

قسم : أمراض الد واجين .  
كلية الطب البيطرى - جامعة أسيوط .  
رئيس القسم : ابراهيم حسن سكر .

دراسات مقارنة على استعمال عترات ف ، ب ، لا سوتا

في تحصين الكتاكيـت

في المفرخات البلديـه

ضد مرض النيوكاسـل

### صـلـاح مـوسـى

تم تحصين الكتاكيـت في المفرخات البلديـه ضد مـرض  
النيوكاسل بعترات ف ، ب ، لا سوتا باستخدام طرق  
التقطير في العين وتغطيس الرأس والرذاذ . قدرت  
مستويات المناعة بطرق العدوى الصناعية وتقدر كمية  
الاجسام المضادة لتلازن الدم .

كانت الاستجابة المناعية عاليه بعد التحصين بعترات ب  
ولا سوتا كنقط في العين واستمرت حتى الاسبوع الخامس  
وكانت أقل مستويات المناعة بعد التحصين بطريقـة  
تغطيس الرأس .

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**COMPARATIVE STUDIES ON THE USE OF THE "F, B AND LASOTA"  
VACCINES OF NEWCASTLE DISEASE VIRUS IN IMMUNIZATION  
OF BABY CHICKS IN NATIVE HATCHERIES**  
(With 5 Tables & 1 Figs.)

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**SUMMARY**

Baby chicks in native hatcheries were immunized with the "F, B<sub>1</sub> and LaSota" vaccines of Newcastle disease virus by the ocular, spray and head dipping methods. Immune response was monitored by challenge and haemagglutination-inhibition tests. High level of immunity lasting up to 5 weeks developed after vaccination with the B<sub>1</sub> and LaSota strains by the intraocular route. A low grade levels of immunity developed after the head dipping method.

**INTRODUCTION**

Baby chicks produced by native "balady" hatcheries still represent the greatest part of the chick production in Egypt. About 120 million chicks are produced yearly in Egypt and 30.000.000 of them die from Newcastle disease (ND), (IBRAHIM *et al.* (1974). During 1980, about 2.8 million chicks were produced by 26 native hatcheries in Assiut province. These chicks come from a large number of small collections of parent flocks with varying levels of immunity against ND. The relatively long period of time elapsing between hatching and distribution of th chicks by dealers which may extend upto 1-2 weeks, the neglecton of the farmers to vaccinate their chicks during the first few weeks of life, and the existing great risk of exposure to virulent field virus contribute to the problem. Vaccination of the chicks in these hatcheries before distribution could be a successful approach to minimize losses from ND.

Several live lentogenic ND vaccine strains including the "F, B<sub>1</sub> and LaSota" strains are currently used for vaccination of baby chicks by different routes (AMIN and WINMILL, 1976; ASPLIN, 1952; EL-SISI, 1966; GOUCH and ALEXANDER, 1973; IBRAHIM *et al.* 1974; MAJIYAGBE and HITCHNER, 1977; MARKHAM *et al.* 1951; SOKKAR, 1966). The selection of the vaccine strain and the route of administration is influenced by the type and age of the flock, antibody level, the degree of threat of infection with virulent virus, labor costs and type of poultry housing (BEARD and MAXBRUGH, 1973).

IBRAHIM *et al.* (1974) vaccinated newly hatched chicks in "balady" hatcheries with the "F" strain of ND virus by the spray method and reported a high level of protection.

in this study, a comparison was made between the vaccinal strains "F, B<sub>1</sub> and LaSota" when administered by different routes. The degree and duration of immunity developed after each method was determined in order to choose the suitable strain/route combination.

**MATERIAL and METHODS**

Chicks: A total of 29.000 day-old chicks produced by "balady" hatcheries at various localities in Assiut province were used for vaccination.

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Chicken embryos: 9-old embryonated chicken eggs were supplied by Beni-Mur poultry governmental farm and used for challenge virus propagation, titration and reisolation.

ND vaccines: The following vaccines were used:

- 1- The "F" strain vaccine in 1000 doses ampoules ( $10^{7.8}$  EID<sub>50</sub>), lot no. 3481 manufactured by the serum and Vaccine Lab., Cairo.
- 2- The Hichner B vaccine strain in 1000 doses vials ( $10^{8.2}$  EID<sub>50</sub>), lot no. 531 produced by TAD pharmazeutisches Werk GMBH, West Germany.
- 3- The LaSota vaccine strain in 1000 doses vials ( $10^{8.33}$  EID<sub>50</sub>), lot no. 269 produced by TAD pharmazeutisches Werk GMBH West Germany.

