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Seroprevalence Avian Metapneumovirus in Broiler Chickens by Indirect Elisa in Duhok Province, Kurdistan, Iraq

Dyar Adil Morad[1]* and Aqeel Mohamed Shareef [2]

[1]Department of Microbiology and Pathology-College of Veterinary Medicine, University of Duhok, Iraq. E- mail: dyar.adil@uod.ac, Phone: 009647504260447

[2]Department of Pathology-Poultry Disease, College of Veterinary Medicine, University of Mosul, Iraq. E- mail: Aqeelalshater@gmail.com, Phone : 009647502210767

THIS study intended to detect a serological prevalence of avian metapneumovirus (aMPV) antibodies by indirect ELISA. Although its presence in our poultry production is unclear, AMPV is reported as a major poultry virus that causes acute, highly contagious upper respiratory tract infections in chickens and swollen head syndrome, both of which cause considerable cost-effective losses to the chicken industry all over most countries. In the province of Duhok, serum samples totaling 450 were taken from 10, 6-8 weeks old aMPV non vaccinated broiler flocks in the period from November 2021 to March 2022, these flocks will be situated in high poultry farm lands to the east of Duhok. 120 (26.6%) of the 450 serum samples examined by indirect ELISA for the presence of (aMPV) Antibodies, or 4 (40%) of the 10 samples Results from the examination of broiler flocks indicated that this virus infected broiler chickens. Using biosecurity will help reduce infections among broilers, and excellent ventilation practices will help farms as well. This research on an MPV was conducted for the first time in Duhok province, Iraq.

Keywords: Avian metapneumovirus, Chickens, Duhok, Indirect ELISA.

Introduction

One of the most significant pathogens producing swollen of head in chicken is avian metapneumovirus (aMPV). AMPV is an RNA virus under the Paramyxoviridae family's Pneumovirinae subfamily. In 1978, this family, which is characterised by not-segmented, was first identified in South Africa before being discovered elsewhere in the world ([1, 2]. The young flocks (4–9 weeks old) that were most severely damaged were predominantly [3]. All ages are vulnerable to infection, and morbidity in birds can approach 100% during the incubation period of 3–7 days. While the mortality rate varies from 1 to 30% depending on many factors as, the flock's personality, age, and secondary infection [4]. Clinical signs of infected birds consist of depression, in appetence, nasal discharge. These signs lead to facial edema, which begins upper and lower part of eye then spreads to the head and submandibular tissues. Additionally, nervous symptoms, such as torticollis and a reluctance to move, may be present [5]. The most popular technique for diagnosing aMPV infections, particularly in flocks that were unvaccinated, is serological aMPV revealing. The most often used test for aMPV analysis is ELISA [6]. The present study was aimed to investigating the serological prevalence of aMPV in infected broiler flocks by indirect ELISA in Duhok Province.

Corresponding author: Dyar Adil Morad, E- mail: dyar.adil@uod.ac, Tel.: +9647504260447
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Material and Methods

Study area

Duration of the study from November 2021 to March 2022. Ten broiler chicken flocks were investigated. East of the Duhok province, in the areas of Qasrook and Rovai.

Collecting of blood Samples

Four hundred and fifty (450) random blood samples for sera were individually collected from 10 flocks (45 samples/ flock). Sampled chicken flocks were non vaccinated against aMPV and suffering from respiratory and swollen head signs. Three milliliters of blood first were taken from each bird's wing vein using a sterile disposable syringe. The blood was then poured into a clean tube without anticoagulant, centrifuged at 3000 rpm for five to ten minutes, and the serum was separated and stored in multiple marked clean tubes kept at - 20 ˚C for the ELISA test Present study was approved by ethical Committee, college of veterinary medicine, University of Duhok, Iraq.

Serological test

The procedure of an ELISA test applied by following the kit's manufacturer's instructions, perform a serological analysis of the samples using the ELISA. AMPV antibodies investigation kit (BioChek).

This formula was used to calculate the S/P ratio:

$$\text{S/P ratio} = \frac{M_{\text{sample}} - M_{\text{NC}}}{M_{\text{PC}} - M_{\text{NC}}}$$

Ab titre

Log10 titre =1.0(log10S/P) + 3.52

Titre range = 1656 or more is regarded as positive, while 1655 or less is regarded as negative (according to kit protocol).

Results

Out of 450 serum samples collected, 120 samples were positive, in an overall prevalence of 26.6% (Table 1). Inthe 10 flocks examined, 5 were in Qasrook and 5 were in Rovia. In Qasrook, the highest prevalence was found in 3 flocks, where 60% of samples from broiler flocks were positive, compared to positivity in 1 flock (20%) in Rovia. Significant differences were detected with a P-value of 2.008 ($p< 0.05$).

