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DIAGNOSTIC AND TREATING TRIALS FOR MYCOPLASMOSIS WITH EMPHASIS ON CHEMICAL ANALYSIS OF BLOOD COMPONENTS

MONA MOHAMED SHAKER and AMAL M. EL-BAGOURY.

Animal Health Research Institute, Dokki, Giza.

SUMMARY

Experimental infection of chicks with *Mycoplasma gallisepticum* and *M. synoviae* was assessed to study the influence of infection on blood glucose and cholesterol levels as a method of diagnosis. Infection with mycoplasma (reference and field strains) resulted in increase of serum glucose and cholesterol levels which returned to their normal levels after treatment with Kitamox.

INTRODUCTION

In domestic poultry, several species of mycoplasma are considered of economic importance because of their association with disease problems and reduced egg production, low hatching rate and broiler meat output compared to pathogenic mycoplasma free flocks (Stipkovitis, 1979).

Experimental infection of chicks with *M. gallisepticum* was associated with increase of serum glucose and cholesterol levels (Siegal et al., 1972 and Fatma El-Shahat, 1981). On contrast, cholesterol level was decreased in serum of chickens infected with the ND (Schiara, 1962).

Information about the effect of Kitamox (amoxycillin tartarate) application on birds and for the treatment of chickens from mycoplasma as well as its effect on serum glucose and cholesterol levels are not available. So the aim of this study was to determine the role of Kitamox application on the condition of birds and serum glucose and cholesterol levels. Regarding that an *in vitro* sensitivity testing was applied for the *Mycoplasma gallisepticum* and *M. synoviae* against different antimicrobial drugs.

MATERIAL AND METHODS

1- One hundred, one-day old chicks free from mycoplasma as evidenced culturally (PPLO medium, Difco (Razin, 1978) used for cultivation of *M. gallisepticum;* Frey's medium, Difco (Frey et al., 1968) used for cultivation of *M. synoviae;* isolation (Razin and Tully, 1983) and serological (serum plate agglutination test and HI test, Meszaros, 1964). Twenty chicks of each group were experimentally infected with MG type culture, MG field strain by intranasal inoculation route and MS type culture, MS field strain by injection in foot pad and finally control gorup, respectively.

The injection of the chicks with 0.2ml of mycoplasma according of Kuba et al. (1968). Broth culture (C.F.U. 10^7) was inoculated on the 3rd week (21 days old).

The mycoplasma strains were supplied by Dr.

Table (1): Number of chicks used for the application of Kitamox 10 µg/ml (drug).

Type of group	Number of chicks
Negative control	20
Positive control infected with MG	20
Positive control infected with MS	20
Infected group with MG and treated	20
Infected group with MS and treated	20
Total	100

S. Kleren, Athens, Georgia, U.S.A.

2- One hundred one-day old chicks (Table, 1). The treated group received Kitamox (10 µg/ml) in drinking water for 5 days after one week post infection.

Blood samples were collected from experimentally infected, from treated birds as well as control birds for serum separation for biochemical analysis of glucose as described by Henry et al. (1974) and total cholesterol as determined by Watson (1960).

All chicks were maintained on balanced diet during this study.

RESULTS

The results of Tables (2 & 3) showed that the glucose level was significantly increased in the chicken serum infected with *M. gallisepticum* and *M. synoviae compared with the negative control.*

Tables (4 & 5) showed that the level of the cholesterol was increased in the chicken serum infected with M. gallisepticum and *M.synoviae* compared with the negative control chickens.

From Tables (6 & 7) it was noticed that the level of glucose was significantly decreased after treatment compared with the positive (infected) control group.

Tables (8 & 9) showed that the level of cholesterol was significantly decreased in the serum of treatment chicken compared with the positive control gorup.

Table (2) : Mean values of chicken serum glucose (mg/100 ml) after *M. gallisepticum* infection (± S.E.).

Weeks post infection	MG (field strain) Mean ± S.E.	MG (S6) Mean ± S.E.	Negative control Mean ± S.E.
1*st* week P.I.	94.15±2.1*	84.68±2.5	79.32±0.4
2*nd* week P.I.	168.77±7.6**	137.35±2.0**	96.66±1.9
3*rd* week P.I.	169.33±8.0**	163.08±10.1*	105.05±2.3
4*th* week P.I.	169.33±8.0*	160.67±0.7**	110.58±0.6

* Significant at $p < 0.01$

** Significant at $p < 0.001$

Table (3) : Mean values of chicken serum glucose (mg/100 ml) after *M. synoviae* infection (± S.E.).

