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STUDIES ON THE IMMUNE RESPONSE STATUS OF CHICKENS VACCINATED WITH DIFFERENT NEWCASTLE VACCINAL PROGRAMS

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SUMMARY

Two commercial breeder chicken flocks of 120 day old were vaccinated by inactivated oil emulsion NDV.

The first flock was inoculated with LaSota strain vaccine every 30 days and the other flock was inoculated with the same vaccine every 50 days for 9 successive vaccinations.

The first flock recorded high immune response and egg production levels than the other flock.

INTRODUCTION

Newcastle disease virus (NDV) is the main poultry pathogen severely affecting poultry industry causing high mortality, reduction of meat and drop in egg production (Biswal and Marril, 1954). The main disease symptoms are respiratory distress, diarrhea, circulatory disturbance and in chronic cases, impairment of the central nervous system. In chicks sudden deaths without major signs (Alexander, 1997).

Mass vaccination against NDV has caused a great reduction in morbidity and mortality. Vaccination programs including Hitchner B1, and LaSota strains proved to be highly efficient in controlling the spread of Newcastle disease in Egypt (Ahmed and Sabban, 1965). It is necessary to re-vaccinate on a regular basis because the vaccines protect for only limited period (Higgins and Warr, 2000). Probably the most common method of application used worldwide is via the drinking water (Gentry and Braine, 1972 and Barhoma et al., 1987). The use of such vaccines has confirmed their value where the vaccination resulted in high levels of antibodies in addition to the freedom of vaccinated birds from disease drop in egg production (Box and Furminger, 1975). LaStoa strain is given

drinking water at 15-21 days of age and produced a maximum HI antibody titre after 14 days post vaccination (Zheng et al., 1985). The actual titres obtained and their relationship to the degree and duration of immunity for any given flocks and programs are difficult to predict (Allan et al., 1978). For NDV immune response is usually estimated by measuring antibody levels using haemagglutination inhibition (HI) test. The HI antibody levels at the early, middle and late stages after inoculation could be detected by the standard method (Wen et al., 1999).

Safonov and Kalmina, (1987) recommended immunization scheme to administer a live vaccine (LaSota in drinking water or as aerosol) to chicks at 15-25 days of age followed by inactivated vaccine at 100-140 days. Pollar (1982) reported that the immunity of day old chicks could be measured by HI test after simultaneous administration of live HB, vaccine and one of two commercially available, inactivated oil based ND vaccines.

MATERIAL AND METHODS

Chickens:

5000 commercial breeder of two chicken flocks of 120 day old were vaccinated by two different NDV vaccinal programs.

Vaccines:

LaSota vaccine:

Living vaccine was prepared in Veterinary Serum and Vaccine Research Institute, Abbasia, Cairo, Newcastle Department with infectivity titre 10^{11} EID_{50}/ml.

Newcastle inactivated oil emulsion vaccine:

It was prepared in Veterinary Serum and Vaccine Research Institute, Abbasia, Cairo. Newcastle Department and stored in refrigerator at +4°C till used.

Serum samples:

Blood samples were collected randomly. Post vaccination every month of representing 20% of the total number of vaccinated birds Serum separated and used in HI test.

Blood sample:

Washed red blood cells were prepared from susceptible adult birds . Bloood was collected in 4% sodium citrate solution as anticoagulant and used in HI test after being diluted 1:100 in physiological saline.

Physiological saline:

It was prepared in concentration of 8.5gm NaCl per litre of distilled water and autoclaved.

Haemagglutination inhibition (HI) test:

It was used for estimating the haemagglutinating inhibiting antibodies against NDV according to Majugabe and Hitchner (1977).

Experimental design:

- Breeder flock 5000 chickens 120 day old was vaccinated by Newcastle inactivated oil emulsion vaccine 0.5ml I/M each.
- The same flock was vaccinated with LaSota vaccine in drinking water every month.

Second breeder flock 5000 chickens 120 day old was primed as the 1st flock with 0.5ml I/M of the same ND inactivated oil emulsion vaccine, then boostered by LaSota vaccine in drinking water every 50 days.

The antibody level against NDV was determined in the two flocks by HI test.

- The egg production level was followed till 360 days old of chicken as well as the mortality %.

RESULTS

Table (1): Mean haemagglutination inhibition antibody titres log 2x of NDV vaccinated chicken sera

Months post vaccination / groups of chicken	HI titre / months post vaccination								
	1	2	3	4	5	6	7	8	9
Grooup (1)	6	7	10	11	11	11	9	10	10
Group (2)	6	8	10	9	10	11	10	11	9