Challenge test: A local virulent velogenic viscerotropic isolate of ND virus was used for challenge in doses of  $10^6$  EID<sub>50</sub> (100 CLD<sub>50</sub>) per bird intramuscularly. Challenged birds were observed for 2 weeks and mortality was taken as a criterion of infection.

Vaccination procedures:

- a- Intraocular method: Each vaccine was reconstituted in 50 ml. dist. water and one drop was instilled in the eye of each bird.
- b- Head dipping method: Each vaccine was suspended in 150 ml. dist. water and the head of each bird was immersed for 2 seconds in the vaccine.
- c- Spray method: Each vaccine was suspended in 150 ml. water and administered by an electric-powered aerosol generator (Root-lowell lab., Lowell, Michigan, U.S.A.) at a low (no. 1) aperture setting. The spray was directed over the heads of the chicks inside the hatcher. The chicks were collected one hour after vaccination.

Haemagglutination-inhibition (HI) test: The microtechnique using the beta procedure was employed. A stock virus suspension of the Komarov strain of ND virus was prepared and 4HA units were used per serum dilution.

Virus titration: Titration of challenge virus was done with tenfold virus dilutions. 9-day-old chicken embryos were inoculated via the allantoic sac (5 eggs/dilution) and the EID<sub>50</sub> was calculated after REED and MUENCH (1938).

Virus reisolation: A bacteria free suspension of liver, spleen, kidneys, lungs and brain of challenged dead chicks was inoculated into chicken embryos via the allantoic sac (5 eggs/sample). The embryonic fluids were subjected to rapid haemagglutination test using 10% suspension of washed chicken red cells.

## EXPERIMENTAL DESIGN

Six hatcheries were chosen for the present experiment, Newly hatched chicks were vaccinated as shown in Table 1. 100 vaccinated chicks from each hatchery as well as group of non vaccinated chicks were taken at random. 10 chicks from each group were bled at weekly intervals and sera were subjected to HI test. Another 10 chicks were challenged and kept under observation for 2 weeks.

## RESULTS

Results of challenge of vaccinated and unvaccinated chicks are shown in Table 2-5. Geometric means (GM) of HI titres are graphically shown in Fig. 1.

The results of challenge in chicks, 3 weeks after vaccination, showed 50% protection after dipping, 70% after spray and intraocular administration of the "F" vaccinal strain. The "B<sub>1</sub>" strain afforded 60% protection after dipping, 80% after spray and 100% after intraocular administration, whereas the LaSota strain gave 50% protection after dipping, 90% after spray and 100% after intraocular administration.

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Protection amounted to 70%, 60% and 10% on the 5th. week after eye drop vaccination with B<sub>1</sub>, LaSota and F strains, respectively.

## DISCUSSION

The present work is an attempt to evaluate the effectiveness of the common lentogenic vaccinal strains and the methods usually employed for immunization of baby chicks against ND in order to choose the best combination which results in the highest protection in vaccinated birds under prevailing conditions of the native hatcheries.

The results showed that the different lentogenic vaccine strains of ND virus stimulate various levels of HI antibodies and protection when given by different routes to day-old chicks with variable immune status.

Analysis of the results revealed that both of the "B<sub>1</sub> and LaSota" strains gave the best protection when administered intraocularly. Evaluation of the different methods of administration adopted under prevailing conditions showed that the intraocular route gave the best results, followed by the spray method and head dipping. Our results agree with those of AMIN and WINMILL (1976) who found a low grade immunity after the dipping method. On the other hand, IBRAHIM *et al.* (1974) reported high protection ranging from 83.4 to 91.7% in chicks vaccinated with the "F" strain with the spray method. In the present work, chicks were vaccinated by aerosol on the floor of the hatcher. Because of their small numbers, they occupied only a small space of the hatcher, thus decreasing the effectiveness of the vaccination procedure by diluting the vaccine. It could be expected that vaccination in a suitable, tightly closed room increases the effectiveness of the procedure. It is generally recognized that aerosol vaccination techniques give the most reliable immune response (ALLAN *et al.* 1978).

Comparing the results of challenge and HI tests, it is apparent that the levels of HI antibodies were generally low even when chicks were protected. Since the LaSota strain is not usually given as the initial immunizing agent during the first few days of life due to its slightly greater pathogenicity (ALLAN *et al.* 1978), the use of the B strain by the intraocular route can be recommended for the immunization of day-old chicks in "balady" hatcheries. Aerosol application is more practical and even could be more effective, provided that suitable, tightly closed room is available at the hatchery for vaccination.

