

Evaluation Of Difloxacin For Treatment Of E. Coli –Septicemia In Japanese Quail

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ABSTRACT

The present work was conducted to evaluate the possible antimicrobial effects of difloxacin on E.coli infection in quail chicks as well as their effect on body weight. Further approach was designed to study the effects of these infection and treatment on some haematological parameters, some liver and kidney functions, as well as pathological changes in internal organs due to E.coli infection. Seventy five quail chicks were divided into three equal groups (25 each). The 1st group was non infected and non treated (-ve control). The other two groups were experimentally infected with E.coli 0.78 strain at the 16th day of age, 2nd group was left as an infected and non treated (+ve control), 3rd group was orally treated with therapeutic dose of difloxacin 25 mg /kg body weight in drinking water for 5 consecutive days. Quail chicks were examined daily for clinical signs of disease, mortality and post mortem lesions were recorded. Total feed consumption and body gain were recorded before and post treatment. On 1st and 7th day post treatment, five quail chicks from each group were sacrificed. Serum and EDTA blood were collected for chemical blood chemistry and erythrogram studies respectively.

Quail Chicks infected with E.coli and non treated showed severe gross pathological lesions as air sacculitis 45%, pericarditis 50% and perihepatitis 70% coupled with high mortality rate 24%. Treatment of E.coli infected chick with difloxacin showed that gross lesions have been significantly reduced and reached air sacculitis 5% beside pericarditis 4% and perihepatitis 6%, medication with difloxacin reduced mortality to 4%.

Antibiogram studies revealed that difloxacin, enrofloxacin and were the most effective against isolated E.coli from Quail Chicks infected with E. Coli

Significant elevation in the feed conversion rate, aspartate aminotransferase, alanine aminotransferase enzymes, urea, creatinine and significant decrease in body weight, feed consumption haematological parameters (RBCs, HB and PCV%) total protein, albumin and globulin in quail chicks infected with E.coli. All above mentioned parameters were returned to the nearly normal levels after 7 days post medication with therapeutic dose of difloxacin.

Quail chicks infected with E.coli showed pathological lesions represented by Liver degenerative changes and coagulative necrosis of hepatocytes, intestine showed congestion and desquamation of the villous epithelium, lung showed thickening and hyalinization in pulmonary blood vessels and infiltration of pulmonary tissue with infiltration kidney showed degenerative change and local coagulative necrosis of some renal tubules, fibrinous pericarditis and hyalinization with thickening of spleen blood vessels. were seen.

It could be concluded that E.coli infection in quail chicks induce many reversible adverse effect on body performance and hemato-biochemical parameters which is confirmed by histopathology lesions. Difloxacin in therapeutic dose is considerable value in medication of E.coli infected quail chicks.

INTRODUCTION

Recently in Egypt great attention has been directed to quail industry to meet the increasing demand for animal protein. One of the major problems in quail breeding is the control of infectious diseases specially enteritis.

Escherichia coli is one of the main normal inhabitants lower of the intestines of worm-blooded animals, including birds and mammals (1). *E. coli* species is a G-ve bacterium composed of numerous strains and serotypes. As we have seen *E. coli* can act as pathogen, even seemingly innocuous strains of *E. coli* may convert to pathogenic strains under appropriate circumstances (2). Quails of all ages are susceptible to diseases caused by *E. coli*, resulting in significant economic losses due to high morbidity, mortality, cost of treatment and condemnation of the infected quails (3). The economic importance of colisepticaemia originated from the colisepticaemia in birds causes of various disease manifestations in all species of poultry including septicemia, arthritis, omphalitis, panophthalmitis, salpingitis, peritonitis, perihepatitis, pericarditis and granuloma (4) and cause severe mortality among broilers (5).

Chemotherapy is one of the most rapidly advancing branches of applied pharmacology. New drugs are continually being introduced with the aim of curing infection with the least possible side effects to the host (6). Fluoroquinolones are synthetic antibiotics of broad-spectrum antibacterial activity widely used to treatment infections in farmed turkeys, pigs, calves and poultry (7). The primary target of all fluoroquinolones is DNA-gyrase, an essential bacterial enzyme that maintains superhelical twist in DNA causing irreversible chromosome damage and fragmentation, thus resulting in rapid cell death (8). In general, fluoroquinolones have been seen to interact with bacterial adherence and colonization of epithelial surface, alter the release of

proinflammatory bacteria products, modulate phagocytic capacity and intraleukocytic killing (9).

Our present work is to evaluate the efficacy of difloxacin in controlling *E. coli* in quails as well as their effect on body weight. Further approach was designed to study the effects of these infection and treatment on some haematological parameters, some liver and kidney functions, as well as pathological changes in internal organs associated with this infection and Treatment.

MATERIAL AND METHODS

Drug

Difloxacin 10% (Dicural)^R it is clear solution prepared for use in drinking water in a dose of 25 mg/kg body weight and is produced by Forte Dodge Veterinaria S.A. Girona-Spain.

Quail

75 Japanese quail obtained from a private farm at Zagazig, Sharkia province Two weeks old and about 25–35 gm body weight, were employed for this study, 20 of them were apparently clinically healthy free from *E. coli* and the rest were experimentally infected with *E. coli*. Quail chicks were housed in wire cages. They were kept under strict hygienic conditions, maintained at temperature of 25–30°C and fed on start ration and watered *ad libitum* during the experimental period. All quail chicks were vaccinated with Newcastle and Gumboro vaccine at 7 and 14 days.

Microorganism:

E. coli serotype (O78) was obtained from Animal Health Research Institute, Dokki, Giza.

B) Antibacterial sensitivity test (*In vitro*)

In vitro antimicrobial activity of different antimicrobial agents (difloxacin (15ug), gentamycin (10ug), enrofloxacin (10ug), flumequine (30ug), chloramphenicol (30ug), erythromycin (15ug), oxytetracycline (30ug) and colistin (10ug).) against pathogenic strain of *E. coli* O78 serotype of avian origin was studied. Disc diffusion technique (10) of antimicrobial sensitivity testing was done.