Discussion

This seroprevalence represented as first study in Duhok to detect aMPV antibodies in 26.6% of tested samples from broiler chickens. An ELISA test is useful method in detection of aMPV [8]. In Twain [9] described that rate (86.4%) were seropositive against aMPV ,this study results are higher than our study because of there is mixed infection with immune-suppression viral disease like (IBD).Another study in Iran [10] showed that (48.1%) were positive to aMPV, there was great percent of Abs Titers because of endemic infection in area. More addition in India [11] reported a higher levels to aMPV (31.8%) due to huge numbers of Turkey production near to chicken flocks as well as, the results are strengthened by Cook et al.[12], who suggested employing live-attenuated TRT vaccinations , challenging hens with a virulent virus to see if they responded serologically to aMPV less strongly than turkeys.. However, a low percentage in neighboring country for instance Jordan [13] reported (21.7%) were positive Ab titers for aMPV, in broilers. Furthermore, in Egypt [14] used ELISA to detect prevalence to aMPV, (21%) of Ab detection against aMPV, low prevalence rate detected because of less number of sera samples examined. More addition to, aMPV is also associated with bacterial infection in chickens, but always complicated with other agents like IB virus (15). The replication of (aMPV and IB) viruses together are well-known into epithelial

TABLE 1. Seroprevalence results of avian metapneumovirus in broiler chickens in Duhok city.

Area	No. of flocks	No. of positive samples	Percent %	No. of positive flocks	Percent %	*P-value
Qasrook	5	80	35.5%	3	60	
Rovia	5	40	17.7%	1	20	2.008
Total	10	120	26.6	4	40	

tissue of the upper part of respiratory tract (16) leading to the possibility that there might be interference between them. Furthermore, (17) who reported that duplication of aMPV interfered with IB virus after vaccination resulted in a decline in the Ab yield but there is will have no opposite influence on the induction of defensive immunity. As the majority of the flocks that were evaluated had infection were older than 4 weeks old and had never received an aMPV vaccination (18).

Conclusion

In Duhok Province, broiler chickens were not immunized against the aMPV. Reputable biosecurity programs were used to prevent the transmission of the disease to poultry and to regulate the atmosphere inside farms.

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الانتشار المصلي لفيروس الميتانيمو الطيور في الدجاج اللحم بواسطة الاليزا الغير المباشر في محافظة دهوك كوردستان - العراق

ديار عادل مراد[1] و عقيل محمد شريف[2]
[1] فرع الأحياء المجهرية الدقيقة وعلم الأمراض - كلية الطب البيطري - جامعة دهوك - دهوك - كوردستان - العراق.
[2] فرع الامراض والدواجن - كلية الطب البيطري - جامعة الموصل - الموصل - العراق.

هدفت هذه الدراسة إلى تحديد الانتشار المصلي للأجسام المضادة لفيروس ميتانيموفيروس للطيور (اي ام بي قي) بواسطة الاليزا غير المباشر. بالرغم من عدم وضوح وجوده في إنتاج الدواجن في المنطقة إلا أن (اي ام بي قي) هو فيروس رئيسي للدواجن يتسبب في التهابات الجهاز التنفسي العلوي الحادة شديدة العدوى في الدجاج ومتلازمة الرأس المنتفخة ، وكلاهما يسبب خسائر كبيرة فعالة من حيث التكلفة لصناعة الدجاج. حيث تم جمع أربعمائة وخمسين عينة من مصل الدم من ١٠ قطعان دجاج اللاحم الغير الملقحة وتتراوح اعمار القطعان بين (٦-٨) اسابيع في شرق دهوك ذات الكثافة العالية من الدواجن. من تشرين الثاني ٢٠٢١ الى آذار ٢٠٢٢. ، تم فحص ٤٥٠ عينة مصل بواسطة الاليزا الغير المباشر ، وكانت ١٢٠ (٢٦.٦٪) موجبة للأجسام المضادة لـ (اي ام بي قي) ، والتي تمثل٤ (٤٠٪) من القطعان المفحوصة، وأظهرت هذه النتائج تأثر دجاج التسمين بهذا الفيروس. تطبيق الأمن وقائي البيولوجي للحد من العدوى بين الدجاج اللاحم وبرنامج التهوية الممتازة في المزارع لحد لهذا الفيروس الممرض الهام للدواجن. أجريت هذه الدراسة لأول مرة على (اي ام بي قي) في محافظة دهوك ، العراق.