قسم : أمراض الدواجـــن.

كليـة : الطب البيطري ـ جامعة أسيوط.

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تقييم الاستجابة المناعية والضراوة للقاحات مرض الجمبورو الموجودة في مصـر

صلاح موسى ، عادل سليمان ، ناهد جاد ،

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تم تقييم خمسة من أنواع لقاح مرض الجمبورو الموجودة بجمهورية مصر العربيـــة على أساس تحديد مدى ضراوتها لاصابة حوصلة نابريس باي تلف، كذلك تحديد فعاليـــة اللقاح في أحداث مناعة ضد المرض وكذلك احتمالات تثبيط المناعة ضد مرض النيوكاسل.

وتم عمل الدراسة في كتاكيت تحوي أجسام مضادة من الأم واخرى لاتحوي أجســـام مضـادة.

وبناء على هذه الدراسة تم تقسيم اللقاحات الى مجموعتين تشمل الأولـــــى : لقاحات (بيوجمبورو ، سيفا ، فنلاند، يونيفاكس) وهي لقاحات ضعيفة الضراوة تمكنـــت من احداث مناعة في الكتاكيت الخالية من الاجسام المناعية ولكنها فشلت في احـــداث المناعة المطلوبة في الكتاكيت التي تحوي أجسام مضادة للمرض.

وشملت المجموعة الثانية لقاح انترفيث ـ ٧٨٥ متوسط الضراوة الذي أمكنه احداث مناعة عالية في كلا المجموعتين التي بها مناعة والخالية من المناعة، وبالرغم من حـدوث آفات ميكروسكوبية في حوصلة فابريس بعد التحصين الا أن هذه الأفات لم يكن لهـــا تأثير تثبيط المناعة ضد مرض النيوكاسل.

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IMMUNE RESPONSE AND PATHOGENICITY OF COMMERCIAlly AVAILABLE INFECTIOUS BURSAL DISEASE VACCINES

(With 4 Tables)

By
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SUMMARY

Five commercially used infectious bursal disease virus (IBDV) vacines in Egypt were subjected to characterization depending on the criteria of safety, efficacy, and immunosuppressive effects. Vaccines varied in their virulence and invasiveness to the bursa of Fabricus. Vaccines were classified into two groups, the first (Bigumboro, CEVA, vineland and univax) was efficiently immunogenic in birds possesing no detectable maternal immunity, but their immune response was not suffecient in chicks with maternal immunity. The second group (Intervet-D 78) produced moderate bursal lesions, was not immunosuppressive and highly immungenic in both immune and susceptible chicks.

INTRODUCTION

Infectious bursal disease (IBD) a virus-caused disease of young chickens causes lymphoid depletition, degeneration of the bursa of Fabricius (BF) and suppression of humoral immune reponse (COSGROVE, 1962).

Currently, numerous IBD vaccines are available and represent numerous virus strains with various characteristics when applied to chickens. Commercial vaccines now available can be grouped by pathogenicity as mildy or moderately pathogenic (WINTERFIELD & THACKER, 1978).

Comparison of different vaccines in the United Kingdom (THORNTON and PATTISON, 1975) and U.S.A. (WINTERFIELD and THACKER, 1978) showed significant variation in their safety, efficacy and immunosuppressive effect.

An IBD vaccine should initiate a long lasting protective immunity against virulent strains, with a concomitant lack of injury to the immune system (NAGI, et al. 1979).

This study aimed the characterization of some vaccinal strains of IBD used in Egypt by the criteria of safety, efficacy, and immunosuppressive effects.

MATERIAL and METHODS

Chickens

Hubbard chicks were obtained as one-day-old from a commercial flock, which posessed detectable antibodies against IBDV till 17 days of age. All chicks were reared in isolation and separated into their respective groups at the beginning of each experiment.

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IBDV vaccines

Five commercial vaccines originated from:

1- Biogumboro[a]
2- CEVA[b]
3- Vineland[c]
4- Univax[d]
5- Intervet - D 78[e]

Were administred in drinking water according to manufactuer's recommendations. Newcastle disease virus (NDV) vaccine.

Hitchner B_1 NDV vaccine was used in drinking water acording to manufacturer's recommendations.

