مسح لامراض الطيور الداجنة في خمسة قرى تابعة لمحافظة بغداد ودراسة تأثير الاصابات المتزامن حدوثها في آن واحد على مستوى اضداد مرض نيوكاسل

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الخلاصة

تناولت الدراسة مسح لإمراض الطيور الداجنة في خمسة قرى تابعة لمحافظة بغداد وذلك لغرض الوصول الى اهم الحالات المرضية والعوامل المحددة لصناعة الدواجن.

جمعت البيانات للحالات المرضية للفترة من شهر تموز لسنة 2007 حتى نهاية شهر اذار لسنة 2008. اعتمد في تشخيص الحالات المرضية على تاريخ الحالة المرضية، الاعراض السريرية، التغيرات المرضية العيانية، والعزل الفايروسي لمرض نيوكاسل.

اظهرت النتائج ان اهم الامراض المنتشرة خلال فترة الدراسة هو مرض نيوكاسل الذي شكل اعلى نسبة من المجموع الكلي للحالات المرضية.

سجلت امراض عديدة اخرى في هذه الدراسة منها امراض فايروسية، بكتيرية، طفيلية وامراض العوز الغذائي.

بالاضافة الى هذا، فأن اهمية هذه الاصابات تكمن في عدم تشخيصها بشكل دقيق وهنالك بعض الدلائل التي اشارت الى ان حدوث الاصابات في آن واحد يولد نوع من التثبيط المناعي في الطيور وبالتالي يعزز من امراضية بقية المسببات المرضية.

Introduction

Smallholder poultry production is very important in developing countries. It seems that it will be important for many years to come, because of the high population densities and the enormous number of small farms. (1)

This production is traditional and based on a free – range production system characterized by low inputs and low out puts. (2)

Most often free- range poultry have sub-clinical infections with a high number of diseases occurring at the same time. (3) Furthermore, the biosecurity level in village production system is very low leading to high losses resulting from mixed infections. Therefore, it should be noted here, that combined infection have an impact not only on morbidity, mortality and production parameters such as weight gain, point of lay, but also epidemiological factors such as carrier status, i.e. spread of diseases to other poultry flocks. (4) From another hand, the most important step in the process of improving the health and survival rate of the poultry is to get an extended and more detailed knowledge of how the immune system responds to infections caused by the different pathogens. (5)

Therefore, the main objective of this study, on one hand to determine causes of poultry losses in free range systems and on the other hand to investigate the effect of concurrent parasitic, bacterial and viral diseases in the immune status by analyzing how the concurrent infections influence on each other, this was done using the antibody response towards Newcastle disease virus vaccine as an indicator for changes in the humoral immune response.

Material and Methods

A baseline survey including 5 villages in the districts of Baghdad was carried out. This study lasted for 9 months from July 2007 to March 2008.

Visits to selected farms were conducted in the two (hot and cold) seasons. Thorough histories were recorded, a clinical examination of the birds was conducted and those showing symptoms were purchased.

Dead or slaughtered birds were examined for lesions and appropriated samples for laboratory tests were collected. Serum samples were collected and haemagglutination- Inhibition test (HI-Test) was done in order to assess the immune status of the chicknes. (6)

Fresh feacal samples were collected in small plastic containers from a total of 280 birds during the study period. These were preserved at $4C^{o}$, until examined for presence of parasitic infection

- **Post mortum Newcastle disease virus isolation** :

Tissue samples of the NDv infected birds were used for NDv isolation.

Tissue samples were obtained shortly after killing the bird. The samples were taken from lung, liver, spleen, trachea and placed in phosphate buffer saline, ph 7.0 – 7.4, containing antibiotic.

Tissue samples were processed according to (7) by inoculating of embryonated chicken eggs. After harvesting of allantoic fluid, it tested for haemagglutination activity using HA-Test. Positive HA- tests were followed by HI –test, according to (6).

- Egg Source

Fertile chicken eggs used for virus isolation, were obtained from a commercial hatchery.

Results

Table (1): Important diseases in free – range chickens and the age group in which the disease is most often observed.

Diseases	Age group
1. Newcastle disease	Mainly growers and adults.
2. Fowl pox	All ages.
3. Coccidiosis	Chicks, growers, (adults)
4. Ectoparasite	All ages.
5. Nematodes	All ages.
6. IBD	<8 weeks
7. Mycotoxcosis	All ages
8. Nutritional diseases	Mainly chicks.
9. Airsacullitis	All ages, but mainly chicks.

Table (2): number of cases during the study period

Months	No. of cases for each disease						
	Newcastle Disease	Airsaculitis	Coccidiosis	Fowl Pox	Ext. parasites	Nematods	Total cases
July	19	20	5	5	30	1	80
August	26	40	9	4	25	1	105
September	29	35	11	2	18	3	98
October	33	30	15	-	11	9	98
November	39	45	25	-	9	12	130
December	50	33	40	-	5	13	141
January	60	17	35	1	-	9	122
February	30	16	25	1	2	9	83
March	10	10	19	2	9	3	53
Total cases	296	246	184	15	109	60	910

As showed above, a wide variety of diseases is expected to occur under village condition. Some of these diseases are age- specific, whereas, others are encountered in all age groups. Newcastle disease are formed the majority of the total cases reported. It was isolated and confirmed according to (7). Flock mortality was higher during the cold season (27%) than during the hot season (17.6). The age group mostly affected by diseases was the young chicks. (Table 3).

