RESEARCH ARTICLE

EFFECT OF *E. COLI* 0H157 ON BALADI TURKEY AND SOME BIOCHEMICAL AND CLINOCOPATHOLOGICAL STUDIES

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ARTICLE INFO	ABSTRACT
	Forty Baladi turkey 4 weeks old and 700 - 1000 g average body weight were used. They kept in a balanced diet to study some performance, and clinicopathological changes under *E.coli* 0157:H7 infection. Ten Baladi turkeys kept as control and 30 were infected with *E. coli* 015,: H7 by dose 0.05m1 (x 10^7 CFU) inoculated intramuscularly. Body weight were recorded, blood samples were collected at 7, 15, 30 days post infection, serum was separated for determination of AST, ALT, *Total* protein. Albumin, urea, creatinine, calcium phosphorous, sodium, potassium and cortisol hormone. The biochemical analysis showed increase in AST and ALT and a significant change in protein. Hypoalbuminemia, was observed, increase of serum urea, creatinine, hypocalcaemia, hyperphosphatemia, and decrease in level of potassium, sodium and cortisol hormone in areas. Blood examination revealed pancytopenia. This indicates that *E. coli* 0157: H7 causes deleterious effect on the Hematopoietic system

INTRODUCTION

Infection with *E. coli* 0157:H7 presents with a wide spectrum of clinical manifestations, including severe abdominal cramps with little or *no* fever and watery diarrhea that often progresses to grossly bloody diarrhea (Levin, 1997). Infection can be asymptomatic or can present with only nonbloody diarrhea (Belongia *et al*., 1990). Extraintestinal involvement, including cardiac and neurologic manifestations, has been reported, and infection can be associated with the hemolytic-uremic syndrom and thrombotic thrombocy-topenic purpura. The disease can be fatal (Karmali *et al*., 1985). Escherichia coli normally found in the digestive tract of poultry and most strains are non-pathogenic. The pathogenic capacity of *E. coli* for Baladi turkeys to cause significant diarrheal and extraintestinal diseases has been associated with numerous extrinsic and intrinsic bird- related factors and condition. The extrinsic factors include environment, exposure to other infectious agents, virulence and duration of exposure. (Quinn *et al* 2002, Compos, *et al* 2004, Kwon, *et al* 2008, El-sayed *et al*. 2015).

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Esherichia coli comprises a group of bacteria found in the intestines of humans, animals and birds, E. coli 0157:H7 strain produces potent toxins and can cause food born poisons to person transmitted disease after ingestion of very low numbers of microorganism E. coli 0157:H7 was first identified as a human pathogen in 1982 (Riley *et al*., 1983). Griffin and Tauxe, (1992), a recorded reported that strain of E. coli infection is more often reported in the young, illness signs are bloody diarrheae, severe abdominal pain, low grade of fever and vomiting. The major source of food born E. coli 0157:H7 ciated disease is undercooked grand beef. Roast beef, roast Baladi turkey, raw milk and water an out break of the disease in persons who had eaten fast food in these restaurant chain. Marks and Robert, (1993), reported that the cytotoxins of E. coli 0157:H7 production seems to be important factors in the pathogenesis of disease. These cytotoxins are among the most potent bacterial toxins. These toxins in active host cell ribosomes disrupting protein synthesis and causing cell death Obrien *et al*. (1992). Prevention of illness is especially critical in addition to strategies designed to prevent food born illness. Controlled production of live animal, meat processing relatively little information is available on clinicopathological changes in

experimental animals with this disease. The present work designed to study some serum biochemical changes after experimental infections of Baladi turkey with E. coli 0157:H7.

MATERIALS AND METHODS

E. coli strain

E. coli 0157: H7 strain was used for the experimental infection for 40 Baladi turkey 4 weeks old as well as 900-1000 gm average body weight. Bird proved to be free from pathogenic bacteria and parasitic infection. I/M with 0.05 * 107cfu colony forming unit ml of viable organisms of E. coli 0157:H7.

Blood samples

Two blood samples were collected from wing vein the first blood sample was collected into dry clean tube containing dipotassium. Ethylene diamine tetracetate (EDTA) as anticoagulant to covering out the hematological studies including red blood cells counts (RBCs) hemoglobin, (H) packed cell volume. (PCV), mean corpuscular. Hemoglobin (MCH) and mean corpuscular hemoglobin concentration (MCIIC) were calculated from these hematological parameters according to Jain, (1986).

