1986)* who reported that the live GD vaccines had immunosuppressive effect against ND vaccines. This might be due to the virulence of the strain used in the preparation of their vaccines.

The preparation of the "Bursa Vac M" GD vaccine is of high economic importance, since it will protect the vaccinated chicks against GD and has no immunosuppressive effect on the vaccination with other viral vaccines such as N.D vaccines.

REFERENCES

Anon (1971): Methods for Examination of Poultry Biologics and for I dentifying and Quantifying Avian Pathogen. National Academy of Science, Washington D.C. (1971). 1-98.

Bastami, M.A.; Amer, M.M.; Khalifa, D.G. and Hamouda, A.S. (1986): Effect of live Gumboro disease virus vaccine on the immune response of chickens to Newcastle disease. Assiut Vet. Med. J., 17: 203-207.

El- Batrawi, A.M. (1990): Studies on severe outbreaks of infectious Bursal disease in Egypt. 1-The natural experimental disease. Proc. 2nd Sci.Meeting, Egypt Vet. Poult. Assoc., 12 March (1990), Cairo.

El-Bordiny, F.A.; El-Assily, S.A.; Khashaba, E.H.; Gergis, S. and Hassan, N. (1993): Some studies on the vaccinal strain of infectious Bursal disease. Proceeding of 42 nd. Western poult. Dis. Confer. (1993) Sacramento, California.

Giambrone, J.J.; Eidson, C.S. and Kleven, S.H. (1977): Effect of infectious Bursal disease on the response of chickens to Mycoplasma Synoviae, Newcastle disease virus and Infectious Bronchitis virus. Amer. J. Vet. Res., 38: 251-255.

Hiari, K.; Shimakura, S. and Kawamoto, E. (1974): Electron microscope characterization of Infectious Bursal disease virus. Avian Dis. (1974), 18 No 3, 467 (En). Dep. Vet. Microbiol. Fac. Agric., Gifu Univ., Gifu, Japan.

Mallick, B.B. (1978): Importance of Gumboro disease in poultry and its rol e in the development of immunity to other fatal diseases such as Newcastle disease virus. Nouva Veterinaria de France, 51: 269-273.

Mousa, S.; Bayoumi, A.H.; Gad, N.; Salem, B. and Ibrahim, M.K. (1984): A record on a severe form of Gumboro disease in Fayoumi chickens. Fac. Vet. Med. Assiut Univ. Egypt. Assiut Vet. Med. J. (1984) 13: 26-75 (16 ref.).

Nagi, S.A.; Marquez, B. and N. Sahin (1982): Maternal antibodies and its effect on Infectious Bursal disease immunization. Avian Dis, 27, 3: 623-627.

Reece, R.L.; Gould, J.A. and Hindmarsh (1982): Studies on a vaccine against Infectious Bursal disease Australian Vet. J. (1982), 27.

Rosenberger, J.K.; Klopp, S.; Eckroade, R.J. and Krauss, W.C. (1975): The role of Infectious Bursal agent and several avian adenoviruses in the haemorrhagic aplastic anaemia syndrome and gangrenous dermatitis. Avian Dis (1975), 19: 717-729.

Sheble, A. and Reda, M.I. (1978): Cited by Khaphagy Thornton, D.H. and Pattison, M. (1975): Comparison of vaccines against Infectious Bursal disease. Journal of comparative Pathology (1975), 58 4: 597-601.

Tripathy, D.N.; Hanson, L.E. and Myers, W.L. (1970): Passive haemagglutination test with fowl pox virus. Avian Dis. 14: 29-33.

Vislitz, E. and Landgraf, H. (1976): Comparative tests on safety and potency of avian Infectious Bursitis vaccines. Development in Biological Standardization (1976). 33: 332-340.

Wyeth, P.J. (1980): Passively transfered immunity to Infectious Bursal Disease following live vaccination of parent chicken by two routes. Vet. Record (1980); 106, 13: 289-295.

Zanella, A.; Pell, A. ; Castelli, G. and Mandelli, N. (1976): Effect of treatment with attenuated Infectious Bursitis agent on the immune response of fowls to vaccination against Newcastle disease. Clinica Veterinaria (1976), 99 8: 387-390.

Zanella, A.; Pell, A.; Castelli, G. and Mandelli, N. (1977): Lack of effect of vaccination with an attenuated Infectious Bursal disease virus on the immune response to Newcastle disease. Avian pathology (1977)6 (1).

Table (1) : Results of PHA test of chicks vaccinated with " Bursa Vac M " GD vaccine at 15 days of age .

Age of tested chicks in days	No. of tested serum samples	Arithmatic mean of GD antibody titer in TRN*
2	30	2.2
6	30	1.2
10	30	0.5
14	30	0.0
22	30	2.5
29	30	5.1
36	30	5.6
43	30	4.2
50	30	3.0

TRN* : Titer reference number .

Serum of control birds contained zero antibodies comparing with vaccinated ones .

Table (2) : Results of the effect of " Bursa Vac M " GD vaccine on the level of antibody titer in chicks vaccinated with some live ND vaccines and the protection percentage against VVNDV .

Group of chicks	Age of chicks in days	No. of tested serum samples	Arith.mean of H.I. titers (log 2)	Mortalities/ total tested	Protection %
Group (1)	28 38 48 58	20 20 20 20	3.4 4.3 6.0 5.2	6 / 75	92
Group (II)	28 38 48 58	20 20 20 20	4.2 5.3 7.2 6.8	3 / 75	96
Group (III)	28 38 48 58	20 20 20 20	2.0 1.8 1.3 0.0	41 / 50	18

Table (3) : Results of protection against challenge for NDV in birds vaccinated with both ND and GD vaccines at the field .

Parameters	Age of challenged birds in days	Mortalities / total tested	Percent of protection	Areth.mean of protection %	Protection % at lab.
Farm 1	24 45	2 / 30 1 / 30	93.4 96.7	94.5	92.0
Farm 2	24 45	1 / 30 0 / 30	96.7 100	98.0	
Farm 3	24 45	3 / 30 1 / 30	90.0 96.7	93.0	
Farm 4	24 45	0 / 30 1 / 30	100 96.7	98.0	
Farm 5	24 45	2 / 30 1 / 30	93.4 96.7	94.5	

لجنـــــة الطباعـة :

قام بكتابة وتصوير وطباعة هذا العدد كل من:

السيد / حسين محمد أحمد جادالله — السيده/ كوكب أحمد علي مسك

السيد / محمد محمود حسين عاشور — الآنسه/ منـــى عبده عبدالحافظ

****