Media

MacConky's agar, nutrient agar, MacConky's broth and Nutrient broth (11).

Experimental design (*In vivo* study)

Quail chicks were divided into three equal groups each of twenty five. The 1st group was left as a control (non infected non treated). The other two groups were experimentally infected done at the 16th day of age with *E. coli* O78 strain by injection of 0.25 ml (2x10⁶) Colony Forming Units (CFU) into the left posterior thoracic air sac of each chick (12), 2nd group was left as a positive control (infected non treated), 3rd group was orally treated with therapeutic dose of difloxacin 25 mg /kg body weight in drinking water for 5 days continuously. Quail chicks were examined daily for clinical signs and mortality. Post-mortem lesions in dead quail chicks were recorded. Total feed consumption and body gain were recorded before and post treatment. At the 1st and 7th day post treatment, five quail chicks from each group were sacrificed, two blood samples were collected,

The first sample was collected in tube contain EDTA for erythrogram studies (13).

Second blood samples were collected for obtaining clear serum for estimating of total protein (14), albumine (15) globulin was calculated as difference between total protein and albumin. The serum transaminases (AST&ALT) (16), alkaline phosphatase (17), urea (18) creatinine (19) were determined.

Statistical analysis

The data obtained from this investigation were statistically analyzed by student (T) test (20).

Histopathological study

Specimens from internal organs (liver, intestine, lung, kidneys, spleen and heart) were collected at 1st and 7th days post treatment, then fixed in 10% formaline saline solution. The collected samples were dehydrated, cleared and embedded in paraffin wax, then specimens were sectioned to 4 micron thickness and stained by haematoxylin and eosin and examined microscopically (21).

RESULTS

Clinical signs

Quail Chicks infected with *E. coli* and non treated displayed clinical symptoms such as loss of appetite, depression, ruffled feathers, dropping of the wings, respiratory symptoms including sneezing, mild conjunctivitis with frothy exudates in their eyes and diarrhoea.

Post mortem findings

Post-mortem examination of both dead and sacrificed quail chickens of all groups were carried out. The control group was apparently normal. Most infected non treated quail chicks revealed severe gross pathological lesions, air sacculitis (45%), pericarditis (50%) and perihepatitis (70%) coupled with high mortality rate (24%). Treatment of *E. coli* infected chick with difloxacin showed that gross lesions have been significantly reduced air sacculitis beside pericarditis and perihepatitis were 5%, 4% and 6% respectively. Whereas, medication with difloxacin reduced mortality to 4%. (Table, 1).

Antibacterial efficacy *in vivo*

Antibiogram studies revealed that difloxacin was the highest effective against field pathogenic *E. coli* followed by enrofloxacin, gentamycin, ceftiofur, ampicillin and rifampicin respectively.

Effects of drug treatment and *E. coli* infection on the body weight

At both periods (1st or 7th days post treatment), the quail infected with *E. coli* and non treated showed a significant decrease in the body weight, feed consumption and increase in feed consumption rate but the quail treated with difloxacin showed a significant improvement in their body weights, feed consumption and decrease in feed consumption rate than infected non treated quail (Table, 3).

Erythrogram

Infected quail chicks with *E. coli* and non treated showed significant decrease in total erythrocytic count, haemoglobin content and packed cell volume % over the experimental

period when compared with non infected non treated. Improvement in haematological parameters occurs when treated infected quail chicks with therapeutic dose of difloxacin (Tables, 4).

6- Blood chemistry parameters

Infected quail chicks with *E.coli* display a significant elevation in AST, ALT, urea, creatinine and significant decrease in serum total protein, albumin and globulin at various periods post infection. Treatment quail chicks infected with *E.coli* with difloxacin induced improvement in the levels of serum ALT, AST, urea, creatinine, total protein, albumin and globulin at various periods post infection (Tables, 5)

7-Histopathological results

The main lesions were in the Quail chicks infected with *E-coli* only and non treated with Difloxacin. The Liver revealed congestion of hepatic blood vessels and sinusoid and focal periportal necrosis of hepatocytes. (Fig,1). Degenerative changes of hepatocytes and focal coagulative necrosis infiltrated with leukocytic cells mainly lymphocytes and heterophils were seen. (Fig,2). The intestine showed congestion of intestinal blood vessels, haemorrhages and

desquamation of the villus epithelium with leukocytic cells infiltration (Fig. 3). Moreover necrotic changes in the villus epithelium infiltrated with inflammatory cells mainly lymphocytes, macrophages and heterophils were seen (Fig. 4). The lung revealed thickening and hyalinization of the wall of pulmonary blood vessels, beside replacement of the pulmonary Tissue with inflammatory cells (Fig. 5) on the other hand congestion of pulmonary blood vessels and thickening in the interalveolar septa due to inflammatory cells infiltration were recorded (Fig, 6). The kidney showed hyperplasia of glomerular tuft and coagulative necrosis of some renal tubules Fig. (7), beside to focal area of coagulative necrosis of some renal tubules infiltrated with inflammatory cells. (Fig, 8). The heart revealed fibrinous pericarditis represented by fibrinous threads and inflammatory cells infiltration (Fig. 9). The spleen showed congestion of splenic blood vessels and severe thickening with hyalinization in their wall beside to mild depletion of lymphocytes in the white pulp. (Fig,10). The quail chicks infected and treated with drug showed reduced pathological changes.

Table 1. Effect of difloxacin on mortality rate and lesions intensity in *E.coli* infected quail chicks.

Groups	Mortality		Lesion intensity %		
	No	%	<i>A.sacculitis</i>	Pericarditis	Perihepatitis
Healthy non inf.	00	00	00	00	00
Inf. non treated	6	24	45	50	70
Inf. difloxacin treated	1	4	5	4	6

Table 2. *In-vitro* susceptibility of *E. coli* to difloxacin and other commonly used antimicrobial agents by disc diffusion method.