Weeks post infection	MS (field strain) Mean ± S.E.	MS WVU Mean ± S.E.	Negative control Mean ± S.E.
1*st* week P.I.	94.31±1.8*	97.45±0.8	79.32±0.4
2*nd* week P.I.	162.64±4.5**	171.80±5.9**	96.66±1.9
3*rd* week P.I.	163.93±2.3**	181.60±3.7*	105.05±2.3
4*th* week P.I.	159.29±2.2*	172.90±10.1**	110.58±0.6

* Significant at $p < 0.01$

** Significant at $p < 0.001$

Table (4) : Mean values of chicken total serum cholesterol (mg/100 ml) after *M. gallisepticum* infection (± S.E.).

Weeks post infection	MG (field strain) Mean ± S.E.	MG (S6) Mean ± S.E.	Negative control Mean ± S.E.
1*st* week P.I.	135.52±1.4**	134.18±1.7**	105.30±1.5
2*nd* week P.I.	145.16±4.1**	139.81±0.4**	108.21±1.2
3*rd* week P.I.	168.72±3.5**	142.58±1.1**	109.00±1.2
4*th* week P.I.	190.97±0.8**	164.90±2.7**	110.73±0.7

* Significant at $p < 0.01$

** Significant at $p < 0.001$

Table (5) : Mean values of chicken total serum cholesterol (mg/100 ml) after *M. synoviae* infection (± S.E.).

Weeks post infection	MS (field strain) Mean ± S.E.	MSWVU Mean ± S.E.	Negative control Mean ± S.E.
1*st* week P.I.	132.00±1.1**	125.37±1.3**	105.30±1.5
2*nd* week P.I.	143.18±1.3**	142.00±1.3**	108.21±1.2
3*rd* week P.I.	152.22±3.7**	145.53±2.5**	109.00±1.2
4*th* week P.I.	181.13±4.4**	181.77±4.9**	110.73±0.7

* Significant at $p < 0.01$

** Significant at $p < 0.001$

Table (6) : Mean values of chicken serum glucose level (mg/100 ml) after treatment from *M. gallisepticum*.

Weeks post infection	Infected treated Mean ± S.E.	Control + ve Mean ± S.E.	Negative control Mean ± S.E.
1*st* week P.I.	96.6±5.2**	123.9±3.9	79.1±0.5
2*nd* week P.I.	98.6±0.9**	169.7±3.8	79.3±1.6
3*rd* week P.I.	101.6±2.8**	178.9±4.7	80.2±1.1

** Significant at $p < 0.001$

Table (7) : Mean values of chicken serum glucose level (mg/100 ml) after treatment from *M. synoviae*.

Weeks post infection	Infected treated Mean ± S.E.	Control + ve Mean ± S.E.	Negative control Mean ± S.E.
1*st* week P.I.	97.3±2.5**	123.9±3.9	79.1±0.5
2*nd* week P.I.	98.6±5.4**	169.7±3.8	79.3±1.6
3*rd* week P.I.	103.0±2.2**	178.9±4.7	80.2±1.1

** Significant at $p < 0.001$

Table (8) : Mean values of chicken total serum cholesterol (mg/100 ml) after treatment from *M. gallisepticum*.

Weeks post infection	Infected treated Mean ± S.E.	Control + ve Mean ± S.E.	Negative control Mean ± S.E.
1*st* week P.I.	106.7±1.3**	134.8±2.6	104.5±1.8
2*nd* week P.I.	118.3±5.0**	151.8±3.2	107.2±2.6
3*rd* week P.I.	124.6±1.6**	168.9±2.8	108.6±0.69

** Significant at $p < 0.001$

Table (9) : Mean values of chicken total serum cholesterol (mg/100 ml) after treatment from *M. synoviae*.

