An outbreak of a respiratory infection of multi-agents occurred in poultry flocks in Tripoli, Libya

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Abstract

During March-May / 2005, the poultry industry in Tripoli faced heavy losses that was characterized by high mortality and respiratory distress. A field analysis of 800,000 broilers of various ages with clinical respiratory infections were conducted. Serum was collected from a 92 broiler at a 6, 10, 19, 23, 31, 43, 48 and 53 days of age. The sero-conversion of antibody titters were detected by Enzyme Linked immunosorbent assay (ELISA) against NDV, IBV, CAV and ORT.

Although vaccination against NDV was performed at day 5 using Hitchner B1 and the birds were boosted at day 21 and 28 by La Sota, a very low antibody titter(2^2) was recorded between 6 to 43 days of age. However, the titter was significantly raised (2^5.5) at 48 and 53 days of age. Vaccination against IBV was conducted only at one-day-old using H120, the antibodies titter were dropped to 2^4 at day 23 whereas, it were significantly increased to 2^12 between day 31 to 53 of age. No vaccination were used against both CAV and ORT. The majority of broiler have detectable antibodies titter against CAV and ORT at day 6 and10, dropped to minimum between day 19 to 43 of age and again sharply raised at the end of the fattening period (day 48 and 53). In conclusion, a field infection of IBV as early as day 25-30 of age were recorded. In addition NDV field infection could also considered at older birds (day 40-50). Vertical transmission of both CAV and ORT were documented as well as a field infection. A mishandling of vaccine in either a storage or application were speculated
to be the actual cause of this outbreaks. Moreover, the vaccination schedule need to be revised (e.g. changes in vaccine strains used and in the time of application) and an excellent monitoring system for various locations should be validated.

**Keywords:** Respiratory infection;

**Introduction**

During the last three decades, poultry industry was tremendously expanded in Libya. Commercial poultry industry consists of broiler for production of white meat (99 thousand tone/year) and the layer for production of table eggs (1000 million eggs/year) (4). Broiler breeders raised locally whereas, fertile eggs of layers were imported from overseas. While the poultry industry has expanded significantly as a result of internal privatization investments, it is also experiences a significant disease disasters. A vast losses have occurred during March-May / 2005 from high mortality rate in broiler chickens and declines in egg production for both parents and layers flocks. Many poultry pathogens (ORT, ICAV, Salmonella and Mycoplasma) could e incorporated in this crises. Moreover, Infectious bronchitis virus (IBV) and Newcastle disease virus (NDV) infection also could be one of the main causes over those losses.

In this study, a field analysis of a commercial poultry with clinical respiratory distress in Libya were conducted. Clinical history, lesions and sero-conversion or rising of antibody titers by ELISA to various pathogens were reported.

**Materials and Methods**

**Birds and Samples:**

A poultry integrated complex with a total number of broiler around 800.000 at various ages were investigated. Sera from various ages were collected from broiler at various ages (Table 1).
Table 1. Show the age of birds in days and the numbers of samples.

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<th>Age of birds (days)</th>
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<td>53</td>
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Enzyme-linked immunosorbent assays (ELISA):
The sera were separated and diluted five hundred fold (1:500) with sample diluent prior to being examined. The indirect ELISA was carried out to investigate the presence of antibodies against NDV, IBV and ORT, using FlockChek NDV, IBV, ORT Antibody Test Kit developed by IDEXX Laboratories (Westbrook, Maine, USA). The blocking ELISA was carried out to investigate the presence of antibodies against CAV, using FlockChek CAV Antibody Test Kit developed by IDEXX. Both procedure steps of the ELISA were followed according to the manufacturer’s recommendations. The absorbance values were evaluated photometrically by automated micro-plate reader (Elx800) from BIO-TEK® INSTRUMENTS, INC. USA. The absorbance values were measured at 650 nm, A (650). Individual bird antibody were expressed as antibody titers. Flock mean titers were calculated from individual titers.

**Results and Discussion**
The vaccination schedule against NDV consist of primary vaccine at day 1-5 using Hitchner B1. A secondary vaccine was conducted usually later at day 21 and 28 by La Sota, In both cases, vaccine was applied by drinking water. A very low antibody titter\(^2\) was recorded between 6 to 43 days of age. However, the titter was significantly raised \((2^{5.5})\) at 48 and 53 days of age (Figure 1, A).
Vaccination against IBV was conducted only at one-day-old using $H_{120}$. Maternal and/or vaccinal antibodies were detected at 6-10 days of age. The antibodies titer were dropped to $2^4$ at day 23 whereas, it were significantly increased to $2^{12}$ between day 31 to 53 of age (Figure 1, B).

**Figure 1.** The antibodies level were detected using ELISA at various ages of broiler for NDV (A), IBV (B), CAV (C) and ORT (D).
Although, no vaccines were used against CAV, 7 out of 10 at day 6 and 10 out of 11 at day 10 of birds have detectable antibodies titer (positive) against CAV (Figure 1, C). The number of positive birds were only 2 out of 10, 1 out of 10, 1 out of 12 and 2 out of 18 birds at day 19, 23, 32, 43 of age respectively. In contrast, the number of positive birds were increased at day 48 (4 out of 12) and at day 53 (6 out of 9).

Specific antibodies against ORT were detected as early as day 6 and 10 of age and dropped to minimum between day 19 to 31 of age (Figure 1, D). Again it was sharply raised at the end of the fattening period (day 48 and 53).

Worldwide, the intervention strategy for the prevention of clinical IBV and NDV infections in poultry is vaccination (1,2,3). However, protection by vaccination with IBV vaccine of a given serotype, is directed mainly against the homologous serotype and less against strains of other serotype (1,3). In contrast, NDV vaccine could protect any diverse serotype (1,2). In order to enable the choice of a vaccination program with the best chance of sufficient protection against an NDV and IBV infection in the next flock, it is necessary to know which IBV serotyp(s) have been circulating on the area in question, and its neighboring, i.e. to establish a herd history bank (3). Unfortunately, in Libya such herd history bank is not provided with reliable information. Therefore, this study indicate that, a field infection of IBV was occurred based on the antibodies raising after day 23 of age. Day-old vaccine response was recorded only till day 15 of age using H120 (unpublished results). Therefore, there was a correlation between the absence of the specific antibodies after routine vaccination and the development of the clinical signs of IBV infection.

This investigation indicates that the vaccine program against NDV could not able to defence against the virulent field isolate. Because, the specific antibodies titter were very low and birds are in face of high risk of infection from day 6 till day 43 of age. From that point of view, NDV field infection was considered at older birds (day 40-50). Moreover, vertical transmission of both CAV and ORT were documented as well as a field infection.

In conclusion, a mishandling of vaccine in either a storage or application were speculated to be the actual cause of this outbreaks. Moreover, the vaccination schedule need to be revised (e.g. changes in vaccine strains used and in the time of application) and an excellent monitoring system for various locations should be validated.

References