Field virus (FV)

IBD - FV was the Cu-1 pathogenic strain. Chickens were challenged with $10^{3.5}$ EID_{50} (100 chicken infective $dose_{50}$) intraoccularly.

ND - Fv was a viscerotropic velogenic NDV. Chickens were challenged with 10^{4} EID_{50} intramuscularly.

Titrations:

Titrations of IBDV were done in 10-day-old chicken embryos by the CAM route. The embryos were held up to 7 days postinoculation, and the deaths were recorded and titers were determined (REED & MUENCH, 1938).

Serology

Sterile inactivated serum samples were kept frozen at -20°C untill used. To assay IBDV antibodies, an agar-gel precipitin (AGP) test was carried out according to HITCHNER. et al. (1975). Virus-neutralization (VN) tests were done with tenfold dilutions of virus suspensions, each dilution was mixed 1:1 with serum (pooled samples) and incubated 30 minutes at room temperature. Virus and virus-serum mixtures were inoculated in chicken embryos and the indices were determined (REED & MUENCH, 1938). Antibody response to ND vaccination was evaluated by a micro hemagglutination-inhibition (HI) test (HITCHNER. et al. 1975).

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a) Biogumboro (strain 1/65/pv)
Bio-pharmaceutical research & production lab.
Chingnolo Po-Pavia-Italy.

b) CEVA lab. inc.
Overland park, Ks 66212 France

c) Vineland lab.
div. of Madaty inc.
Nj. 08360 USA

d) Univax - BD
American scientific lab. Divis
Nebraska 68103. USA

e) Intervet international B.V.
Boxmeer - Holland.

Gross and histopathological evaluation of bursal lesions

Bursae were examined for gross and histopathologic lesions. Bursae were processed and stained with hematoxylen and eosin (H&E) and microscopic lesions scored from 0 to 4 based on increasing severity (SKULES, et al. 1978).

Experimental design

The study was divided into four experiments. In the first experiment, their were six groups of 20 birds each, representing two replicates of ten birds each. The first five groups recieved either of the used IBD vaccines at one day of age. The sixth group was unvaccinated. At 21 days, ten birds were killed, sera were subjected to AGP and VN tests to assay IBDV antibodies and bursae were subjected to histopathological examination. The other ten birds were challenged with IBD-Fv. At 3 days post-challenge (PC), all birds were killed, and necropsied, and the bursae were taken for pathological examination.

In the second experiment, seven groups were used. Birds were vaccinated as in exp. I. At 2 weeks of age, birds of the first six groups were vaccinated against ND. At 4 weeks of age, ten birds were bled and sera were subjected to HI test and the other ten birds were challenged with ND-Fv.

In the third experiment, five groups recieved the IBD vaccines at 3 weeks of age and the sixth group remained as unvaccinated control. At 6 weeks of age, ten birds were killed, IBDV antibodies were assayed in sera, bursae were examined histopathologically, and the other ten birds were killed, necropsied, bursae were examined histopathologically.

In the fourth experiment, seven groups were used. Birds of the first 5 groups were vaccinated at 3 weeks of age against IBDV. At 5 weeks of age, birds of the first 6 groups were vaccinated against ND. At 7 weeks fo age, ten birds were bled and HI antibodies were determined, while the other ten birds were challenged with ND-Fv.

RESULTS

Exp. I.

All five IBD vaccines were not equally capable of producing sufficient protection against IBD challenge. D-78 vaccine was superior in protection as evidenced by higher antibody titers and minimal gross and histopathologic lesions in the bursae of challenged birds (Table 1).

Exp. II.

Data presented in table 2 revealed that non of the five IBD vaccines was immunosupressive. All sera possed as high as NDV antibody titer and birds were as resistant to NDV challenge as birds of group 6 that were vaccinated against ND but not against IBD.

Exp. III.

Susceptible birds vaccinated with IBD vaccines produced detectable titers of antibodies as measured by AGP and VN tests (Table 3). Non of the vaccines resulted in gross lesions of the bursa, while D-78 vaccine produced relatively higher microscopic lesions. On challenge with IBD-Fv, birds of all groups showed satisfactory rate of protection as measured by gross and microscopic lesions of bursae.

Exp. IV.