Table (3): Mortality rate (%) by age and season.

- Percent of death in cold season	27%
- Percent of death in hot season	17.6%
- Percent of death in chicks	33.34%
- Percent of death in growers	12.28%
- Percent of death in adults	10.53%

Results of serological test:

During the study period, serum samples were collected from a total of 144, healthy, non infected chicks and analyzed by HI-test for NDv antibodies. To confirm whether chicks were vaccinated or infected with NDv, we asked farmers to describe the case history.

The results indicated that only 46 birds had high antibody against NDv, while 98 birds had low titre of antibody and were therefore, completely susceptable to NDv. (Table 4)

In some clinical cases, the antibody titres to NDv showed a reduction from more than $\log_2$ of 3 in very young chicks to less than $\log_2$ of 1 in birds over 2 months of age. The mean HI-titre then increased to $\log_2$ of 6 or more in birds older than 3 years.

Furthermore, the chickens having a high level of parasitic infection showed a significant reduction in antibody production post vaccination to NDv compared to the individuals having no or few worm (Table 5).

Table (4): Results of antibody titre to NDv vaccine in non infected birds, using the HI- Test.

Antibody titres	2^1	2^2	2^3	2^4	2^5	2^6	2^7	2^8	2^9	2^{10}	2^{11}
No. of samples	30	30	25	10	1	2	10	6	13	11	6

Low antibody titre High antibody titre

Table (5): a- Result of antibody titres to NDv vaccines in chicken having high level of parasitic infection

Antibody titres	2^1	2^2	2^3	2^4	2^5	2^6	2^7	2^8	2^9	2^{10}	2^{11}
No. of samples	15	12	30	20	10	4	6	9	0	0	1

Table (5): b- Result of antibody titres to NDv vaccines in chickens having no or few worms

Antibody titres	2^1	2^2	2^3	2^4	2^5	2^6	2^7	2^8	2^9	2^{10}	2^{11}
No. of samples	0	3	2	3	6	2	6	13	9	20	20

From another hand, when infection with airsaculitis occur in NDv vaccinated chicks, the antibody titres in these chicks were significantly lowered by at least two logs compared with the other chicks non infected with airsaculitis (Table 6).

Table (6):- Effect of airsaculitis infection on HI-titres to NDv vaccines in chickens.

	* HI titres to NDv vaccine in chickens infected with airsaculitis	* HI titres to NDv vaccine in chickens non infected with airsaculitis
1.	4.22	6.15
2.	3.33	5.14
3.	2.03	4.05
4.	3.20	4.10
5.	1.80	2.40
6.	0.90	3.12
7.	1.40	3.01
8.	2.52	3.55

*values represent arithmetic mean antibody titre of 10 chicks,, measured by HI-test.

Results of endoparasite:

All farms showed helminthiosis and only a total of 34 out of 280 feacal samples examined for worms, gave negative results, which equal an infection prevalence of 87.85.

The most frequently encountered parasitic infection during the study period were coccidia (20.21%) followed by nemadotes (6.59%).

In addition, post mortum examination of dead birds revealed hemorrhages or thickening whitish mucosa and cores of clotted blood in the caeca which specific for *Eimeria tenella* infection .

Furthermore, the coccidiostatic treated chicks had a higher survival rate (85%) and no bloody diarrhea was observed in poultry building, while lower survival

rate (57%), higher number of birds found with bloody diarrhea and higher lesion score were observed in non treated chicks (figure 1).

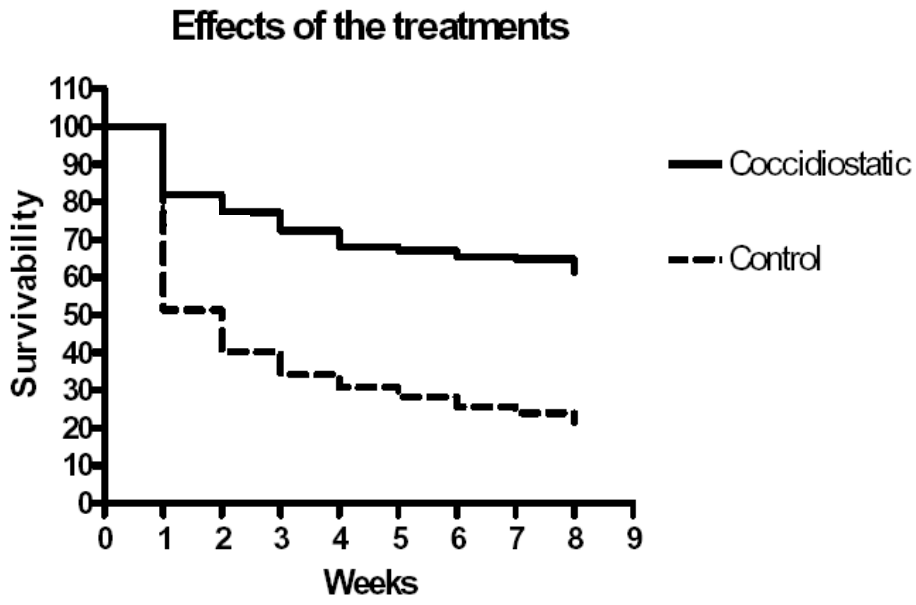

Figure 1:- effect of the treatment on chick survivability

Discussion

Approximately 80% of the world poultry population is kept as free-range poultry. The free-range poultry production, systems have also been designated as low input-low output. (8)