Drug	Concentration (ug)	Mean Zone of Inhibition (mm)
Difloxacin	15	22.5
Enrofloxacin	10	22
Pefloxacin	5	21
Gentamycin	10	21
Ceftiofur	30	20
Ampicillin	30	16
Refampicin	5	13

Table 3 Mean body weight gain(B.W.G.(gm),feed consumption(F.C.)and feed conversion rate (FCR) at 1st and 7th day post medication with difloxacin for 5 successive days in infected quail chicks with E.coli.

Group	Ineasial B.W	1 st day postmedication				7 th day postmedication			
		B.W	B.W.G	F.c.	FCR	B.W.	B.W.G	F.c.	FCR
Non inf., non treated	27.16± 0.88	60.22± 1.84	33.06± 1.12	62.36± 1.54	1.89	142.2± 1.46	81.99	103.5± 1.23	1.26
Inf. non treated	28.25± 0.93	44.27± 1.91*	23.98± 1.14**	48.18± 1.23**	2.009	120.4± 1.36**	76.11	98.09± 1.41	1.29
Inf.treated difloxacin	29.41± 0.89	58.17± 1.92*	28.76± 1.38**	55.49± 1.43*	1.93	139.4± 1.14	81.20	102.7± 1.28	1.27

* significant at P < 0.05 ** significant at P < 0.01

Table 4 Effect of oral administration of difloxacin for 5 successive days on erythrogram in infected quail chicks with E.coli (n = 5).

Group	1st day post medication			7th day postmedication		
	RBCs 106/UL	H.b. gm/dl	PCV gm/dl	RBCs 106/UL	H.b. gm/dl	PCV gm/dl
non inf., non treated	6.21± 0.52	10.08± 0.36	28.06± 1.32	6.09± 0.41	10.47± 0.48	27.32± 1.08
Inf. non treated	3.23± 0.47*	6.83± 0.49*	20.37± 1.05**	3.65± 0.72*	7.08± 0.28*	21.04± 0.98**
Inf. Difloxacin treated	5.08± 0.68+	9.52± 0.37+	26.29± 0.96++	5.93± 0.46+	9.95± 0.29+	27.08± 1.06++

* significant at P < 0.05 ** significant at P < 0.01

Table 5 Effect of oral administration of difloxacin for 5 successive days on protein profile in infected quail chicks with E.coli (n = 5)

Group	1st day post medication			7th day post medication		
	T.protein gm/dl	Albumin gm/dl	Globulin gm/dl	T.proteins gm/dl	Albumin gm/dl	Globulin gm/dl
non inf, non treated	8.12± 0.45	4.53± 0.15	3.59± 0.16	8.04± 0.62	4.50± 0.21	3.54± 0.35
Inf, non treated	5.34± 0.37**	3.30± 0.11	2.04± 0.34**	5.34± 0.37**	3.41± 0.21*	1.93± 0.34**
Inf. difloxacin treated	8.04± 0.47++	4.46± 0.16+	3.58± 0.23+	7.84± 0.21++	4.40± 0.20+	3.44± 0.22++

* significant at P < 0.05 ** significant at P < 0.01

Table 6 Effect of oral administration of difloxacin for 5 successive days on some liver enzymes and kidney function values in infected quail chicks with E.coli (n = 5)

Group	1st day post medication				7th day post medication			
	Liver enzymes		Kidney function		Liver enzymes		Kidney function	
	AST IU / L	ALT IU / L	Uricacid mg/dl	Creat. mg/dl	AST IU / L	ALT IU / L	Uricacid mg/dl	Creat. mg/dl
Non inf, Non treated	50.08± 1.22	29.15± 1.10	3.04± 0.42	1.02± 0.15	49.13± 1.06	30.02± 1.04	2.98± 0.36	0.97± 0.10
Inf,non treated	61.45± 2.05**	37.03± 1.14**	5.02± 0.56**	1.85± 0.12**	59.93± 1.08**	39± 1.44**	4.99± 0.46**	1.72± 0.11**
Inf.Difloxacin treated	51.24± 2.13++	30.01± 0.94++	2.89± 0.17++	0.98± 0.08++	50.46± 1.21++	31.21± 0.87++	2.80± 0.14++	1.01± 0.09++

* significant at P < 0.05 ** significant at P < 0.01

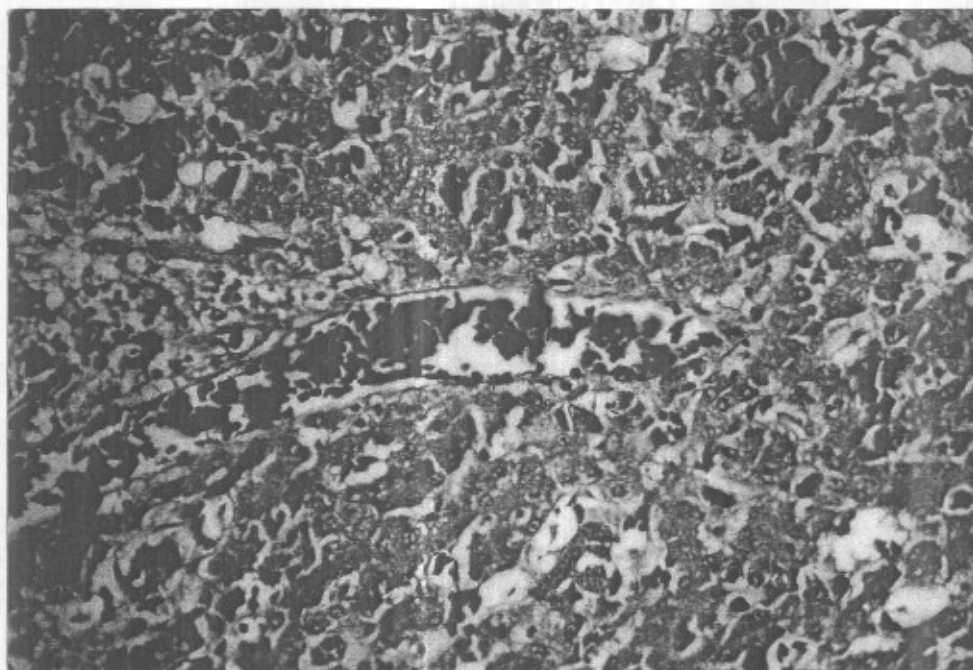


Fig 1. Section in the liver of infected quail non treated showing congestion of hepatic blood vessels and sinusoids with periportal necrosis of hepatocytes. H&E X 400.

