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Comparative Study of Antibody Titers Obtained from Avinew, Lasota, and Clone30 Vaccines in Broiler Chicks with Hi Test

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Abstract: Newcastle disease is an important viral disease, that its occurrence and virulence was increase in Iran in recent years. Therefore, in order to control the disease incidence effective vaccination program has been important. The objective of this study was comparison 3 types of vaccines include La Sota, Avinew, and Clone30 on broiler chickens. In this study 360 day old, Ross broiler chicks divided into 4 groups (A, B, C, and D) that each group consists of 3 replicate, and each of them contains 30 chicks. In group A, Avinew; B, La Sota; and C, Clone30 vaccine was used. Group D was control group and Newcastle vaccine was not used in this group. All rearing conditions was same in all 4 groups and on days 1, 15, 28, and 43 their blood samples were obtained for determination of Newcastle vaccines' antibody titers; for this purpose HI serological test was used. Results showed that, vaccinated groups (A, B, and C) showed meaningful antibody titers compared with control group (D) after 28th day($p<0.05$), but in control group (D) maternal immunity's antibody titer after 28 days decreased significantly such that control's have no immunity against Newcastle disease after 28th day and susceptible to the disease. Antibody titers that obtained from Avinew, La Sota, and Clone30 vaccines didn't show any significant difference ($p>0.05$), however considering more reactions to vaccination reaction of La Sota vaccine compared with Avinew and Clone30 vaccines, Avinew and Clone30 vaccines better than La Sota vaccine regarding vaccine reactions and preferable herein.

Key words: Newcastle disease, Vaccination, HI, Broiler chick

INTRODUCTION

The Paramyxoviridae, Flaviviridae, Rhabdoviridae are of mononegaviral viruses i.e. mono strand without fragments, negative sense RNA with symmetrical capside Jayawardane and Spradbrow, (1995). Generally, the first incidence of Newcastle disease was in Indonesia and Newcastle in England, in 1926. Reports about Newcastle disease incidence like that of 1926 have been reported in central Europe (Erickson *et al.,* 1977).

Newcastle virus has different strains that can develop variations in the severity of the disease even in a particular host like poultries. For better understanding, pathotype is divided based on clinical signs in poultries. Doyle form: acute form of the Newcastle disease. In this form, the hemorrhage lesions were observed in digestive system and known as velogenic viscerotropic Newcastle disease (VVND).

Beach form: acute form of the Newcastle disease that develops fatal infection in poultries of all ages. Always some respiratory and nervous signs are observed so called neurotropic velogenic (NVND).

Beaudette form: Its pathogenesis is less than acute form and mortality often is seen in young birds. These types of viruses are known as mezogenic viruses. These viruses are used as live booster vaccines.

Hitchner form: Reveals as very slow unknown respiratory infection.

These viruses are used as live vaccines (lentogen).

Unsigned Digestive form: Mainly appeared as intestinal infection, develops by lentogen virus and apparent sign. Some of commercial vaccines are of this type (Perozo and Villegas, 2008; Doyle, 1927). The economical importance of Newcastle virus is much more compared with other bird's viruses even animal viruses. With develops in birds' industry in developed countries, incidence of the virus is not very costly but some preventive costs like vaccination against it is high. By identification ND (Newcastle disease) in U.S, at first inactive vaccines were used. Later observations of some strategic viruses that caused only slight disease led to discover of live mesogenic vaccine, Roakin ; followed by mild vaccine, B1; and La Sota strain that have vast usage worldwide(6). In the current study, we used immunogenic vaccines such as: La Sota, Avinew and Clone30. Lentogenic virus

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of Avinew isolated by Gilson and Villages from digestive system (intestine) of turkey (Mayo, 2002; Glisson *et al.,*1990). Viruses in this vaccine have low pathogenesis. This strain of Newcastle virus attracted more attention when was injected into the SPF eggs; it revealed that the strain not only doesn't have any pathogenesis but also makes low respiratory problems. Based on these experiments, USDA organization of the strain (VG/GA) makes proper immunity response with low respiratory problems against velogenic Newcastle viruses. Investigations revealed that antibodies obtained from this stain substitute in respiratory tracts and intestines, which leads to excellent immunity level in birds (Jordan, F. Pattison, 2002; Cillers and Coetzee, 1998; Beard *et al.,* 1993). Clone30 has been derived from La sota vaccine and researchers believe that resembles La sota considering immunogenic properties but didn't show problems like that. In any case, regarding the increase rate of disease acuteness in the country, we planned to compare the problems and immunogenic properties of theses three vaccines to present the results to the veterinarians employed in this area.