It appeared in the present experiment that, the extent and severity of losses were reported to be seasonal with the greatest magnitude of losses occurring during the cold season. (Table 3).

Martin (9) in a review concluded that diseases outbreaks are often associated with the change of season, specially at the start of the rainy season, with cold weather.

The population dynamics of village flocks may also contribute to the seasonal occurrence of disease epidemics. Seasonal peaks in egg laying and hatching increase the numbers of susceptible birds, which are needed to fuel an outbreaks, at particular times of the year. (10) Thus, there would be a tendency for outbreaks to follow a seasonal pattern.

In addition losses or mortalities in this study were highest in chicks, particularly during the first 3 week after hatching. Similar study (11) has shown that the highest mortalities are reported in the young chicks.

However , it should be noted here that maternal immunity may remain protective for the early weeks of life, while, others without maternal antibodies are very susceptible to diseases and when infections occurs, it results in heavy losses. (10)

From another hand, when looking at table (2), it is evident ND is depicted as the biggest cause of poultry losses.

This problem arises from the fact that vaccination of a flock today does not protect the hatchlings from the next brood. Invariably, the newly hatched chicks are susceptible to the disease. (8) It was also noted that farmers were a ware of how the disease was transmitted to their flock for example, introduction of new birds in to their flocks, other method of ND transmission, include exposure to wild birds and the existence of various age group of birds in the flock. (12)

Thus, seasonal variation in the introduction of new birds and in off take of old birds leads to different age- structures over the year resulting in flocks of varying age-susceptibility to ND. (9)

Many other viral, bacterial and nutritional diseases were also recorded in this study (table 2).

Another disease that was identified as a major cause of mortality was coccidiosis, that was occur most often during winter.

Several studies, on the prevalence of endoparasites have been conducted on indigenous free-range chickes in the world, and they all reported a high prevalence. (13) In accordance with these previous investigation, the finding in this study also indicate that the prevalence of endoparasitic infection is indeed very high among free-range chickens.

This study was further extended to include multifactorial variance analysis models describing the connection between the virus, bacteria or parasite and the HI-Titre, to exclude or at least minimize the effect of a mixed infection on the immune response.

There was clear tendency that chickens with high helminth infection level had a lower antibody response to NDv compared to chickens with a lower infection level (table 5).

Helminthes are known to induce a Th2 immune response in murine hosts (14) and although it is not yet fully established whether chickens, have the same Th1/Th2 subsets within the T-helper cells. (15)

Helminths also do seem to have an immunosuppressive effect on the immune response against viral infections in chickens, which could indicate an immune modulation induced by the parasites or due to another kind of interaction in the immune mechanisms. (16)The effect is probably related to genetic characteristics of the chicken genome. (17)

In addition, chickens infected with airsaculitis showed significantly decreased in antibody titres to NDv (table 6). This finding is in agreement with previous work of (18)

In general. airsaculitis is one of the major problems that have an impact on poultry production and can be occurred by exposure to certain serotype of *E.coli*. (19)

So, the protective mechanisms induced by E.coli are complex, and probably involve activation of host non specific defense mechanisms and inhibition of viral attachment and / or penetration and hence, interfered with NDv absorption and replication. (20, 21)

Initial infection with bacteria can interfere with subsequent viral infection either by producing antiviral soluble factors like interferon and cytokins or by activation of non specific host defense immuse mechanisms like machrophages and natural killer cells. (22)

In conclusion, the interaction between bacterial infection and NDv can lead to modification of the course of the disease and hence, to the response to the live NDv vaccine, as well as evaluation of vaccines.

It has been seen, that concurrent infections (the most common situation under field condition), lead to immunosuppression, increased pathogencity of diseases and a prolonged carrier state. (4)

From another hand, in addition to diseases, a number of external parasites mainly, fleas and mites were identified as a contributing to poultry losses.

Among the adverse effects of these parasites on poultry production were associated with reduction in growth rate of poultry through irritation. Some suck blood resulting in anemia. The parasites were very common in most poultry houses particularly during the hot season.

Farmers indicated that they some times spray the chicken's house with insecticides or use traditional medicines to reduce pests.

But, the long – term consequences of chronic exposure to insecticides is now a global problem. Often, spraying in one area results in not only local contamination but, depending on weather condition and patterns, may result in contamination hundreds to thousands of miles away (23) as a result man and animals are at risk of exposure to these insecticide.

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