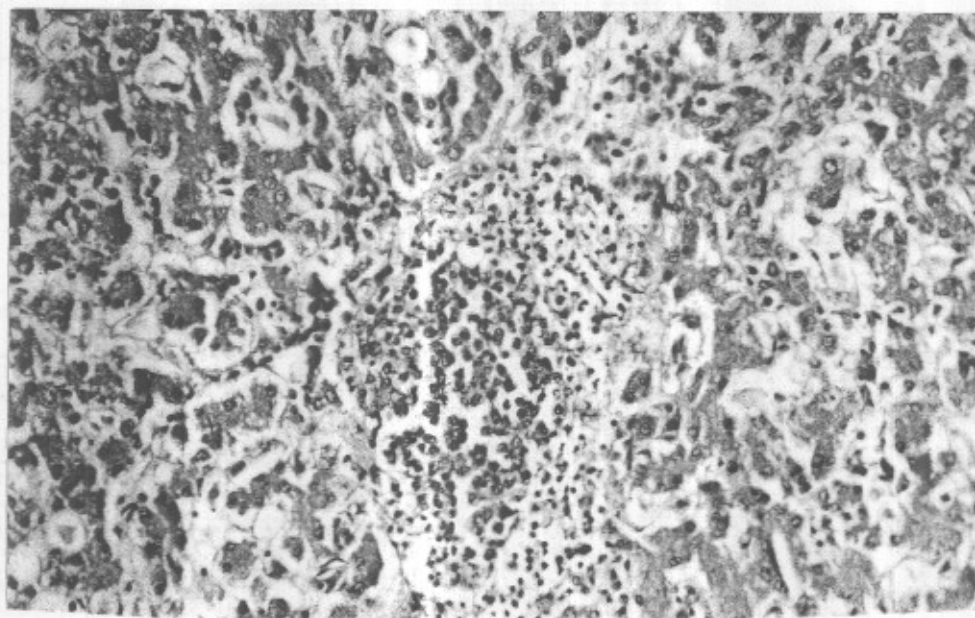


Fig 2. Section in the liver of infected non treated quail showing degenerative changes of hepatocytes and focal coagulative necrosis infiltrated with lymphocytes and heterophils. H&E X 400.

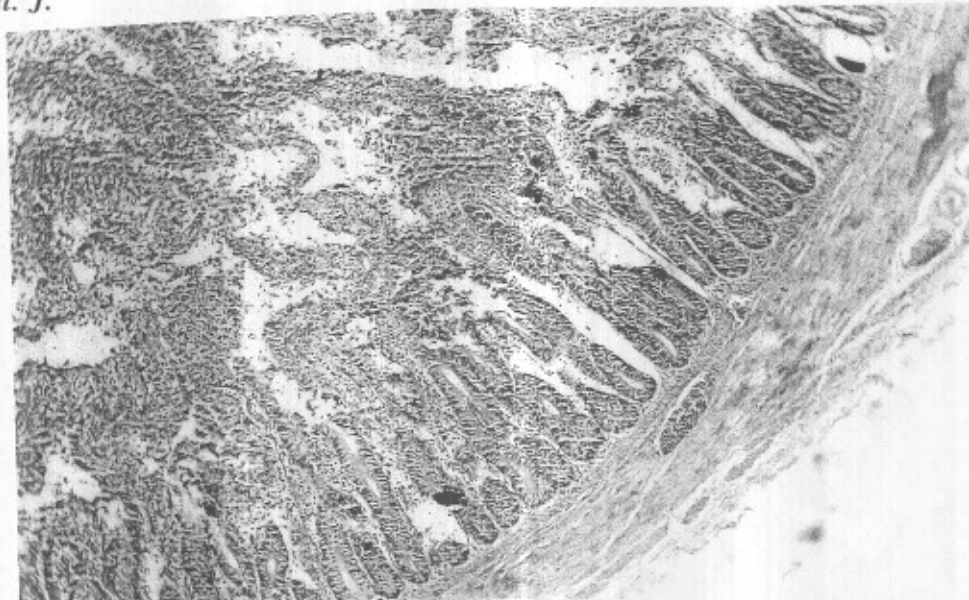


Fig 3. Section in the intestine of infected quail non treated showing congestion in intestinal blood vessels, haemorrhages and desquamation of villus epithelium with leukocytic cells infiltrated. H&E X 300.

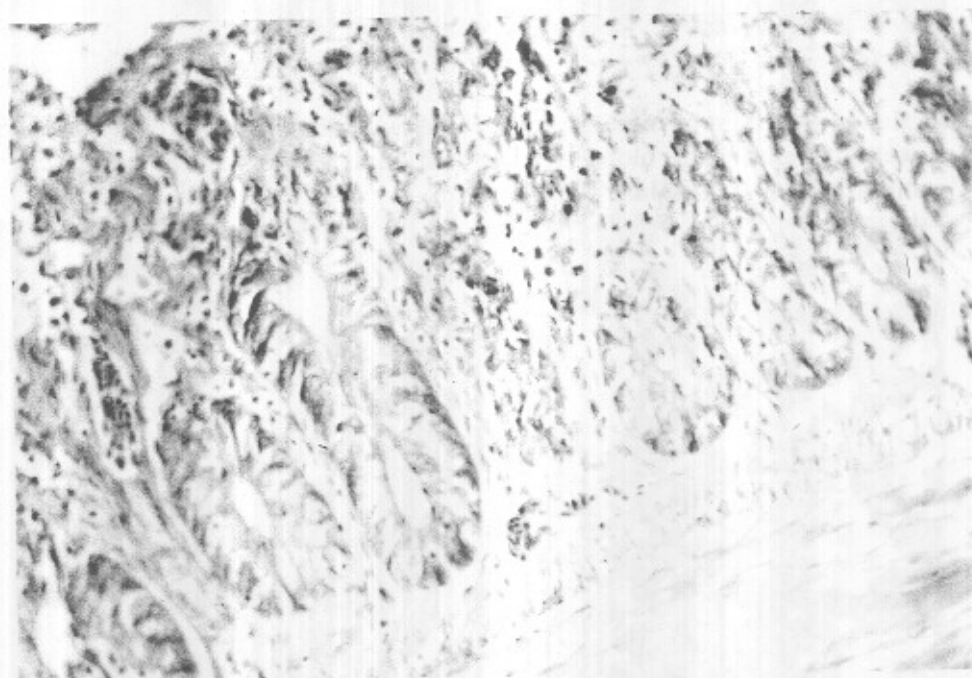


Fig 4. Section in the intestine of infected non treated quail showing necrotic changes in the villus epithelium and infiltrated with lymphocysts macrophages and heterophils cells. H&E X 400.

