

EXPERIMENTAL STUDIES ON PMV-4 INOCULUM AND
HB, VACCINE FOR CONTROL NEWCASTLE
DISEASE IN CHICKENS.

(With One Table & One Fig.)

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**دراسات معملية عن الباراميكزو - ٤ المحضر
محلياً ولقاح هتشنرب ١ المستورد للسيطرة
على مرض النيوكاسل في الدواجن**

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عند تقييم دور عترة الباراميكزو - ٤ المحضرة محلياً عند استخدامها في التحصين الاضطراري للدواجن معملياً السابق عدواها بفيروس النيوكاسل العترة الضاربه (١٠ / ملئ بالحقن بالعضل أو ١٠ / ملئ بالانف) وذلك بالمقارنه باللقاح المستورد من الهتشنرب ١ . وجد ان معدل الوقايه من العدوى تصل الى ٤٥ % في الدواجن المحصنه بعترة الباراميكزو - ٤ بينما وصلت الى ٢٥ % في الدواجن المحصنه هتشنري ١ وذلك في الدواجن المعديه بالنيوكاسل الضارى بالحقن عضلياً أما الدواجن المعديه بالنيوكاسل الضارى عن طريق الانف اعطت معدل وقايه وصل الى ٤٠ % عند استخدام باراميكزو - ٤ ووصلت الى ١٠ % عن استخدام لقاح الهتشنرب ١ .
ومما سبق يمكن القول بانه يمكن استخدام عترة الباراميكزو - ٤ المحضر محلياً في حماية الطيور أثناء الاصابه بعدوى فيروس النيوكاسل في المزارع الدواجن الحقلية .

SUMMARY

For evaluation of the role of locally prepared PMV - 4 inoculumentally emergency vaccination, for control ND (PMV - 1) in chickens; the eye drop and aerosol methods of vaccination were undertaken in infected chickens with 10^6 I/M and $10^{7.5}$ I/N VVUDV. When PMV - 4 inoculum in comparison with HB1 vaccine were done in infected chickens, the rate of protection reached 45% in both groups vaccinated with PMV - 4 inoculum as comparison rate with 30% and 25% in HB1 respectively in I/M experimentally infection VVNDV. While, in I/N route of infection the rate of protection reached 40% in group vaccinated with PMV - 4 inoculum via aerosol route and 10% in PMV - 4 and HB1 vaccinated groups via drop. The HB1 vaccinated group via eye drop after I/N infection give nil results.

Keywords: PMV - 4 inoculum, HB vaccine NDV, Egypt.

INTRODUCTION

Eventually the group on avian paramyxoviruses (PMVs) is divided into 2 subgroups on the bases of antigenic interrelationship (RISHE and LIPKINDE; 1987). Those of group one include PMV-2 and PMV-6, while the other group includes PMV - 1 (Newcastle disease virus "NDV"), -3, -4, -7, -8 and -9.

The interrelationship between PMVs and NDV recorded by GROS et al. (1986) and SUZAN (1991). Other authors spoken about serological cross reaction (GROS et al., 1986; BOX et al., 1988 and RUSSELL and OZDEMIN, 1989).

The local occurrence and importance of Newcastle virus (PMV -1) infection as well as other avian PMV serotypes in Egypt has already been established (DAUBNEY and MANSY, 1947; REDA, 1982 and SUZAN, 1987 and 1991).

PMVs other than NDV had been known to be of world wide distribution (BANKOWSKI et al., 1960; ALEXANDER et al., 1983 and others). Many investigators incriminated PMV in induction of some disease condition including respiratory symptoms in chickens (ISACHENKO et al., 1975 and SUZAN, 1987) and in turkeys (BRADSHOW and JENSEN, 1979 and ANDRAL et al., 1985), drop in egg production (ALEXANDER et al., 1984; ANDRAL and TOQUIN, 1984 and GROS et al., 1986), nervous symptoms (ARIES et

al., 1978) as well as diarrhoea and conjunctivitis (SCHEMERA et al., 1987). Moreover, many authors considered these viruses as complicating agents for other avian pathogens as infectious laryngotracheitis (BANKOWSKI et al., 1960) and avian mycoplasma (HELLER et al., 1984).

