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بعض العوامل المؤثرة على الاستجابة المناعية في الدجاج

١- التثبيط المناعي للتحصين ضد مرض النيوكاسل بواسطة لقاح الماريك

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تحصين الكتاكيت عمر يوم بلقاح الماريك أدى الى تثبيط الاستجابة المناعية عند عمر ٤-٦ أسابيع مقاسة بانخفاض الاستجابة المناعية للطيور وذلك عند تحصينها ضد مرض النيوكاسل وذلك في صورة انخفاض الاجسام المناعية المضادة لتلزن الدم والمقاومة لاختبار التحدي كما أدى ذلك الى تغيرات في صورة الدم البيضاء ممثلة بقلة في عدد كرات الدم البيضاء ، وهيتروفيل وزيادة اللمفوسيت.

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SOME FACTORS INFLUENCES OF IMMUNOSUPPRESION IN CHICKENS I- IMMUNOSUPPRESION OF NEWCASTLE DISEASE VACCINATION BY TURKEY HERPS VIRUS (MAREK'S DISEASE VACCINE)

(With Two Tables)

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SUMMARY

Vaccination of one day old chicks with 0.2 ml S/C with Marek's disease vaccine (HTV), produced a significant suppression of the immune response of chickens at 4 to 6 weeks of age represented by decreased level of HI titre, low protection rate and change in leukogram which characterized by leucopenia, neteropenia and lymphocytosis.

INTRODUCTION

Field as well as vaccinal virus strains of Marek's disease has gross changes in both bursa of Fabricus and thymus glands of chickens with drastic reduction in packed cell volume and hematopoiesis which result in immunosuppressive effects (JAKOWSKI et al., 1986; JAKOWSKI et al., 1969 and SHARMA, 1978).

Reduction in antibody response to Mycoplasma synoviae in chickens inoculated with Marek's disease herps virus has been reported by KLEVEN et al. (1972) and ELLIS (1980).

Due to the pandemic situation of Newcastle disease; vaccination against this infection is undertaken allover the world. However, with vaccinatioh against Marek's disease at the first day of life in baby chicks; an impairment could be expected in vaccination of Newcastle disease. Eventually; this work was planned to study the possible immunosuppression due to Turkey herps virus vaccine (Marek's disease vaccine) in vaccination against Newcastle disease virus.

MATERIAL and METHOD

Strains :

- Newcastle disease virus (NDV) vaccines:
  Hitchner B_1 (HB_1) containing $10^{9.4}$ EID 1 ml were giving intraoccularly and in drinking water respectively.
- Newcastle disease challenge strain:
  Velogeinc viscerotropic Newcastle diseas (VVND) virus strain characterized by SHEBLE and REDA (1976) was used.
- Marek's disease (MD) vaccine:
  Turkey herps virus (HTV) vaccine obtained from TAD company was given sub-cutanously (S/C) to vaccinated birds.

Experimental design :

Two hundered and Twenty five one day old ISL chickens were used in this experiment. At 1st day of life 25 chicks were sacrified for serum collection to determine NDV maternal HI antibodies. The remaining 200 chicks were divided into 10 equal groups (1-10). Birds of only 5 out of the 10 groups (3,5,7,8 and 9) were injected S/C with 0.2 ml of Marek's disease vaccine (HTV).

At 7th day of life; birds of groups 2 and 3 were vaccinated with HB_1 vaccine. Birds of groups 4 and 5 were vaccinated with lasota vaccine at 21 days of age while groups 6 and 7 received both HB_1 and Lasota vaccines at 7 and 21 days respectively. Birds of groups 1 and 10 were left as nonvaccinated negative controls. At the 3rd week post-vaccination; birds of all groups were I/m injected with 0.2 ml of VVND. The challenged chickens were kept under daily observation for 21 days for recording symptoms; rate of mortality and post-mortem lesions. Birds with persisted symptoms till the end of the observation period were considered as if dead. Fifteen blood samples were randomly taken from each group at 0, 1, 2 and 3 weeks post-vaccination to determine the HI antibodies. For haematological examination; five blood samples were taken from the wing vein at the 3rd week after vaccination as well as after challenge to determine their total and differential leucocytic count.