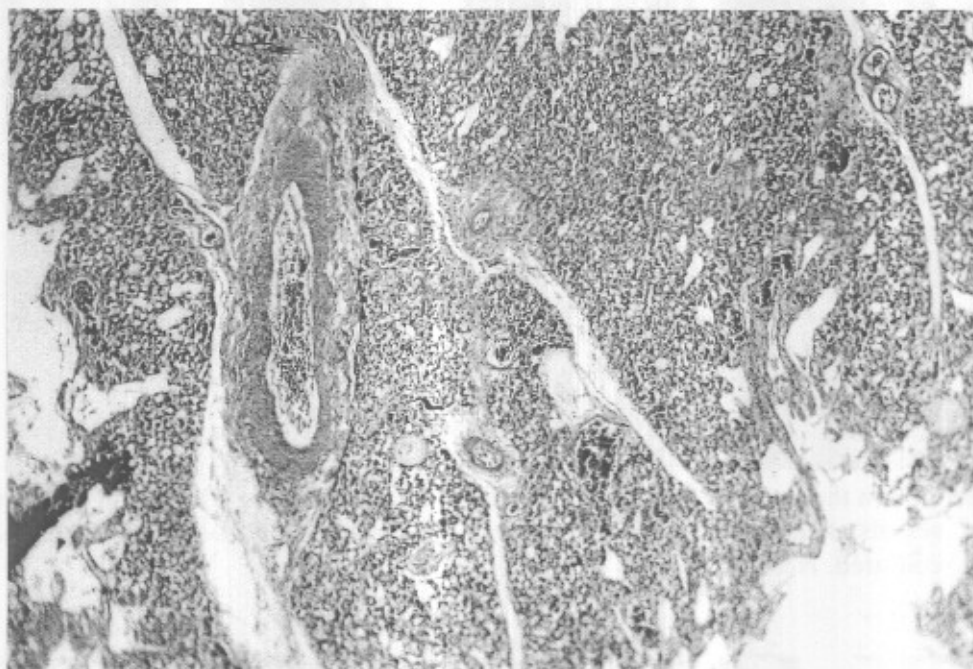


Fig 5. Section in the lung of infected non treated quail showing thickening and hyalinization of wall of pulmonary blood vessels and replacement of the pulmonary tissue with inflammatory cells H&E X 300.

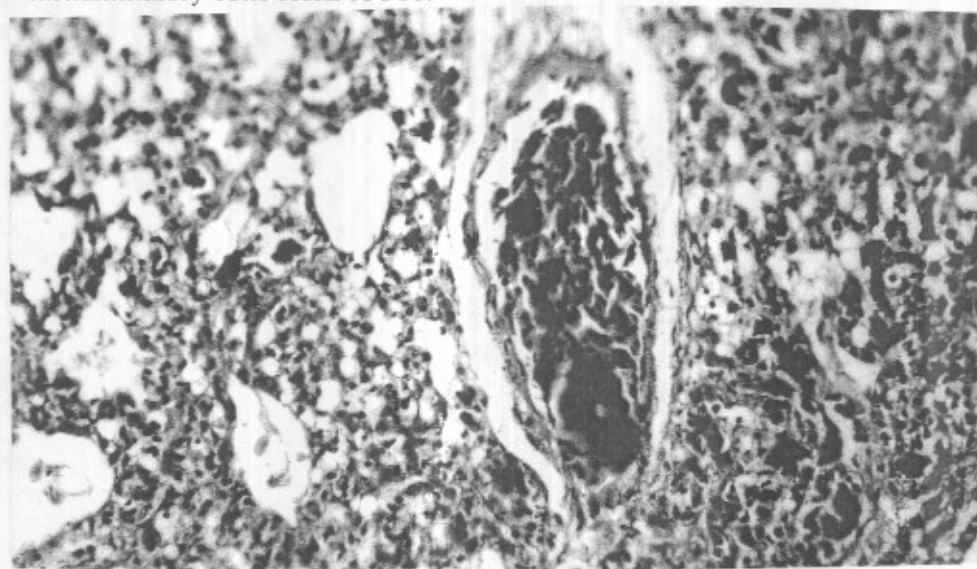


Fig 6. Section in the lung of infected non treated quail showing sever congestion of pulmonary blood vessels , thickening in the interalveolar septa due to inflammatory cells infiltration. H&E X 400.