Weeks post infection	Infected treated Mean ± S.E.	Control + ve Mean ± S.E.	Negative control Mean ± S.E.
1*st* week P.I.	108.3±0.6**	134.8±2.6	104.5±1.8
2*nd* week P.I.	119.3±4.3**	151.8±3.2	107.2±2.6
3*rd* week P.I.	126.6±1.4**	168.9±2.8	108.6±0.69

** Significant at $p < 0.001$

DISCUSSION

From the results obtained (Tables 2 & 3), it is noticed that blood glucose level significantly increased in the infected groups, compared to its level in the control negative ones. Our data confirmed the work of Juszkiewicz (1966) who observed that the serum glucose level was significantly increased in cockerels infected with *Pasteurella multocida*. Moreover, Siegal et al. (1972), found that chicks inoculated with Newcastle disease and *Mycoplasma gallisepticum* evidenced elevated level of blood glucose. On contrast, the investigation of Lietsch (1963) and Hazelwood (1965) showed that diseases which induce states of increased body temperature appear to induce hyperglycemia in birds.

Concerning serum chlolesterol, our results showed that the serum total cholesterol level was significantly increased in mycoplasma infected groups (reference and field strains) compared to the level in the normal negative group. Our results support the data obtained by Juszkiewicz (1967) who stated that the serum cholesterol levels were significantly increased in cockerels infected with *Pasteurella multocida*. On contrast to that, the cholesterol level in the serum of chickens infected with disease or after vaccination with N.D.V., either decreased or did not alter during the period of experiment. Data about the levels of glucose and cholesterol in the serum of chicks after

treatment with Kitamox are lacking, but our results showed that serum glucose and cholesterol levels returned to normal after treatment.

REFERENCES

Fatma El-Shahat, T.(1981): Effect of stress caused by Newcastle vaccination on the blood of Hubbard chickens. M.V.Sc., Fac. Vet. Med., Cairo Univ.

Frey, M.C.; Hasan, R.P. and Anderson, D.P. (1968): A medium for the isolation of avian mycoplasma. Am. J. Vet. Res., 29: 2164-2171.

Hazelwood, R.L. (1965): Carbohydrate metabolism. In: Avian Physiology, 2nd Ed., B.D. Sturki, Ed. Comstock Publishing Assoc., Ithaca.

Henry, R.J.; Cannon, D.C. and Winkelman, J. (1974): Clinical Chemistry, Principles and Techniques. 2nd Ed., Harper and Row Publishers Inc., N.Y., P. 1288.

Juszkiewicz, J. (1966): Hyperthermia and prednisolone acetate as promactive factors of *Pasteurella multocida* infection in chickens. Pol. Arch. Veternaryine, 10: 141-151.

Juszkiewicz, J. (1967): Experimental *Pasteurella multocida* infection in chickens exposed to cold: Biochemical and Bacteriological investigation. Pol. Arch. Veternaryine, 10: 615-625.

Kuba, N.; Hashimato, K.; Sato, T.; Sach, I.; Inoguchi, T. and Komalsu, M. (1968): Studies on experimental mycoplasmosis in chickens. J. Jap. Vet. Med. Ass., 21: 315-321.

Lietsch, C.D.D. (1963): Enzymatic determination of blood sugar in hens. Inang. Diss. Hanover, pp. 84.

Meszaros, J. (1964): Specificity and value of serological tests in the control of mycoplasmosis. Magy. Ao, Japja., 19: 227-231.

Razin, S. (1978): Methods in Mycoplasmology. Vol. 1- Mycoplasma Characterization. Acad. Press, N.Y.

Razin, S. and Tully, J. (1983): Methods in Mycoplasmology, Vol. I- Mycoplasma Characterization. acad. Press, N.Y.

Schiara, A. (1962): Cholesterol levels in serum and eggs of fowls vaccinated against Newcastel disease. Acta Med. Vet. Napoli, 8: 257-281.

Siegal, H.S.; Yoder, H.W.J. and Drury, L.N. (1972): Serum chemistry of chickens maintained at various environmental temperature and inoculated with Newcastle disease and *Mycoplasma gallisepticum*. Poultry Sci., 51: 1997-2000.

Stipkovitis, L. (1979): Mycoplasmosis in Poultry. XLVII General Session of the O.T.F. Committee, Paris, 21-26 May, 1979.

Watson, D. (1960): A simple method for the determination of serum cholesterol. Clin. Chim. Acta, 5: 637-643.