Virological examination :

Virus reisolation of challenged dead birds was undertaken by inoculation of five 9-10 day old-embryonating chicken eggs via allantoic sac (CUNINGHAM, 1964). The inoculated eggs were incubated at 37.8°C for six days and specific deaths were identified by the slow HA test as well as HI test with known ND specific immune serum.

Haematological studies :

Blood samples were collected on anticoagulant ethylen-diamintetra acetic acid (EDTA) and subjected to the following:

- Total leucocytic count: was done according to NUTT and HENRICK (1952).
- Differential leucocytic count was done according to the SCHALM et al. (1975).

Data obtained were statistically evaluted according to SNEDECOR and COCHRAN (1967).

RESULTS

Challenge of the non vaccinated control groups as well as birds of groups injected with HTV vaccine developed respiratory clinical signs 2-12 days post challenge while nervous signs appeared at the 10th day post challenge. Mortality started on the 3rd day till the 15th day after challenge. HI titre in negative control birds was significantly higher than in birds received HTV vaccine before and after vaccination. The vaccinated control birds with HB_1 showed higher HI titers before vaccination and at one week post vaccination. Vaccinated groups with lasota and birds vaccinated with both HB_1 and lasota vaccines showed higher HI titre than those received HTV and simillarly vaccinated with HB_1 and lasota at 2 and 3 weeks post-vaccination. The protection rate recorded in control vaccinated birds was significantly higher than birds received HTV vaccine and vaccinated with ND vaccines.

The changes of the white blood cells depended mainly on the kinetic of heterophils and lymphocytes. Statistical analysis of the total and differential leucocytic count in table (2) revealed that no significant difference between control negative (group 1) and (group 8) which reveived HTV (Marek's disease vaccine) as well as control vaccinated with HB_1 (group 2) and birds vaccinated with HB_1 and received HTV at one day old (group 3), at 3rd week post-vaccination and challenge.

But control birds vaccinated with lasota (group 4) as well as control birds vaccinated with HB_1 and lasota (group 6) showed significant increase in the total leucocytic count and heterophil values with decreased in the mean values of lymphocytes than birds which vaccinated with lasota and received HTV (group 5) and birds vaccinated with HB_1 and lasota and received HTV (group 7) respectively, at 3rd week post-vaccination and challenge.

DISCUSSION

Taking results of the HI titre as a criterion of immune response determination after NDV vaccination. The obtained results proved that Turkey herps virus (HIV) vaccine (Maek's vaccine) strated to suppress the HI antibodies from the 4th week post-vaccination against NDV and onwards (Table 1). PURCHASE et al. (1968) and EVANS and PETTERSON (1971) concluded that Marek's disease herps (MDH) and HTV inhibit the antibody response to poultry pathogens. KLEVEN et al. (1972) reported tht antibody response to M. synoviae was decreased in chickens vaccinated with HTV and this decrease was most evident during the first 4-6 weeks after inoculation.

Determination of the protection rate after ND challenge of vaccinated birds with either lasota or with both HB_1 and lasota revealed significant high rates than that recorded in groups received HTV vaccine and similarly vaccinated either with lasota or with both HB_1 and lasota respectively (Table 1).

At 3rd week post either lasota vaccination or challenge, groups of birds vaccinated with HTV showed leucocytosis, heterophilia and lymphopenia than non-vaccinated control groups which indicated that HTV vaccination resulted in lymphocytosis, heteropenia and leucopeina after five weeks post inoculation. JAKOWSKI et al. (1969) found that Marek's disease virus (MDV) caused haemopoitic destruction in lymphoid, myloid and erythroid tissues by other viruses falling in the herps virus. CALNEK and HITCHNER (1949) reported that herps like virus of MDV caused increase in the small immature lymphocytes. PAYNE and REMINE (1973), ROSS (1977) and SHARMA (1978) recorded that MDV caused inhibition of peripheral blood leucocytes and lymphoid organs as well as lytic affection on lymphocytes.

Our results are in disaggrement with FURIMINGER and WARDEN (1971) who concluded that attenuated NDV vaccine not interfer with the effectiveness of Killed ND vaccine. Contrary to our findings ZANELLA and POLI (1981) also found that the immunosuppressive effect not occur in chickens vaccinated with HTV at one day old and subsequently to MD. FLETCHER et al. (1972) mentioned that HTV did not produce adverse effect on the antibody production.