The present work was designated to carry out the PMV - 4 inoculum in the emergency vaccination of Newcastle disease infection as a control measure.

MATERIAL AND METHODS

A. MATERIAL :

1. Chicks:

220, one - day - old, commercial broiler (Hubbard Chicks) were used in this study. They were floor reared and fed on a balanced commercial ration.

At the 28 th day of life when mycoplasma an maternally acquired HI (either NDV or PMV - 4) antibodies completely free. 200 chickens were classified and experimentally infected with VVNDY.

Third day post infection respiratory manifestation and at 5th day the nervous manifestation were observed in infected birds. The dead birds have specific NB lesion.

On appearance of ND infected signs and lesions, emergency vaccination using either HB₁ vaccine or OMV - 4 inoculum were carried (groups 1 - 8). Infected chickens of groups (9 and 10) 20 birds for each were kept without emergency vaccination as infected non vaccinated control groups.

The representing 20 chickens were kept without infection or vaccination as blank control (group 11).

Chickens of all groups kept 28 days observation period for clinical signs, mortalities and post mortom lesions.

2. Embryonated chicken Eggs (ECE):

Commercial hatching eggs, 9 to 11 day - old were used for propagation and titration of NDV vaccinal and challenge strains as well as paramyxovirus - 4 inoculum and for virus reisolation.

3. Viral strain:

a. Velogenic Viscerotropic Newcastle Disease Virus (VVNDV) challenge strain:

A local velogenic viscerotropic Newcastle disease virus (VVNDV) strain isolated and characterized by SHEBLE and REDA (1975) was used as challenge virus. It was obtained from Serum and Vaccine Research Institute, Abbasia, Cairo.

b. Newcastle Disease Vaccinal Strain (NDV):

Hitchner B₁ vaccine strain was obtained from INTERVET international B.V. Boxmeer, Holland, Lot No. 33066E containing $10^{9.6}$ EID₅₀.

c. Paramyxovirus - 4 (PMV - 4) inoculum:

The PMV - 4 inoculum prepared and evaluated by SUZAN, (1991).

4. Viral antigens for HI test:

The mesogenic Komarov (K) strain, obtained from Serum and Vaccine Research Institute, Abbasia, Cairo.

B. METHODS

1. Hemagglutination (HA) and hemagglutination inhibition test (HI):

HA and HI were carried out according to the standard method reported by ANON (1963).

2. Infection:

Chickens were infected intramuscularly I/M and intranasally I/N with 0.2 ml containing 10^6 EID₅₀ $10^{7.5}$ EID₅₀ respectively of VVNDV according to RENANT and ZYGRAICH (1979).

3. Vaccination:

a. Spray Administration:

This was carried out according to method described by NARVAEZ (1976).

b. Eye Drop:

This was carried out according to TAD (Germany) instructions (SUZAN, 1991).

4. Virus reisolation:

Specimens, preparation of samples and egg inoculation was adapted after the method described by FABRICANT (1956).

5. Determination of the median virus infective dose in chicken embryos (EID₅₀):

Titration was carried out according to the standard method reported by ANON (1963). The EID₅₀ was estimated according to the method described by REED and MUENCH (1938).

RESULTS AND DISCUSSION

The obtained results (Table 1 and Figure 1) are clearly showing that the protection percentage in emergency vaccination reached 30, 25, 10, 0% and 45, 45, 10, 40% in chicken groups vaccinated with HB₁ (eye drop and aerosol) as well as PMV - 4 inoculum (eye drop and aerosol); respectively as compared with 100% protection in blank control and 0% in I/M or I/N infected non vaccinated groups.