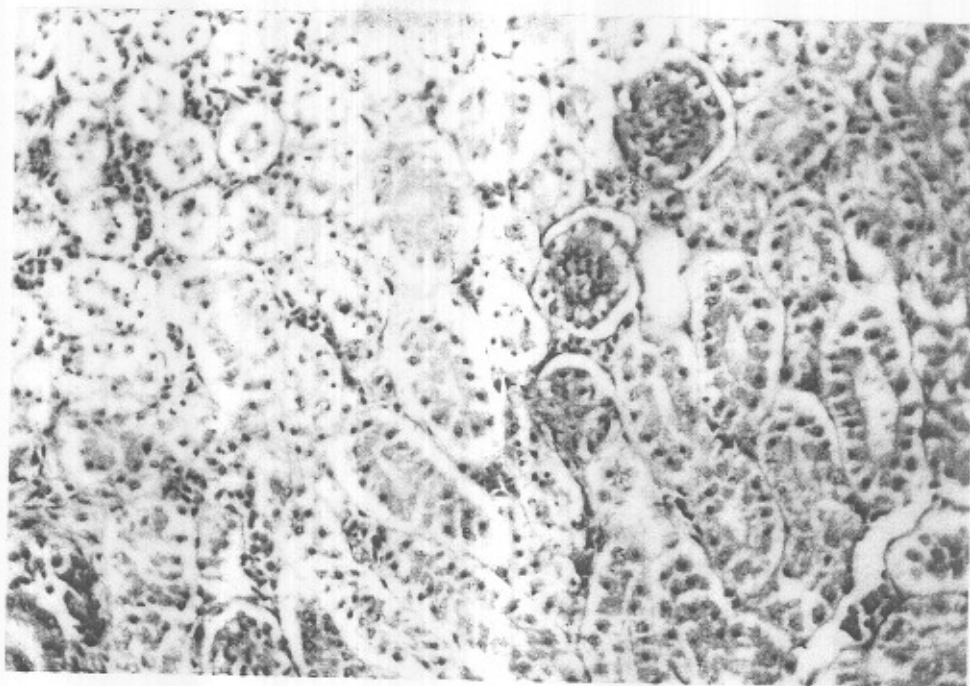


Fig 7. Section in the kidney of infected quail non treated showing hyperplasia of glomerular tuft and coagulative necrosis of some renal tubules. H&E X 300.

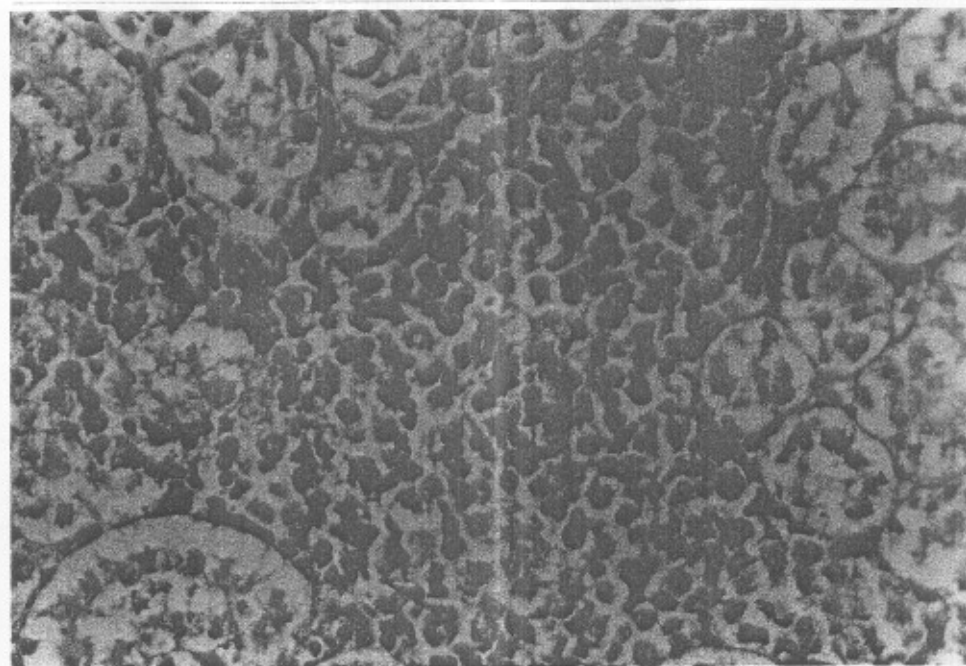


Fig 8. Section in the kidney of infected quail non treated showing focal coagulative necrosis of some renal tubules infiltrated with leukocytes H&E X 400.

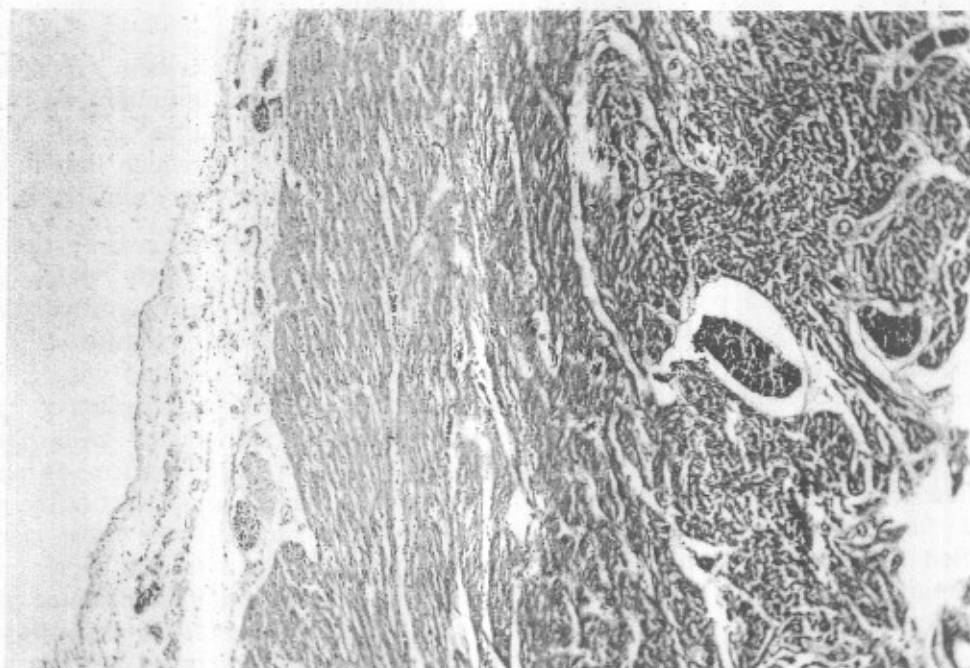


Fig 9. Section in the :heart of infected non treated quail showing fibrinous pericarditis represented by fibrinous thread and inflammatory cells infiltration H&E X300.

