

STUDY ON THE EFFECT OF DOXIN ON THE SERUM BIOCHEMICAL AND ENZYMIC VALUES OF BROILER CHICKENS

Muhammad Afzal, Shakil Akhtar Khan, Khalid Muneer and Muhammad Afzal¹
Pathology Section and ¹Parasitology Section,
College of Veterinary Sciences, Lahore, Pakistan

ABSTRACT

The effect of Doxin on the serum biochemical and enzymic values of broiler chickens was studied. A total of 150 one day-old broiler chicks were randomly divided into six equal groups, A through F, each containing 25 birds. Group A and B were kept as control i.e. A was non medicated (Doxin) and vaccinated against Newcastle disease (ND) while B was non medicated (Doxin) and vaccinated against ND. Groups C and E were given Doxin at different levels (0.5 gm/l and 4 gm/l) from 1st to 5th day and 22nd to 26th day respectively, but both groups were non vaccinated against ND. The experimental period was 42 days. Serum total protein, albumin (A), globulin (G), A/G ratio, uric acid, urea, alkaline phosphatase, alanin amino transferase and aspartate amino transferase levels were observed. The data obtained indicated that the mean levels of serum total protein and albumin of control and medicated groups were not significantly different from each other. The mean levels of globulin, A/G ratio of vaccinated and non vaccinated groups carry statistical significant difference. The mean levels of urea and uric acid were increased in the medicated groups and highest in the double dose medicated groups. There was no significant difference in alkaline phosphatase (ALP), alanine amino transferase (ALT) and aspartate amino transferase (AST) levels of all medicated and non medicated groups. Doxin proved to be a safe drug in broiler chickens.

INTRODUCTION

The use of combinations of antibacterial drugs to treat or prevent infections is widely used in avian practice. Now a days a number of problems are arising in antibiotic therapy in poultry: development of resistance against certain antibiotics, decrease of beneficial microflora in the body of bird, immunosuppressive effects due to certain antibiotics, toxicity after over-dosing of certain antibiotics, substandard quality of antibiotics, their improper use, use of poultry products, by human beings without considering withdrawal period of antibiotics, etc. By keeping in view the problems related to antibiotic therapy, the project was designed to record the effect of Doxin (Doxycycline + Tylosin) on serum biochemical and enzymic values of broiler chickens. In future, the results of this study will give an insight on the action of above combination in poultry.

MATERIALS AND METHODS

A total number of 150 one day-old broiler chicks were randomly divided into six equal groups, A through F each containing 25 birds. The experimental

period was 42 days. This study was conducted during June and July, 1996. Doxin and vaccines were given to different groups in accordance to the Table 1.

Blood samples were collected from each bird of all groups at the time of slaughtering on 42nd day of age. The following serum constituents were estimated by using commercial kits as described by Coles (1986).

Total serum protein, Albumin, Globulin, Albumin/Globulin ratio, Uric acid, Urea, Alkaline phosphatase (ALP), Alanine amino transferase (ALT) and Aspartate amino transferase (AST). The data of the all groups was compared by analysis of variance and statistical differences among the various treatment means were determined by using DMR test at 5% level of probability as described by Steel and Torrie, (1981).

RESULTS

Mean values of serum total protein, albumin, globulin and albumin/globulin ratio of birds of all groups are furnished in Table 2. The levels of uric acid, urea and serum enzymes in experimental and control groups are shown in Table 3 and 4, respectively.

DISCUSSION

The present study was designed to know the effect of Doxin on the serum biochemical and enzymic values of broiler chickens.

The mean levels of serum total proteins (STP) and albumin of groups A, B, D and E carry statistically no significant difference. It reflects that medication of Doxin at the dose rate of 0.5 mg/l has not caused any harmful effect on the synthesis of protein either in vaccinated or in non vaccinated birds. It can also be inferred that even high dose (4 mg/l) of Doxin has not caused any drastic effect on protein synthesis. According to Aletor *et al.* (1981) serum total protein and albumin were significantly depressed in the groups receiving Ochratoxin A as also observed by Kubena *et al.* (1983) and Kubena *et al.* (1988). Kumar and Chandiramani (1979) recorded an interesting observation regarding total and fractional serum proteins in birds infected with *Mycoplasma gallisepticum*: serum total protein increased and albumin level declined. The results of our study are not in line with the findings of above workers. On the basis of this, it can be believed that Tylosin + Doxycycline neither stimulate nor depress synthetic activity of serum protein. This view is augmented by the fact that tylosin is distributed particularly into lung tissue after its absorption as reported by Einstein *et al.* (1994).

The mean levels of uric acid and urea showed that their levels increased in the medicated groups. Acute tubular necrosis, manifested as proteinuria and an inability to concentrate urine, followed a reduction in glomerular filtration rate and a rise in blood urea nitrogen, can occur after aminoglycosides. This damage is normally reversible when treatment is stopped (Einstein *et al.*, 1994). Increased level of uric acid may be due to the administration of antibiotics like Gentamicin (June and Watson, 1991). Our results are quite similar with the findings of Einstein *et al.* (1994) and June and Watson, (1991). It can be believed that higher levels of uric acid and urea in serum samples of medicated birds are not the after effects of toxicity by causing transient glomerular damage.