As shown from table 4, birds of all groups vaccinated against ND produced high level of HI antibodies and birds were protected against ND challenge.

DISCUSSION

From the results of the foregoing experiments, it is suggested that the used IBDV vaccines vary in their virulence and invasiveness to the bursa of Fabricius. Generally, these vaccines could be classified into 2 groups, the first is of lower virulence including (Biogumboro, CEVA, vineland and univax) vaccines of this group inspite of being effeciently immunogenic in susceptible birds, were negated by presence of maternal antibodies. The second group represented by Intervet D-78 vaccine was of higher virulence and invasiveness. Even though this vaccine produced moderate microscopic bursal lesions in susceptible birds, was not immunosuppressive as evidenced by subsequent ND vaccination responses. Similar classification of commercial IBDV vaccines was given by WINTERFIELD & THACKER, 1978 and GIAMBRONE, 1984. It could be concluded that the intermediate IBDV vaccines seem to be the vaccines of choice in commercial flocks. Because nearly all chickens will have some residual maternal antibodies at first days of age, a more invasive, yet nonimmunodepressive vaccine would be needed to overcome maternal antibody (GIAMBRONE & CLAY, 1986).

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Table (I)

Evaluation of IBDV vaccines (serologic and challenge results) in chicks with maternal immunity

IBDV vaccines	vaccinated unchallenged				vaccinated challenged	
	AGP pos./total	VN index	detectable gross bursal lesions/total	Mic. bursal lesions (mean)	gross bursal lesions/total	mic. bursal lesions (mean)
1- Biogumboro	2/10	0.67^{6}	0/10	0.4^{a}	5/10	2.2^{b}
2- CEVA	1/10	0.70^{b}	0/10	0.2^{a}	5/10	2.1^{b}
3- Vineland	1/10	1.18^{b}	0/10	0.6^{a}	3/10	2.3^{b}
4- Univax	0/10	1.33^{b}	0/10	0.3^{a}	4/10	1.8^{b}
5- Intervet. D78	8/10	2.00^{a}	0/10	0.8^{a}	0/10	1.1^{a}
6- non	0/10	0.33^{c}	0/10	0^{b}	10/10	3.1^{c}

^{a,b,c} Means with different manuscripts with the same column differ significantly (P/_ .05)

Table (II)

NDV Serology and challenge

IBDV vaccine	ND vaccine	Mean HI titers	NDV ch. dis./total
1- Biogumboro	B_1	23^{a}	0/10
2- CEVA	B_1	20^{a}	0/10
3- vineland	B_1	18^{a}	0/10
4- Univax	B_1	22^{a}	0/10
5- Intervet. D78	B_1	18^{a}	0/10
6- Non	B_1	26^{a}	0/10
7- Non	No	0^{b}	10/10

Table (III)

Evaluation of IBDV vaccines (serologic and challenge results) in succeptable chicks

IBDV vaccines	Vaccinated unchallenged				Vaccinated challenged	
	AGP pos./total	VN index	detectable gross bursal lesions/total	Mic. bursal lesins (mean)	gross bursal lesions/total	Mic. bursal lesions (mean)
1- Biogumboro	4/10	1.60	0/10	0.8^{a}	1/10	1.[illegible]
2- CEVA	6/10	1.5	0/10	0.6^{a}	0/10	1.8^{a}
3- Vineland	5/10	1.67	0/10	1.1^{a}	1/10	1.5^{a}
4- Univax	6/10	1.7	0/10	0.9^{a}	0/10	2.1^{a}
5- Intervet-D78	10/10	2.67	0/10	1.6^{b}	0/10	2.0^{a}
6- Non	0/10	0.18	0/10	0^{c}	10/10	3.[illegible]

Table (IV)

NDV serology and challenge

IBDV vaccine	ND vaccine	Mean HI titers	NDV ch. dis./total
1- Biogumboro	Hilchner B_1	36^{a}	0/10
2- CEVA	,,	34^{a}	1/10
3- Vineland	,,	32^{a}	0/10
4- Univax	,,	28^{a}	1/10
5- Intervet -D78	,,	31^{a}	0/10
6- Non	,,	39^{a}	0/10
7- Non	Non	0^{c}	10/10