Second blood samples were collected from wing vein and serum was separated and used for the determination the activity of asparatate aminotransferase.

(AST) and alamine aminotransferase (ALT) according to Reitman and Frankel, (1957). Total protein and albumin according to Doumas and Biggs, (1972). Urea according to Sanders, (1980) creatinine was estimated according to Bartels, (1971), calcium was determined according to Sarkar and Chankan, (1967), phosphorous was measured according to Goodwin, (1970), Na, K were determined by atomic absorption. Serum cortisol was analyzed by means of a gammacoat 125 I cortisal radioimunassay kit according to the method described by Campbell and Coles, (1986). Also at the time of scarification feaces from these birds are cultivated on sorbitol MaConkey agar medium for bacteriological examination according to Ratnam and March, (1986). Statistical analysis according to Snedecor and Cochran, (1967).

RESULTS

Bacteriological results recorded fail to ferment sorbitol can be recognized as colorless colonies. Further confirmation we made by agglutination test with anti-serum against the flagella antigen H7 it give positive results. In Table (1) there is a significant decrease on body weight at 7, 15, 30 days and mortality rate is increase in the 1" week after infection, signs of infection appears in the form of depression, loss of body weight, bloody diarrhea and ascites. Table (3) revealed a significant decrease in RBcs count Hb concentrations PCV, MCV, MCH, McHc also TLC such decrease was very highly significant on days 30 of infection (P< 0.01). In Table (4) there is a significant increase in ALT and AST if compared with control group P < 0.05.

Table 1. Changes in body weight in infected baladi Baladi turkey with E coli

	7 days	15 days	30 days
Control	760 ±0.62	780 ± 0.10	900 ± 0.30
Infected	700 ± 0.60	600 ± 0.65*	608 ± 0.46**

*P<0.05**P<0.01

Table 2. Composition of the basal diets (according to National Research Council)

Ingredients (%)	Started diet	Grower-Finisher diet
Yellow corn ground	60.40	70.90
Soyabean meal (44 %)	19.30	16.30
Fish meal (72 %)	3.00	2.50
Meat meal (60 %)	4.84	3.80
Bone meal	0.07	0.08
Dicalcium phosphate	0.10	0.09
Limestone ground	0.70	0.90
Salt	0.68	0.13
Methionine	0.10	0.03
Premix *	0.10	0.12
Calculated analysis		
Crude protein (%)	2050	16
ME (Kcal/kg)	2889	3000
C/P ratio	119.02	140

Table 3. Hematological values (mean Values ± S.E of normal and affected baladi turkey by E. coli

Groups	R.B.C.S 106 µL	HB gm/dl	P.cv %	M.cv	MCH pg	M.CH.C% * 103 µl	TL. C
Control	2.0 ± 0.20	8.0 ± 0.13	26.9 ±0.33	110.5 ± 10.8	38.1 ± 1.02	33.3 ± 0.10	30.2 ± 0.20
7 days	2.4* ± 0.19	8.3 ± 0.30	24.9 ±0.63	110 ± 5.2	33.4 ± 0.20	30.1 ± 0.9	22.2 ± 0.65
15 days	1.9 ± 0.74	7.00 ± 0.50*	20.8±0.0.9*	101.5 ± 3.13*	32.6 ± 0.20*	18.4 ± 0.19*	20.2 ± 0.20*
30 days	1.54 ± 0.52*	6.40 ± 0.65*	20.0±0.60*	99.0 ± 1.50*	19 ± 0.54*	16.4 ± 0.10**	18.2 ± 0.10**

Table 4. Changes Of Liver function test and cortisol hormone in baladi turkey infested with E coli 0157:H$_7$

Pavameter		A S T μ/d	A L T μ/d	Total protein gm/dl	Albumin gm/dl	Cortisol μg/dl
Control		24.0 ± 0.10	13 ± 0.20	4.0 ± 0.90	2.10 ± 0.02	0.07 ± 0.90
Infected	7 days	25 ± 0.90	14 ± 0.15	3.8 ± 0.60	2.26 ± 0.17	0.09 ± 0.60
Infected	15 days	35 ± 0.90	18 ± 0.18	2.8 ± 0.46*	1.43 ± 0.10*	0.08 ± 0.45*
Infected	30 days	43 ± 0.20*	25.8 ± 0.60**	2.6 ± 0.60	0.90 ± 0.50	0.14 ± 0.60**