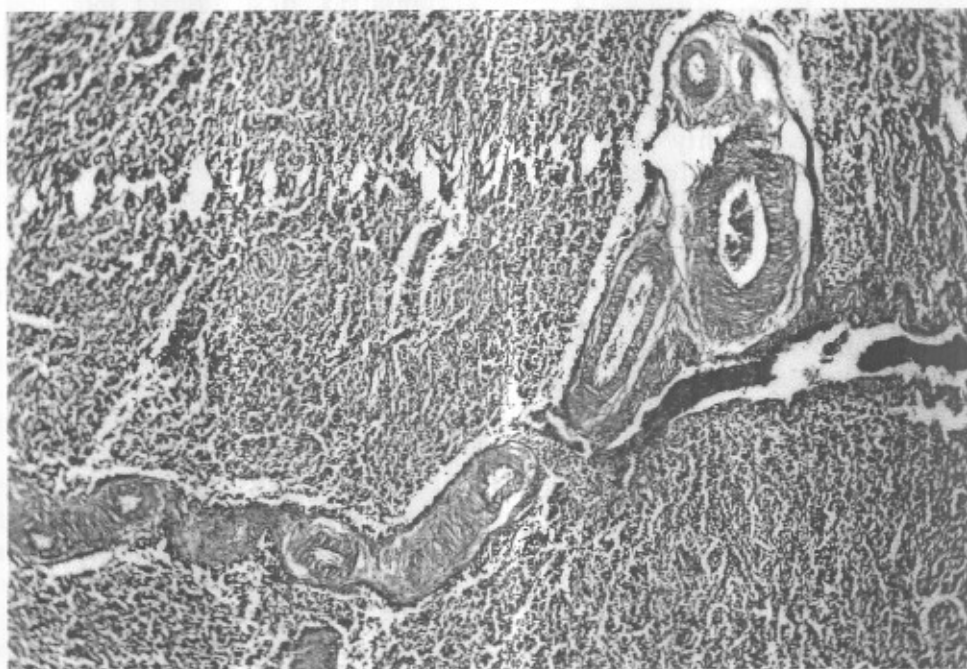


Fig 10. Section in the spleen of infected non treated quail showing congestion of splenic blood vessels and sever hyalinization and thickening in their wall beside depletion of lymphocyt in the white pulp. H&E X 300.

DISCUSSION

In recent years, a great attention was paid towards quail farming as a trial to fulfill the increasing demands for the animal proteins.

In the present study, the clinical signs appeared on the infected non-treated quail chicks were loss of appetite, depression, ruffled feathers, dropping of the wings, respiratory symptoms including sneezing, mild conjunctivitis with frothy exudates in their eyes and diarrhoea. These results are similar to those recorded in a flock of sixteen week old pollutes (5). Similar symptoms were recorded and loss of appetite, depression, diarrhea, ruffled feathers, dropping of the wings, respiratory symptoms and rise in body temperature (22).

In the current work, the mortality % in the infected quail chicks with *E.coli* & non-treated was 24%, whereas difloxacin at the dose of 25 mg/kg b. wt daily for 5 days was highly effective in reducing mortality rate from 24% in the infected & non-treated quail chick to 4% in the infected & treated quail chick. This may be attributed to pharmacodynamic characters of difloxacin. The mortality rate in broiler chickens experimentally infected with *E.coli* and treated with pefloxacin (23).

The results of this study demonstrated that quail chicks revealed severe gross pathological lesions i.e. air sacculitis 45%, pericarditis 50% and perihepatitis 70% is influenced by *E.coli* infection. It has been found that the infected chickens with *E.coli* revealed gross pathological lesions (air sacculitis perihepatitis, enteritis and peritonitis (24).

Disc diffusion test is widely used for antimicrobial sensitivity test for reasons of time, simplicity and cost (25). Using the disc-diffusion test in present study showed that the difloxacin was the highest effective against felid pathogenic *E.coli* of avian origin than other tested drug followed by enrofloxacin, gentamycin, ceftiofur, ampicillin and refampicin respectively. Fluoroquinolones had potent antibacterial activity at very low

concentrations when compared with other classes of antimicrobial agents (26). Our findings correlate with those obtained previously (27) which stated that the *E.coli* of avian origin is very sensitive to difloxacin.

The present investigation revealed that body weight, body weight gain and feed consumption were significantly decreased but conversion rate significantly increased in quail chicks infected with *E.coli* all over the experimental period when compared with non-infected non treated group. This results post studied (23,28), confirms. It may be attributed to the deleterious effect of the micro-organism which invaded the host and retarded its metabolic activity and decreased absorption of nutrients from the inflamed alimentary tract and diarrhoea (29). Our results were reinforced with those recorded (30) in an experimental infection with *E. coli* and resulted in a decreased in weight gain. Administration of difloxacin in treatment of *E.coli* infection resulted in significant increase in the body weight, weight gain, feed consumption and decrease feed conversion rate when compared with infected non treated group and the weight nearly returned to normal level at the end of the experimental period. These results may be due to antimicrobial effect of the drug which consequently improves metabolic activity of the birds. This result was supported by as they postulated that the growth stimulating effect of the antimicrobials resulted from their suppression to the microorganisms that invade the host and retard its metabolic activity (31). Also the, (29) recorded that antibacterials if given in very small amounts produce an increase in growth rate and reduce mortality in growing chicks, and increase body weight gain with improved food conversion through inhibiting pathogenic organisms which damage the gut epithelium impairing food absorption, inhibiting non pathogenic organisms which compete for growth factors in the gut and inhibiting organisms producing toxic substances affecting the growth.

The result of erythrogram (Table 4) showed significant decrease in all erythrocytic

parameters in quail chicks infected with *E. coli*. It has been reported that a significant decrease in total erythrocytic count, haemoglobin concentration and packed cell volume% of infected with non treated chickens. Our results were supported with previously result, (30) Who found a significant decrease in RBCs count, Hb concentration and PCV % of infected which showed non treated chickens. This may be attributed to *E. coli* produce cell damaging protein toxin (enterohemolysin) produced by pathogenic *E. coli* that causes changes in cell membrane permeability and formation of surface lesions causes RBC destruction (32). Also *E. coli* lipopolysaccharide has direct effect as it inhibits bone marrow cells and its nephrotoxicity decrease erythropoietine blood level (33).

