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THE CLINICAL, PATHOLOGICAL AND SOME BIOCHEMICAL CHANGES IN THE BLOOD SERUM CONSTITUENTS OF CHICKENS INFECTED BY CELO VIRUS

(With One Table)

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الصورة الأكلينيكية الباثولوجية بالاضافة الى التغيرات البيوكيميائية
في مكونات مصل دم الدجاج بعد العدوى الصناعية بفيروس السيلو

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تم اجراء العدوى الصناعية بفيروس السيلو في كتاكيت محلية عمر أربعة عشر يوما باستخدام الحقن تحت الجلد والعدوى عن طريق الأنف ، وقد لوحظ حدوث ضعف عام مع تأثير على الصحة العامة للطيور بعد الحقن باستخدام الطريقتين مع عدم ظهور الأعراض الأكلينيكية للمرض مع ملاحظة عدم ظهور علامات باثولوجية على الكبد . وقد تم اعادة عزل الفيروس من الطيور المعداة . بالنسبة للصورة البيوكيميائية : شمل البحث تقدير تركيزات بعض مكونات مصل دم الدجاج بعد العدوى بفيروس السيلو مثل الجلوكوز والكوليسترول مقدرة بالملليجرام لكل ١٠٠ ملليمتر من مصل الدم وكذلك البروتينات الكلية مقدرة بالجرام لكل ١٠٠ ملليمتر من مصل الدم بالمقارنة لمكونات مصل دم الدجاج الغير معامل، وقد لوحظ زيادة معنوية في مستوى الجلوكوز والكوليسترول مع انخفاض في مستوى البورتينات الكلية.

SUMMARY

Fourteen days old chickens (local breeds), were inoculated subcutaneously and intranasally with adeno-virus (CELO). Depression with temporary effect on general health was observed after inoculation using two routes, without reproducing the disease, no liver lesions were observed while reisolation of the virus was done. Concerning biochemical changes in the blood serum constituents of chickens infected with CELO virus, the concentration of glucose, cholesterol (mg/dl) and total proteins (gm/dl) were estimated in the serum of infected and control birds. A significant increase of both glucose and cholesterol levels was observed in the serum of chicken infected subcutaneously and intranasally by CELO virus. Total protein levels decreased in serum of infected bird than non infected ones.

INTRODUCTION

Avian adenoviruses are widely spread in poultry population, it constitue a common infectious agents of chickens COOK (1970). They have been associated with or without apparent clinical signs. Many workers have been unable to reproduce clinical disease following the exposure of chickens to adenoviruses YATES and FRY (1957); CHOMIAK et al. (1961); KAWAMURA and HORIUCHI (1964); MOUSTAFFA-BABJEE and SPRADBROW (1975) and McFERRAN & ADAIR (1977). Adenoviruses can also produce a variety of clinical and pathological conditions. MONREAL and AHMED (1963) noticed only a slight respiratory disturbance and temporary effect on general health after inocultion of chickens with a CELO strain. The pathogenicity of adenoviruses was established by experimental infection of chickens FADLY and WINTERFIELD (1973) and ROSENBERGER et al. (1974).

Serum or plasma chemistry is routinely used for the detection of both evaluation of organ function and its disease in domestic mammals. Veterinarians are just beginning to use this tool in the evaluation of avian patients to achieve the same degree of critical evaluation that it has in domestic mammals. Veterinarians are confronted with the problem of sample size when dealing with avian serum chemistries. This problem has been somewhat alleviated by the development of accurate microtechniques, and the development of dry reagent and reflectance photometric methods that offers the avian veterinarian a reliable and clinically meaningful "in house" serum chemistry capability. Investigators will continue their interest in avian clinical pathology and provide sufficient informations to permit a continued evaluation of the various tests available.

The present study was conducted to clearify:

1- The clinical and pathological picture after intranasal and subcutaneous inoculation of adenovirus (CELO phelps strain).
2- Studies on the biochemical parameters in chickens after infection with adenovirus (CELO phelps strain).

MATERIAL and METHODS

Three groups of 10 birds each (Dandarawi breed) 14 days old were used in the present work. This birds were supplied by the Faculty of Agriculture poultry farm, Assiut University. All birds were proved to be free from bacterial andviral diseases by trials of isolation and serological testing.

CELO - phelps strain from the Institute of Poultry Diseases, Berlin was used in this experiment at a concentration of $10^{-8.2}$/ml. ELD50, was titrated before use in the experiment.

The first group of birds was inoculated subcutaneously by 0.2 ml of virus suspension containing $10^{-8.2}$/ml. ELD50 and the second group was inoculated intranasaly by the same dose. The third group was kept separately as non infected control.

Each group of birds was kept in a separate cage. All the environmental conditions including temperature, humidity and light were under control. Moreover, feeding ration and drinking water were allowed ad Libitum. All birds were under close observation for 2 weeks following inoculation for any clinical symptoms manifested by the birds and/or mortalities.

Serum samples and cloacal swabs were collected at the end of the second week from both experimental and control birds. Serum samples were subjected to biochemical examination and precipitating test. On the other hand, trials of viral isolation from cloacal swabs were carried out.

By the end of the second week, all birds were sacrificed and gross post mortem lesions were recorded.