MATERIAL AND METHOD

In the current study 360 Ross broiler chicks on their 1st day in four groups (A, B, C, D) was used. Each group consisted of three replicates of 30 chicks in each replicate. Vaccination program was as follow:

Group A: bronchitis H120 (Razi-IranCo). As spray on first day, Avinew vaccine in oral form on 10th day, Gambro GM/97 in oral form on 15th day, Avinew vaccine in oral form on 21st day.

Group B: Same as the Group A vaccination program but La sota instead of Avinew.

Group C: Same as the Groups A and B vaccination program but Clone30 instead of La sota and Avinew.

Group D: this group was the control group and wasn't used any Newcastle vaccine for this group.

Dietary and environmental conditions were identical in each of three groups. They placed in a saloon with specific distance from each other. Blood samples were obtained from 50% of all group's chicks on 1, 15, 28, 42 day. It must be note that for obtaining blood samples on first day the chicks were beheaded. For this purpose, 15 more chicks were purchased in any of replications.

Serum samples examined by HI serologic method to determination of the antibody titer because Avinew, LaSota, and Clone30 vaccines.

Table 1: constituents of used dietaries

Age(day) Type of dietary	0 – 14	15-35	36 until slaughter
Corn	537.5	633.5	674
Soybean	380	320	280
supplement	6	6	6
Methionine	2	2	1.5
Lysine	1	1	1
Di calcium phosphate	15	15	15
Oyster	15	15	15
Salt	2	2	2
Soybean oil	5	5	5
Salinimysine	0.5	0.5	0.5
Total	1000	1000	1000
Metabolizable energy (Kcal/kg)	2826	3299	3346
Raw protein (%)	21.6	19.5	18.1
Calcium (%)	1	1	1
Available phosphorous (%)	0.43	0.42	0.41

* consumed supplement, obtained from Syanis co. ; consists of 3 Kg mineral supplement and 3 Kg vitamins

Following experiments, data reported as mean ± SD. In order to data analysis, ANOVA test was used. In the case of meaningful difference, Duncan pursuing test was used in order to determining meaningful difference among groups. Data analyzed using SPSS software, version 17 and $P>0.05$ considered for determining meaningful level among groups.

RESULTS AND DISCUSSION

Table 2: Comparison of antibody titer status obtained from Avinew vaccine by HI

age replications	A1	A2	A3	mean titer
1st day	5.4	5.5	5.3	0.12±5.4
15th day	3.4	3.5	3.2	0.14±3.4
28th day	4.1	4	4.3	0.09±4.1
42nd day	5.2	5.1	5.4	0.05±5.2

Table 3: Comparison of antibody titer status obtained from La sota vaccine by HI

age replications	B1	B2	B3	mean titer
1st day	5.4	5.5	5.3	0.15±5.4
15th day	4.2	3.5	3.2	0.21±3.6
28th day	4.4	5.4	4.2	0.10±4.6
42nd day	5.6	5.7	5.4	0.09±5.5

Table 4: Comparison of antibody titer status obtained from Clone30 vaccine by HI

Age Replications	C1	C2	C3	mean titer
1st day	5.2	5.5	5.4	0.08±5.3
15th day	3.8	3.2	3.5	0.17±3.5
28th day	4.1	4.8	4.6	0.2±4.5
42nd day	4.6	5.1	5.2	0.18±4.96

Table 5: Comparison of antibody titer status obtained from control group by HI

age Replications	D1	D2	D3	mean titer
1st day	5.4	5.5	5.4	0.18±5.4
15th day	3.4	3.5	3.2	0.14±3.4
28th day	1.6	1.7	1.5	0.21±1.6
42nd day	0.5	0.8	0.5	0.18±0.6

Table 6: comparative analysis of antibody titer status obtained from Avinew, La Sota, and Clone30 vaccines by HI

age Replications	Avinew vaccine	La Sota vaccine	Clone30 vaccine	Control group
1st day	0.12^{a}±5.4	0.15^{a}±5.4	0.08^{a}±5.3	0.18^{a}±5.4
15th day	0.14^{a}±3.4	0.21^{a}±3.6	0.17^{a}±3.5	0.14^{a}±3.4
28th day	0.09^{a}±4.1	0.10^{a}±4.6	0.2^{a}±4.5	0.21^{b}±1.6
42nd day	0.05^{a}±5.2	0.09^{a}±5.5	0.18^{a}±4.96	0.18^{b}±0.6

Means within a column with different superscript letters (a,b) denote significant differences (P>0.05).