## REFERENCES

- Allan, W.H.; J.E. Lancaster and Toth (1978): Newcastle disease vaccines, their production and use. FAO Animal Production and Health Series NO. 10.
- Amin, A. and A.J. Winmill (1976): Some observation on the immunity produced by F strain NDV vaccination by the dipping method with and without secondary vaccination with the LaSota vaccine administered by spray. (Immunity produced by F & LaSota ND vaccines) *J. Egypt. Vet. Med. Assoc.*, 36, 107-122.
- Aslin, F.D. (1952): Immunization against Newcastle disease with a virus of low virulence (strain F) and observations on subclinical infection in partially resistant fowls. *Vet. Rec.*, 64, 245-249.
- Beard, V. and Jr. Max Brugh (1973): Immunity to Newcastle disease. *Am. J. Vet. Res.* 36, 509-512.
- El-Sisi, M.A. (1966): The role of the different existing vaccines in the control and prevention of Newcastle disease. Thesis, Faculty Vet. Med., Cairo University Giza, Egypt.

- Gough, R.E. and D.J. Alexander (1973): The spread of resistance to challenge induced in chickens vaccinated by different routes with a B strain of Newcastle disease vaccine. *Vet. Rec.* 92, 463-465.
- Ibrahim, S.N.; I.N., I. Sabri, H.N. Ahmed, M.A. Ezzat and N.N. Barhouma (1974): Vaccination of chickens in native hatcheries with the Newcastle disease vaccine "F" strain by the spray method. *J. Egypt. Vet. Med. Assoc.*, 34, 45-55.
- Majiyagbe, K.A. and S.B. Hitchner (1977): Antibody response to strain combinations of Newcastle disease virus as measured by haemagglutination-inhibition. *Avian Dis.* 21, 576-583.
- Markham, F.S.; C.A. Bottorff and H.R. Cox (1951): The conjunctival application of Newcastle disease vaccine (intranasal type) in parentally immune and susceptible chicks. *Cornell Vet.* 41, 267-282.
- Read, L.J. and H. Muench (1938): A simple method of estimating 50 percent endpoints. *Am. J. Hyg.* 27, 493-495.
- Sokkar, I.M.H. (1966): Evaluation of some methods used for vaccination of baby chicks against Newcastle disease. *Egypt. Vet. Med. J., Faculty of Vet. Med., Cairo Univ.* 13, 233-238.

Table (1)

No. of chicks immunized with the different ND vaccine strains by different routes

Group	Hatchery	No. of vaccinated chicks	Strain	Route of vaccination
1	Khalifa-Assiut	3500	F	spray
2	Elmalawany-Manfalout	3000	F	dipping
3	Sahel Saleem	3000	F	ocular
4	Dayrout	3500	B <sub>1</sub>	spray
5	Khalifa-Assiut	4000	B <sub>1</sub>	dipping
6	Abu-Teeg	3000	B <sub>1</sub>	ocular
7	Mankabad	2500	LaSota	spray
8	Elmalawany	3000	LaSota	dipping
9	Sahel Saleem	3500	LaSota	ocular
<b>Total</b>		<b>29.000</b>		

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Table (2)  
Results of challenge of chicks vaccinated with the "F" strain by different routes

Age in weeks	No. of challenged chicks	Route of vaccination					
		Spray		Dipping		Ocular	
		survivors		survivors		survivors	
		No.	%	No.	%	No.	%
1	10	8	80	8	80	9	90
2	10	8	80	9	90	8	80
3	10	7	70	5	50	7	70
4	10	1	10	0	0	1	10
5	10	0	0	0	0	1	10

Table (3)  
Results of challenge of chicks vaccinated with "B<sub>1</sub>" strain by different routes

Age in weeks	No. of challenged chicks	Route of vaccination					
		Spray		Dipping		Ocular	
		survivors		survivors		survivors	
		No.	%	No.	%	No.	%
1	10	9	90	8	80	9	90
2	10	10	100	8	80	10	100
3	10	8	80	6	60	10	100
4	10	5	50	4	40	9	90
5	10	1	10	2	20	7	70
6	10	0	0	0	0	3	30
7	10	0	0	0	0	0	0

Table (4)  
Results of challenge of chicks vaccinated with LaSota  
strain by different routes

Age in weeks	No. of challenged chicks	Routes of vaccination					
		<u>Spray</u> <u>survivors</u>		<u>Dipping</u> <u>survivors</u>		<u>Ocular</u> <u>survivors</u>	
		No.	%	No.	%	No.	%
1	10	10	100	9	90	9	90
2	10	9	90	10	100	9	90
3	10	9	90	5	50	10	100
4	10	6	60	5	50	8	80
5	10	1	10	0	0	6	60
6	10	0	0	0	0	1	10
7	10	0	0	0	0	0	0