The mean levels of serum globulin and albumin and albumin/globulin ratio (A/G ratio) of vaccinated and non vaccinated groups carries statistically significant difference, but the values within the vaccinated groups carry statistically non significant difference. Kumar and Chandiramani (1979) reported that mean Gamma globulin level increased while A/G ratio level decreased in birds infected with *Mycoplasma gallisepticum*. The results of this study differ from the findings of Kumar and Chandiramani (1979) because they recorded these findings in infected birds. It is tempting to speculate that higher or lower doses of Doxin has no remarkable effect on alpha, beta, gamma globulin levels A/G values in broiler chickens.

The mean levels of alkaline phosphatase (ALP), alanine amino transferase (ALT) and aspartate amino transferase (AST) of all the groups from A to F carry no statistical difference. According to Baoumy (1986), SGOT, SGPT activities showed marked increase and ALP activity showed a marked decrease after i/v injection of Gentamicin (2 mg/kg) in sheep. Verma and Bahga (1976) noted that after administration of 100 mg/kg paraquat buffalo calves, SGOT, SGPT activities increased and ALT decreased. Amrousi *et al.* (1974) observed that SGPT activity was increased in early all cases of liver disease. SGOT showed variable results with a tendency to decrease in nearly all cases with liver lesions in sheep. An increase in SGOT, SGPT after oral administration of lethal dose of methyl parathion to rates (Golbs and Kuhnert, 1973). On the basis of this study it can be believed that Tylosin + Doxycycline neither stimulate nor depressed synthetic activity of enzymes ALT, AST and ALP. The difference in the results of this study and Baoumy (1986) are quite interesting. It may be due to three reasons; difference in mode of action of gentamicin and doxycycline and tylosin, different modes of administration and species difference. Doxin proved to be safe drug in broiler chickens.

Table 1: Experimental design.

Group	Medication with Doxin	Vaccination against Newcastle disease
	1 st -5 th day and 22 nd -26 th day	
A	-	+
B	-	-
C	0.5 mg/l	+
D	0.5 mg/l	-
E	4 mg/l	+
F	4 mg/l	-

Table 2: Levels of biochemical substances in experimental and control birds.

Group	Mean \pm S.E.			
	Serum total protein (g/dl)	Albumin (g/dl)	Globulin (g/dl)	Albumin/ Globulin ratio (g/dl)
A	5.09 \pm 0.16 ^{ab}	3.38 \pm 0.05	1.22 \pm 0.14 ^{ab}	2.30 \pm 0.28 ^b
B	5.09 \pm 0.16 ^{ab}	3.72 \pm 0.06	1.12 \pm 0.08 ^{bc}	3.19 \pm 0.18 ^{ab}
C	5.16 \pm 0.16 ^a	3.53 \pm 0.11	1.61 \pm 0.23 ^a	2.10 \pm 0.40 ^b
D	4.63 \pm 0.23 ^{ab}	3.49 \pm 0.09	0.75 \pm 0.11 ^c	3.94 \pm 0.83 ^a
E	4.77 \pm 0.20 ^{ab}	3.50 \pm 0.11	0.87 \pm 0.16 ^{bc}	3.61 \pm 0.69 ^{ab}
F	4.56 \pm 0.09 ^b	3.46 \pm 0.07	0.97 \pm 0.12 ^{bc}	4.03 \pm 0.46 ^a

Abcd = Any two means in a column carrying the same superscripts are not significantly different from each other at 5% probability level using DMR test.

Table 3: Levels of alkaline phosphatase, alanine amino transferase, aspartate amino transferase in experimental and control groups.

Group	Mean S.E.		
	Alkaline Phosphatase (I.U./l)	Alanine amino transferase (I.U./l)	Aspartate amino transferase (I.U./l)
A	15.74 \pm 4.19	13.77 \pm 2.12	24.78 \pm 2.66
B	15.27 \pm 4.66	30.13 \pm 1.42	30.91 \pm 3.66
C	21.92 \pm 5.98	17.68 \pm 2.03	40.23 \pm 12.18
D	18.91 \pm 2.33	19.59 \pm 4.15	22.18 \pm 3.86
E	17.58 \pm 2.95	20.80 \pm 2.52	28.43 \pm 4.75
F	22.62 \pm 4.83	15.79 \pm 2.45	34.35 \pm 1.80

Abcd = Any two means in a column carrying the same superscripts are not significantly different from each other at 5% probability level using DMR test.

Table 4: Levels of uric acid and urea in experimental and control groups

Group	Uric acid (mg/dl)	Urea (mg/dl)
A	5.73 \pm 0.08 ^{ab}	38.76 \pm 3.86 ^c
B	6.31 \pm 0.57 ^b	64.59 \pm 15.87 ^b
C	4.63 \pm 0.08 ^d	25.73 \pm 2.50 ^d
D	5.10 \pm 0.11 ^{cd}	41.86 \pm 1.52 ^c
E	5.95 \pm 0.19 ^{bc}	47.05 \pm 10.65 ^c
F	7.23 \pm 0.37 ^a	78.31 \pm 18.29 ^a

Abcd = Any two means in a column carrying the same superscripts are not significantly different from each other at 5% probability level using DMR test.

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