E. coli infection in quail chick resulted in significant decrease total protein, albumin and globulin level all over the experimental period. The decrease of albumin might possibly be attributed to its renal loss (34). Furthermore, the liver is the sole of albumin synthesis and hypoalbuminaemia is an important feature of liver diseases (35). Our results are confirmed pathologically by the presence of degenerative changes in the liver and kidneys.

In this study it is clear that the infection of quail chicks with *E. coli* resulted in the a significant increase in serum AST and ALT enzymes all over the experimental period. Chicken infected with *E. coli* induce significant elevation in serum levels of transaminases (AST and ALT) activities (36). The elevation of the liver enzymes may be attributed to the increase of liver damage by the effect of the of the infectious agent toxins which is followed by the escape of these enzymes into serum in abnormal high levels (37)

Regarding the effect of *E. coli* infected quail non treated chick, our result revealed an increase in uric acid and creatinine levels all over the experimental period when compared with non infected non treated chick. The avian kidney excretes uric acid primarily

by tubular excretion. Therefore, the elevation in uric acid and creatinine are expected in birds with impaired renal function (37). The increased uric acid, creatinine in the infected birds could be attributed to the degenerative changes in the kidney tubules preventing excretion of uric acid and creatinine increasing their levels in serum (35). These results are confirmed by the histopathological changes as the kidneys showed degenerative changes in some tubules (cloudy swelling and hydropic degeneration). Similar results were obtained by several investigator (38,24).

The results concerned with the histopathological findings of liver and kidney were explained in Figures (1-8). The recorded alterations in the liver and kidneys of infected non treated chicks were severe congestion of all blood vessels and sinusoids, bands of hepatocytes that had undergone coagulative necrosis with indistinct cell boundaries and infiltration of granulocytes. The renal lobules were enlarged, dark red in color and pin point haemorrhages occurred on the surface of kidney lobules. There were focal necrosis of the epithelium of the convoluted and collecting tubules characterized by presence of eosinophilia of the cytoplasm and nuclear pyknosis. Our results in it has been observed (39), that there were petechial haemorrhages on the liver, congestion of internal organs and perihepatitis in chicks infected with *E. coli* and non treated haemorrhage. Chicks infected with *E. coli* and non treated there were congestion of the kidneys and liver (40).

The histopathological results in this study in Quail chicks infected with *E. coli* were recorded in showed liver degenerative changes, congestion and coagulative necrosis in hepatocytes, intestine revealed congestion, desquamation of intestinal epithelial villi with leukocytic infiltration. Lung showed congestion, thickening and hyalinization with thickening in splenic blood vessel wall. Ducks and Quail chicks showed similar lesion (41,42). The groups of Quail chicks infected and treated showed very mild histopathological alteration.

From this study we could be concluded that, E.coli infection in quail chicks Difloxacin treatment helped in eradication of the infection by E.coli and resulted in hepatotoxicity, nephrotoxicity and immune suppression which lead to economic losses in quail chicks.

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الملخص العربي

التقييم الحقلّي للدّاي فلوكساسين في علاج الإصابة بالميكروب القولوني

العصوى بالسّمان الياباني

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الإصابة بمرض القولون العصوي تمثل خطراً على صناعة السمان وهذا يرجع إلى أضرارها المتعددة منها إتهابات الأكياس الهوائية والقلب والكبد وزيادة نسبة الوفيات لذلك استهدفت هذه الدراسة استبيان المزيد من المعلومات عن كفاءة عقار الداي فلوكساسين لعلاج كتاكيت السمان المصابة بالميكروب القولوني العصوي.

في هذه الدراسة تم استخدام عدد ٧٥ كتكوت سمان من أحد مزارع السمان بمدينة الزقازيق - شرقية منها ٢٥ كتكوت سليمة و ٥٠ تم إصابتهم إصابة صناعية بميكروب القولوني العصوي ونم تقسيمهم إلى ثلاث مجموعات كلاً منها يحتوي على ٢٥ كتكوت، الأولى: مجموعة ضابطة سليمة وغير معالجة، الثانية: مصابة وغير معالجة أما الثالثة مصابة ومعالجة بعقار الداي فلوكساسين بمعدل ٢٥ ملجم / كجم وزن حي. استمر العلاج لمدة خمس أيام متتالية عن طريق مياه الشرب.

إصابة كتاكيت السمان بمرض القولون العصوي أدت إلى حدوث نقص معنوي في وزن الجسم المكتسب ونقص في استهلاك العليقة ونقص معدلات التحول الغذائي وزيادة في نسبة النفوق وعلاوة على ذلك وجد أن الإصابة بمرض القولون العصوي بكتاكيت السمان أظهرت الدراسة حدوث نقص معنوي في العدد الكلي لكرات الدم الحمراء، تركيز الهيموجلوبين، حجم الخلايا المضغوطة، البروتين الكلي، الزلال والجلوبولين وحدثت زيادة معنوية في انزيمات الكبد (الأسبرتيت امينوترانس فيراز، الالنين امينوترانس فيراز، حمض البوليك والكرياتينين).

واستناداً إلى التحسن الملحوظ على الأعراض الإكلينيكية ونسبة النفوق والصفة التشريحية ومعدل استهلاك العلف ومعدل التحويل الغذائي بالإضافة إلى الوزن المكتسب في كل المجموع يمكن القول بكفاءة الداي فلوكساسين في التغلب على الإصابة بالميكروب القولوني في كتاكيت السمان.

وبدراسة التغيرات الهستوباثولوجية في كتاكيت السمان المصاب والمعالج وجد أن العقار له تأثير واضح في علاج الأعراض المرضية للمرض.

خلاصة القول أن هذه النتائج أثبتت كفاءة الداي فلوكساسين بجرعة (٢٥ ملجم/ ك وزن حي) في التغلب على الإصابة بميكروب القولون العصوي الذي يصيب كتاكيت السمان ويسبب خسائر فادحة.