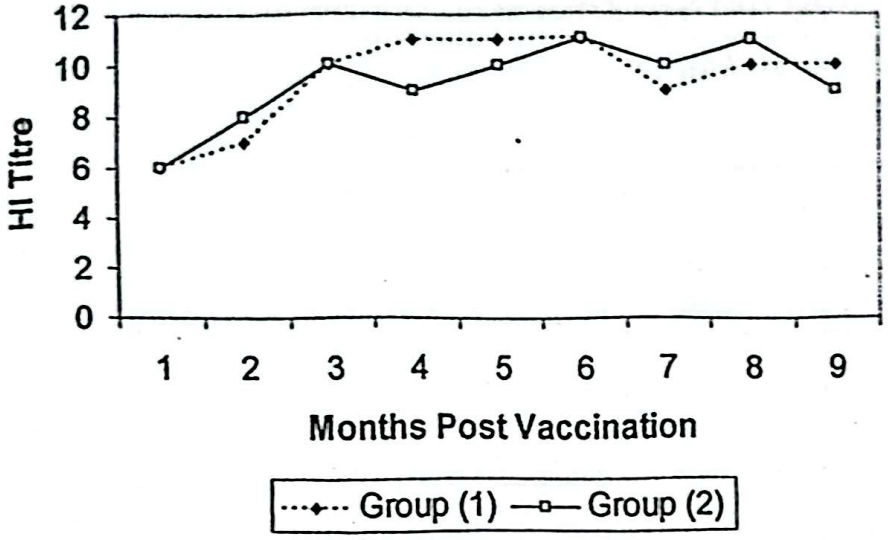

Fig.(1) Mean haemagglutination inhibition antibody titres logg 2x of NDV vaccinated chicken sera.

Table (2): Data of group (1) vaccinated breeder chickens

Number of vaccination	Types of vaccine	Dose and route of vaccine	Age of chickens/ day	Mortality %	P/M lesion	Re-isolate	Egg production / months
1	NDinactivated oil emulsion vaccine	0.5ml I/M	120	2-2.5	No Newcastle post mortum lesion	No Newcastle virus isolated	legg
2	LaSota	In drinking water	150	0.1			2890
3	LaSota		180	0.5			4260
4	LaSota		210	-			4100
5	LaSota		240	-			3630
6	LaSota		270	-			3960
7	LaSota		300	0.02			4050
8	LaSota		330	0.04			4020
9	LaSota		360	0.02			3870

Table (3): Data of group (2) vaccinated breeder chickens.

Number of vaccination	Time of vaccination / days	Types of vaccine	Dose & route of vaccine	Age & chickens/ day	Mortality %	P/M lesion	Re-isolate	Egg production
1	120	ND inactivated oil emulsion vaccine	0.5ml I/M	120	0.1	No Newcastle post mortum lesion	No Newcastle virus isolated	2 eggs
2	170	LaSota	In drinking water	170	0.5	No PM lesion		4260
3	220	LaSota		220	2-3	No PM lesion		3305
4	270	LaSota		270	5-7	Heat retention		3060
5	320	LaSota		320	0.5	No NDV P/M lesion		3900
6	370	LaSota		370	0.3	No PM lesion		3690

DISCUSSION

Newcastle disease causes great economic losses due to the high rate of mortality, reduction of body weight drop in egg production and egg quality (Biswal and Morril, 1954).

The milder Hitchner B1 and LaSota strains are now the most widely used vaccines for NDV vaccination (Hitchner and Johnson, 1948 and Goldhaft, 1980). The immune response increases as the pathogenicity of the live vaccine increase (Reeve et al., 1974). Therefore to obtain the desired level of protections without serious reaction, vaccination programs are needed that involve sequential use of progressively more virulent viruses or live virus (Seif et al., 2003).

Nameva (1985) reported that leghorn chicks of 2 days and two months of age were exposed to three different concentrations of LaSota virus. 15 days later, they were inoculated I/M with the virulent ND virus. He found that there was little or no persistent virus in the two-month-old chicks immunized with high dose of LaSota virus. In case of 10-day-old chicks immunized with a small dose of LaSota strain, the virulent virus persisted in the body for 3-7 days.

For the NDV immune response is usually estimated by the HI titres obtained. Single vaccination with live lentogenic virus will produce a response in susceptible birds of about 2^4 to 26, but HI titres as high as 2^{11} or more may be obtained following a vaccination program involving oil emulsion vaccine (Allan et al., 1978). The data in table (1) shows that the HI titre was increasing till the beak 2^{11} at 4th months and the curve keep higher in all the experimental time in the group (1). In group (2) the HI curve was decreasing and then increase again making some drop points of immunity level, this recording agreement with Partadiredja et al., (1979) who found that the immune response to live virus vaccine, given at 2, 9, 20, 30, 42 and 54 weeks of age in the drinking water, was high but there was lacking in the antibody response in chickens. Pollar (1982) also said that the immune response of chickens vaccinated by HB1 and then by inactivated oil NDV based vaccines was monitored for up to the 18th weeks of age.

Tables (2 & 3) showed that the egg production level is high in the first group but there were some drops in the second group egg production.

This is may be the effect of low level of NDV immunity of chickens in these periods as showed in table (1).

This agreed with (Thompson et al., 2005), who recommended that a 4-week interval be used between successive vaccinations. This will maximize the titre produced and give producers best value into vaccination.

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دراسات عن الإستجابة المناعية للدجاج المحصن بلقاح النيوكاسل بإستخدام برامج تحصين مختلفة

نانسى بطرس روفائيل

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تم تحصين قطيعان من قطعان البياض سن ١٢٠ يوم بلقاح النيوكاسل الزيتى الميت ثم تم تحصين القطيع الأول بلقاح اللاسوتا كل ٣٠ يوم فى ماء الشرب وتم تحصين القطيع الثانى بنفس اللقاح كل ٥٠ يوم وبتتبع الحالة المناعية وإنتاج البيض والمقارنة وجد أن نظام التحصيين كل ٣٠ يوم أفضل ونسبة إنتاج البيض فى هذا القطيع أعلى ومنتظمة.