Table (5)  
Results of challenge of unvaccinated chicks

Age in weeks	No. of challenged chicks	<u>Survivors</u>	
		No.	%
1	10	7	70
2	10	3	30
3	10	0	0
4	10	0	0

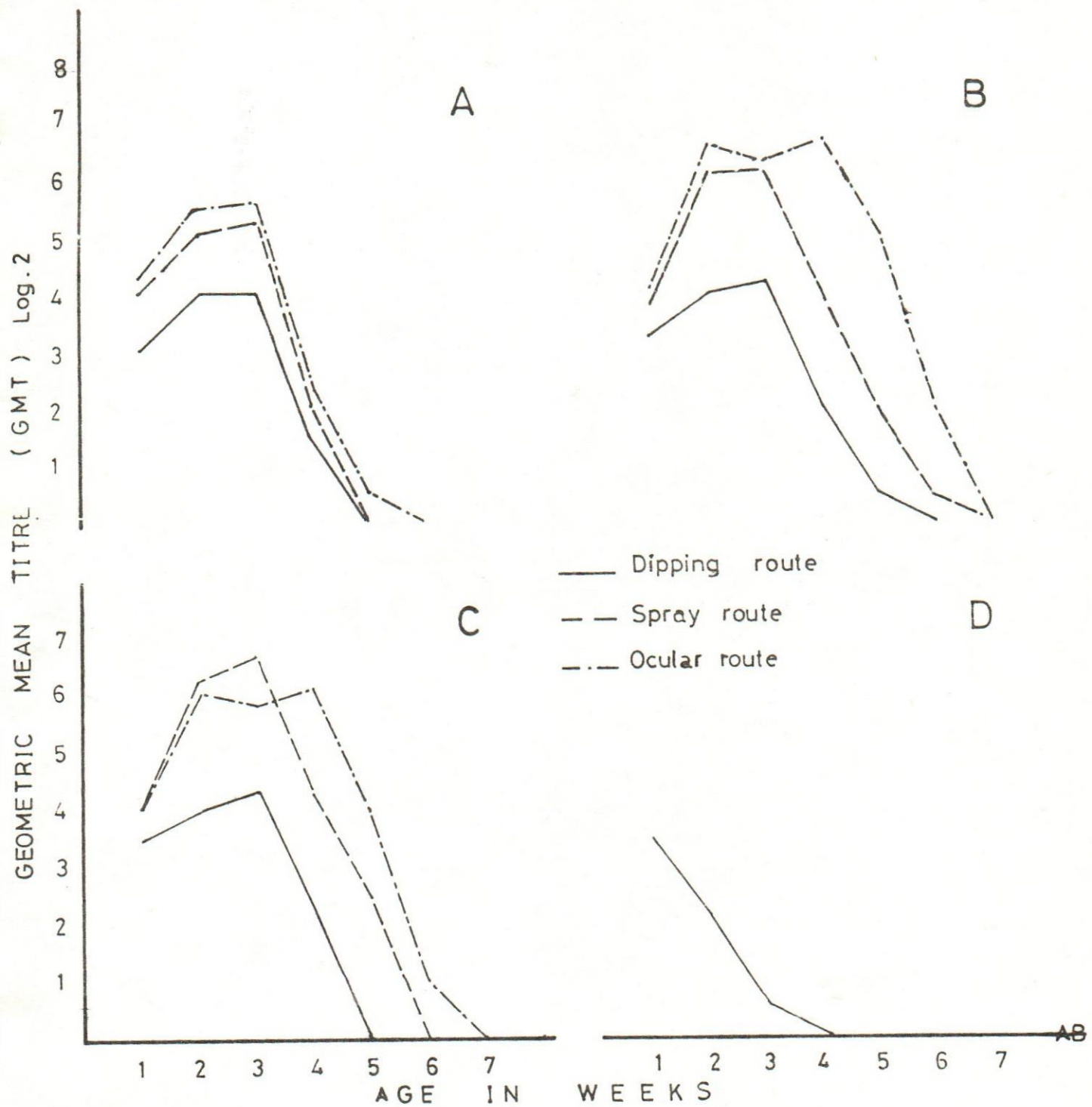


FIG.1: Shows geometric mean titres of HI antibodies after vaccination with "F" strain (A), B<sub>1</sub> (B), Lasota (C) or non vaccinated chicks (D).