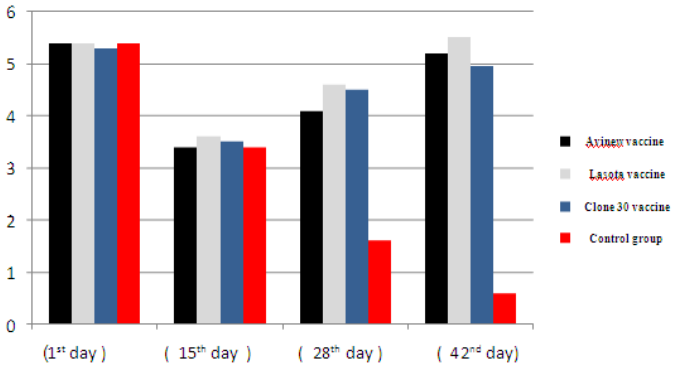

Diagram 1: comparative analysis of antibody titer status obtained from Avinew, La Sota, and Clone30 vaccines and control group by HI

Based on results obtained from table 4, control group received no vaccine and has apparent difference of Newcastle antibody titer Compared with groups, which were vaccinated two times with Avinew, La Sota, and Clone30.so, in control group the antibody titer in blood decreased severely and the chicks susceptible to Newcastle disease. However, in vaccinated groups, there wasn't such status and active immunity was produced in order to protection capability against Newcastle disease. It worth to note that La sota vaccine was used in B group and 2 days after vaccination some reactions were observed like crouching and increased respiratory disorders. Any of these symptoms didn't appeared in group A which vaccinated with Avinew. Respiratory disorders of group C, which vaccinated with Clone was low, compared with group B.

Discussion:

Newcastle disease is among the viral contagious disease that infect all species of pet and wild birds. Importance of the disease in pet birds, high susceptible birds and sever consequences of disease incidence are result of acuteness of strains in poultry industry. In order to controlling Newcastle disease, the use of vaccines is necessary. Current study attempted to compare our country's common vaccines to determine the functions of vaccines regarding obtained results. For better evaluation of Avinew, La Sota, and Clone30 vaccines, we had to use antibody titers obtained from mentioned vaccines and HI serology was used in this study. This method is common regarding its fastness and low cost in poultry industry for evaluating blood antibodies (Judith and

Alamares, 2005). Based on obtained results from present study, maternal antibody titer in selected chicks was 5.4 n all groups. Groups A,B,C received Avinew, La Sota, and Clone30 vaccines respectively on 10th and 21st days and anti body titer of four groups calculated on 15th day; the rate of which was in four groups was 3.5 and didn't show no meaningful difference(P>0/05). Booster vaccination was conducted proportional to selected vaccines, in groups (A, B, C) on 21st day. Blood samples were obtained from three groups chicks on day 28. At this time, in A,B,C groups that had received booster vaccine, antibody titer was approximately 4 but in group D that received no Newcastle vaccine, the titer was below 2. Another evaluation was conducted in A, B, C groups of each replication without any repetition of vaccination on 42nd day that showed antibody titer higher than 5 and group D (control) showed titer lower than one. Considering obtained results from antibody titer evaluation on 28th and 42nd days, it is appeared that A, B, C groups which received Avinew, La Sota, and Clone30 vaccines two times have higher antibody titer compared with control group which didn't receive any vaccine. So, Group D chicks were susceptible to Newcastle virus after 21st day whereas A, B, C chicks had proper immunity level on 28th day and afterwards. Alexander reported that live lentogenic Newcastle vaccines produce antibody titer about 4-6; in current study the rate of antibody titer obtained from Avinew, La Sota, and Clone30 was about 5 which showed conformity to results of study conducted by Alexander (Alexander *et al.,* 2006; Sang *et al.,* 2003).

Charlos Facon et al. in a report that has been published in Wild life Disease magazine, conducted an evaluation of live lentogenic vaccines and inactive vaccines and found that the rate of antibody obtained from live lentogenic vaccines on 6th day was about 5 or slightly higher that conform with current study's results (Chauhan and Sushovan, 2004). Westhary et al. observed that Avinew and Clone30 vaccines can higher titer compared with B1 strain because of identical titer La Sota vaccine.

J.clilliers in 1996 following an evaluation of La Sota and Avinew vaccines suggested that Avinew vaccine produce antibody titer higher than 5 on 42nd day as La Sota vaccine which conforms to the results of the current study (Cillers, J.A. Coetzee, 1998). Fruncisc Perozo et al. in 2008 revealed that antibody titer obtained from La Sota and Avinew vaccines using ELISA method had no meaningful difference (P > 0.05) which conforms to the results of the current study (Nunes *et al.,* 2002).

Conclusion of the study specially of applied aspect is that in spite of better antibody titer of La Sota vaccine, slight or sever problems maybe resulted of its use specially in respiratory system that can cause CRD Complex in stressful herds. But avinew and Clone30 vaccines, specially Avinew, while acceptable antibody titer make no problem and Avinew vaccine can be used in stead of La Sota vaccine in hazardous areas and stressful conditions.

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