The alterations in antibody formation, protection to challenge test and changes in the leukogram values are indicating the immunosupprissive effect of HTV vaccine on ND immoune response. A conclusion which is similar to that reported by ELLIS (1980) and KLEVEN et al. (1972). This effect might be attributed to the destructive action of the virus to the bursal lymphocytes (SCHAT and CALNEK, 1978; POWEL and RENINE, 1978 and ELLIS, 1980).

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Table (1): The effect of Marek's disease vaccine (HVT) on the immune response of chickens vaccinated with Newcastle disease vaccines.

Group No.	No. of birds	Vaccination of ND	Vaccination of MDV	Haemagglutination Inhibition test: Post vaccination: WPV	No. of samp.	Distrib. of H-I titres: 0	2	3	4	5	6	7	8	9	AM	Post challenge: WPC	No. of samp.	Distrib. of H-I titre: 0	2	3	4	5	6	7	8	9	AM	Challenge test: No. of birds	No. of dead	No. of survived	Proctection rate%
1	120	-	⊖	0	25	1	1	8	11	4		-			3.60	0	15	6	4	3	2						1.66	15	15		0
	80			1	20	2	8	5	3	2						1															
	80			2	20	4	9	5	2						2.05	2															
	20			3	15	6	5	3	1						1.53	3															
2	120	+	⊖	0	25	1	1	8	11	4					3.60	0	15	1	2	2	3	3		4			4.33	15		15	100
	80			1	20		3	3	5	6	3				4.15	1	10			2		3			3	2	6.30				
	80			2	20			4	7	5	2	2			4.55	2	10		1					3	5	1	7.20				
	20			3	15	1	2	2	3	3		4			4.33	3	10			2		3			2	2	6.30				
3	120	+	⊖	0	25	2	5	8	8	2					3.04	0	15	1	3	2	6	3					3.80	15	2	13	86
	80			1	20			6	10	2	2				4.00	1	10	1					5	4			5.80				
	80			2	20		3	5	4	4	3	1			4.10	2	10					5		1	2	2	6.60				
	20			3	15	1	3	2	6	3					3.40	3	10	1					4	-	5		6.40				
4	80	++	⊖	0	20	1	9	5	2						2.05	0	15	2	2	3	2	2	3	1			3.70	15	2	13	86
	20			1	15		4	5	3	1	2				3.40	1	10	4				1	3	2			5.10				
	20			2	15		4	3	2	2	3	1			4.00	2	10			1		4		2			6.20				
	20			3	15	2	2	3	2	2	3	1			3.70	3	10			2			4	3	1		5.90				
5	80	++	•	0	20	6	7	4	3						1.90	0	15	3		7	3	1	1	1			3.40	15	6	9	60
	20			1	15	2	2	6	1	2	2				3.20	1	9			3	1		2	1	2		4.80				
	20			2	15	4	1	1	3		3	3			3.70	2	9			3		3		1	2		5.20				
	20			3	15	3		7	3	1	1	1			3.40	3	9			2	1	3	2		1		5.00				
6	80	+++	⊖	0	20			4	7	5	2	2			4.55	0	15		1	2	2	5	2	3			4.90	15		15	100
	20			1	15			3	5	3	2				4.60	1	10			2	2		2	2	2	1	6.20				
	20			2	15		3			6		6			5.20	2	10					3		2	2	3	7.90				
	20			3	15		1	2	2	5	2	3			4.90	3	10					1	3	2	2	2	7.10				
7	80	+++	•	0	20		3	5	4	4	3	1			4.10	0	15	2		2	2	2	3	3	1		4.70	15	4	11	73
	20			1	15		1	3	5	3	2	1			4.30	1	10			2	1	4			2	1	5.40				
	20			2	15		1	3	2	4	2	3			4.80	2	10				4		2	3		1	5.80				
	20			3	15	2		2	2	2	3	3	1		4.70	3	10				3		4	3			5.20				
8	120	-	•	0	25	2	5	8	8	2					3.40	0	15	6	5	3	1						1.60	15	15		0
	80			1	20	4	5	7	4						2.35	1	d														
	80			2	20	6	7	4	3						1.90	2	d														
	20			3	15	6	5	3	1						1.50	3	d														
9	80	-	•	0	20	6	7	4	3						1.90	0	15	15									0	15	15	0	0
	20			1	15	6	5	3	1						1.50	1	d														
	20			2	15	12	3								0.40	2	d														
	20			3	15	15									0.00	3	d														
10	80	-	⊖	0	20	4	9	5	2						2.05	0	15	14	1								0.06	15	15	0	0
	20			1	15	6	5	3	1						1.55	1	d														
	20			2	15	11	3	1							0.60	2	d														
	20			3	15	15	0								0.00	3	d														