The concentration of glucose, cholesterol, (mg./dl.) and total proteins (gm./dl.) were estimated using testkits supplied by Biomerieux (Bains, France) and following the techniques decribed by SIEST et al. (1981); RICHMOND (1973) and PETERS (1968) respectively. The obtained results were statistically analysed according to the procedures of MINIUM and CLARKE (1982).

RESULTS

No clinical signs were observed after both subcutaneous and intranasal infection routes, while in some birds depression with temporary effect on generl health was observed after inoculation. After 2 weeks no liver lesions were noticed. Reisolation of the virus from itestinal content was done after 2 weeks.

DISCUSSION

Adenovirus infections of avian species have been regarded as veterinary medical oddities since their role in the etiology of clinical disease often remaining obscure in addition marked difference in pathogenicity among isolates of the same and different serotypes have been demonstrated, WINTERFIELD (1984).

Avian adenoviruses have not necessarily been associated with a disease; indeed, at times they have been described as orphan viruses with a questionable disease - inciting potential. One of these was designated chicken embryo lethal orphan virus (CELO) by YATE and FRY (1957).

The pathogenicity of some of these viruses was established by experimental infection of chickens FADLY and WINTERFIELD (1973) and ROSENBERGER et al. (1974).

Concerning clinical symptoms and post mortem lesions after infection with adenovirus strain (CELO - phelps strain), a mild temporary effect on general condition was observed, without reproducing the disease or appearance of hepatic lesions. In contrast MONREAL and AHMED (1963) noticed only a slight respiratory disturbance and temporary effect on general health after inoculation of chickens with a CELO strain. Many

workers have been unable to reproduce clinical disease following the exposure of chickens to adenoviruses YATES and FRY (1957); CHOMIAK et al. (1961); KAWAMURA and HORIUCHI (1964); MUSTAFFA - BABEE and SPRADBROW (1975) and McFERRAN and ADAIR (1977).

The present work was in agreement with TAYLOR and CALNEK (1962); FADLY and WINTERFIELD (1973) and WINTERFIELD et al. (1973), who could isolate adenoviruses from chickens with or without presence of obvious signs of disease. This coincides also with the findings of BURKE et al. (1959) and AGHAKHAN (1974) who found that most adenovirus infections are probably silent. No clinical signs are observed in many flocks from which viruses were isolated or in which serologic conversions were detected.

Respiratory tract infections with mild signs and lesions have been recorded by KAWAMURA et al. (1963) and WINTERFIELD et al. (1973). DHILLON et al. (1982), they also demonstrated respiratory signs and pulmonary lesions in chickens inoculated with isolates representing different serotypes of the virus.

In addition, these result are supported by the findings of OLSON (1950) who observed chickens and turkeys were susceptible to experimental infections with CELO virus, either by no clinical symptoms or relatively mild respiratory signs however virus was reisolated from both species.

Concerning P.M. lesions observed after injection using two routes of infection. The results of present study disagree with RINALDI et al. (1968) and WINTERFIELD et al. (1973) who found a hepatitis in chickens, varying in severity, after infection with CELO virus.

Serum glucose level in the present work recorded signiicant ($P/\_\_ 0.05$) differences between infected and non infecte birds. ALTMAN and KIRMAYER (1976) demonstrated diabetes mellitus in birds suffered from hepatic fibrosis, necrosis and lipidosis, but with a normal pancreas (Table 1).

Regarding serum cholesterol values, the obtained results revealed a significant ($P/\_\_ 0.05$) increase after infection using two routes comparing with control. This increase might be due to affection of the liver. HALLWELL (1981) recorded that hypercholesterolemia has been associated with starvation, high level of dietary fat, hypothyroidism, and liver disease (Table 1).

Significant ($P/\_\_ 0.05$) decrease of serum total protein was observed in the samples of birds infected with CELO virus either with subcutaneous or intranasal routes. Similar ALTMAN, (1979) concluded hypoproteinemia with chronic renal or hepatic disease, malnutrition, malabsorption or chronic blood loss (Table 1).

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Table (1): Blood serum concentration of glucose, cholesterol (mg./dl.) and total proteins (gm./dl.) of experimental birds.

No.	treatment	parameter		
		glucose mg./dl.	cholesterol mg./dl.	Total protein gm./dl.
1	control	214.09	128.4	3.2
2	control	178.64	130.3	3.4
3	control	200.00	120.1	3.8
4	control	199.64	137.4	3.6
5	control	210.00	135.5	3.7
$\bar{x}$±sE		200.47±12.27	130.34±6.08	3.54±0.22
6	I.N.	347.27	210.6	2.3
7	I.N.	375.45	205.3	2.6
8	I.N.	327.27	230.1	2.3
9	I.N.	306.82	229.7	2.6
10	I.N.	339.20	219.2	2.5
$\bar{x}$±sE		319.20±42.32	218.98±9.95	2.46±0.14
11	S/C	388.64	228.1	2.5
12	S/C	390.45	221.6	2.6
13	S/C	350.00	216.3	2.7
14	S/C	456.82	210.4	2.5
15	S/C	375.45	225.1	2.6
$\bar{x}$±sE		392.27±35.36	220.30±6.32	2.58±0.07

No. = Number.

I.N. and S/C = the level of the parameter after intranasal & subcutaneous infection by CELO virus.

$\bar{x}$±sE = Mean + Standard error