Statistical analysis of the above mentioned figure proved significant increase in the protection rate in PMV - 4 inoculated group over those vaccinated with HB₁ ($P < 0.05$).

From the above mentioned we can say that using eye drop or aerosol methods of vaccinations with PMV - 4 inoculum in emergency measure during I/M VVND gave equal protection rates. While using in I/N infection with VVND gave highly protection rate than HB₁ vaccination. These results were agreed with MARKHAM *et al.*, 1954; ALLAN *et al.*, 1978 and SUZAN, 1991) who found that the use of the individual application of vaccines by the eye drop gave high degree of flock protection against virulent infection.

Also EIDSON and KLEVEN (1976) and ALLAN *et al.* (1978) reported that HB₁ vaccination by spraying route play a role in resistance to infection with challenging virus.

From the above all mentioned we can say that the locally prepared PMV - 4 inoculum is better than HB₁ in control of experimentally emergency vaccination for control of NDV in chickens.

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The incidence of morbidity and mortality in vaccinated HB₁ and PMV - 4 vaccine.

| Group No. | No. of infected birds | Route of infection | Type of vaccination | Route of vaccination | Morbidity | | | | | | | | | | Mortality | | | | | | | | | | Total + ve | Protection Rate % | Total + ve | Protection Rate % | | | | | |
|-----------|-----------------------|---------------------|---------------------|----------------------|-----------|---|---|----|---|---|---|---|---|----|-----------|---|---|---|---|---|---|---|---|---|------------|-------------------|------------|-------------------|-----|-------|-----|-----|----|
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11-28 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | | | | | 10 | 11-28 | | | |
| 1 | 16 | I/N HB ₁ | ED | ED | - | 4 | 4 | 2 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 11 | 70 | 30 | 11 | 70 | 30 |
| 2 | 16 | I/N PMV | SP | SP | - | 2 | 2 | 2 | 1 | 1 | - | 1 | 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 12 | 75 | 25 | 12 | 75 | 25 |
| 3 | 16 | I/N PMV | ED | ED | - | 1 | 1 | - | 1 | 2 | - | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 7 | 40 | 60 | 7 | 40 | 60 | |
| 4 | 16 | I/N PMV | SP | SP | - | 1 | 1 | 1 | 1 | 1 | - | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 7 | 40 | 60 | 7 | 40 | 60 | |
| 5 | 16 | I/N HB ₁ | ED | ED | - | 3 | 3 | 2 | 7 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 15 | 90 | 10 | 15 | 90 | 10 | |
| 6 | 16 | I/N PMV | SP | SP | - | 4 | 3 | 3 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 16 | 100 | - | 16 | 100 | - | |
| 7 | 16 | I/N PMV | ED | ED | - | 2 | 1 | 6 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 15 | 90 | 10 | 15 | 90 | 10 | |
| 8 | 16 | I/N PMV | SP | SP | - | 4 | 4 | 1 | 1 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 10 | 60 | 40 | 10 | 60 | 40 | |
| 9 | 20 | Infect-ion Control | I/N Control | I/N Control | - | 2 | 2 | 10 | 6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 20 | 100 | - | 20 | 100 | - | |
| 10 | 20 | Infect-ion Control | I/N Control | I/N Control | - | 4 | 2 | 10 | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 20 | 100 | - | 20 | 100 | - | |
| 11 | 20 | Blank Control | Blank Control | Blank Control | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 | 0 | 100 | 0 | 0 | 100 | |

Remarks :
 Significant difference at P < 0.05
 ED = Eye Drop.
 SP = Spraying.
 I/N = Intramuscular.
 I/N = Intranasal.
 VVND = Virulent Newcastle Challenge Virus.
 HB₁ = Hitchner B.
 PMV - 4 = Parainfluenza virus - 4.

Protection rate of PMV - 4 when used as control for VVND infection is significantly higher than those of HB₁.