WPV : Week post vaccination. AM: Arithmatic mean. WPC : Week post challenge.
- : Non-vaccinated. () Non-vaccinated with Marek's disease. * : Marek's disease vaccination at one day old (0.2 ml S/C).
+ : Vaccinated with Hitchner B_1 at 7th day.
++ : vaccinated with La Sota at 21st day.
+++ : Vaccinated with Hitcher B_1 at 7th day and La Sota at 21st day.

Table (2): The effect of Marek's disease vaccine on the total and differential leucocytic count on the chickens vaccinated with Newcastle disease vaccines (mean ± S.D).

Group No.	No. of birds	Vaccination of ND	Vaccination of MDV	3rd week post vaccination							3rd week post- challenge						
				No. of Sample	Total leucocytic count/ 10^3	Absolute value X 10^3					No. of Sample	Total leucocytic count/ 10^3	Absolute value X 10^3				
						Eosino-philes	Hetro-philes	Baso-philes	Lympho-cytes	Mono-cytes			Eosino-philes	Hetro-philes	Baso-philes	Lympho-cytes	Mono-cytes
1	20	-	⊖	5	28.6±4.7	7.7±1.34	8.7±1.95	0.1±0.19	81.6±2.45	1.9±0.39	d	--	--	--	--	--	--
2		+	⊖	5	40.0±1.1	1.1±0.15	27.6±2.90	0.9±0.28	68.3±2.85	2.1±0.41	5	36.0±2.1	0.3±2.8	33.0±5.71	1.4±0.33	62.5±5.76	2.8±0.06
3		+	⊕	5	32.0±2.5	0.3±0.07	24.3±3.10	1.2±0.73	71.4±3.60	3.8±0.28	5	27.4±3.5	0.0±0.0	27.3±2.80	2.0±0.81	68.6±3.60	2.1±0.41
4		++	⊖	5	33.6±2.8	0.9±0.14	25.9±1.80	1.1±0.39	69.2±2.10	2.9±0.41	5	30.1±1.9	0.2±2.6	31.2±3.90	0.8±0.82	64.2±1.90	3.6±0.±0
5		++	⊕	5	22.6±5.3*	0.7±0.93	6.5±1.90*	1.0±0.33	89.9±1.27*	1.9±0.39	5	19.2±2.5*	0.3±1.6	17.2±2.90*	0.1±0.19	79.5±2.30*	2.9±0.10
6		+++	⊖	5	47.6±1.7	0.6±0.21	31.3±2.43	1.6±0.37	64.6±2.42	1.9±0.32	5	43.4±2.8	0.9±0.32	34.6±1.90	1.9±1.42	61.4±1.83	1.2±0.92
7		+++	⊕	5	29.0±4.9*	0.0±0.00	13.2±1.78*	0.6±1.20	83.7±3.20*	2.5±0.92	5	24.9±2.6*	0.0±0.00	21.8±2.77*	0.9±1.20	75.5±5.60*	1.8±0.28
8		-	⊕	5	25.0±2.3	2.3±1.42	6.8±0.93	0.0±0.0	88.9±2.90	2.0±0.60	d	--	--	--	--	--	--
9		-	⊕	5	11.8±5.6	0.0±0.00	4.1±0.39	0.0±0.00	93.2±0.60	2.7±1.90	d	--	--	--	--	--	--
10		-	⊖	5	13.1±5.1	0.0±0.00	5.9±1.26	0.0±0.00	89.9±1.20	3.9±0.27	d	--	--	--	--	--	--

- : Non vaccinated + : Vaccinated with Hitchner B vaccine at 7th day of age. ++ : Vaccinated with La Sota vaccine at 21st day of age.
d: Dead +++ : Vaccinated with Hitchner at 7th day and La Sota at 21st day of age. ⊖: Non vaccined with HVT. ⊕ : Vaccinated with HTV.
* : Significant difference between control group and HDV vaccinated group.