* $P<0.05$ ** $p<0.01$

Table 5. Renal Function in baladi turkey infested with E coli 0157:H$_7$

Parameter	Urea mg/dl	Creatinine mg/dl	Calcium mg/dl	Phosphorous mg/dl	Sadium Meq/l	Potassium Meq/l
Control	2.97 ± 0.52	1.25 ± 0.56	8.00 ± 0.10	5.99 ± 0.20	150 ± 0.52	7.5± 0.10*
Infected 7 days	3.50 ± 0.10*	1.8 ± 0.09*	7.10 ± 09*	5.82 ± 0.20*	135 ± 0.60*	6.4 ± 0.15*
Infected 15 dys	4.12 ± 0.19*	2.4 ± 0.20	6.44 ± 0.11*	6.50 ± 0.09	125 ± 0.27*	5.3 ± 0.7*
Infected 30 days	5.00 ± 0.62**	2.58 ± 0.60*	5.6 ± 0.10*	7.41 ± 0.70	118 ± 010*	4.40 ± 0.10

** $P\,0.01$ * $P< 0.05$

Total protein and Albumin showed highly significant decrease if compared with control group. Concerning cortisol the result showed highly significant increase if compared with control group. Table (5) revealed a significant increases in serum urea and creatinine and Hyperphosphatemia in d15 and d30 .p<0.01.also there is a significant decrease in serum level sodium,potassium and Hypocalcemia in d15 and d30 p<0.01. Broiler premix furnishing the following ingredients per kg of feed vit. A 12000 IU, vit D$_3$ 2000 IU, Vit E 10 mg, folic acid I mg vit Niacin 20 mg, pantothenic acid 10 mg, vit K 2 mg, vit B$_1$ 1mg, vit B2 4 mg, vit B6 1.5 mg vit B12 10 μg, iron 30 mg, copper 10 mg, Zinc 55 mg, Mn 55 mg, Iodine 1 mg, Se 0.1 mg, choline chloride 500 mg.

DISCUSSION

E. coli typically colonize the gastrointestinal tract of warm-blooded animals within a few hours after birth. However, a large number of highly adapted *E. coli* pathogens have acquired specific virulence attributes (Kaper *et al*., 2004). Some pathotypes of *E. coli* are capable of causing intestinal diseases, while others referred to as extra intestinal pathogenic *E. coli* (ExPEC). Hemorrhagic colitis caused by E. coli 0157:-H7 is a clinical syndrome that consists of abdominal cramps; diarrhea that progresses to become bloody; radiologic or endoscopic evidence of clonic mucosal edema, erosion, or hemorrhage; and the absence of conventional enteric organisms in the stool. The present study shows a significant decrease in RBcs count, Hb concentration and PCV in the affected birds indicate anemia of microcytic hypochromic as showed by the erythrocytic indices that were proportionally correlated with the severity of infection of *E. coli.* This result is in accordance with Jain, (1986). The increase in serum AST levels in this work could be due to liver damage produces by the infected bacteria. Campell and Coles, (1986); mentioned that the increased of the activity of.AST has been associated with hepatocellular damage in birds.

Concerning ALT in Baladi turkey some studies reported elevation of ALT *it* birds infected with bacteria. (Bokori and karasi, 1969). Our result agrees with Omaima (1987), who observed a significant increase in (AST & ALT; in Baladi turkey infected with *E. coli.* The significant change in total protein and albumin in the present work could be due to liver and kidney damage which could be associated with bacterial infection. Similar findings were previously mentioned by Riley *et al.,* (1983) Pai, (1984); Campbell and Coles, (1986) and Ostroff *et al.,* (1989). The increase in Urea and creatinine could be due to the effect of th+ micro-organisms and its Toxin on the kidneys.

Our results is completely agree with Pai *et al.,* (1986); Tzipori *et al.,* (1987) and Obrig *et al., (1987) who* reported increased creatinine, urea level in case of renal disease. Hypocalcaemia, and. Hyperphosphatemia could be due to decreas calcium resorption by damaged renal tubules and associated wit: Hypoalbuminemia as reported by Campell and Coles, (1986); Beer *et al.* (1985) and Marks and Robert, (1993). The decrease of potassium and sodium level in serum could be due t renal disease as reported by Campbell and Coles, (1986). Also th metabolism of Calcium and Phosphorus is closely linked in the body an hypocalcaemia always accompanied with hyperphosphatemia concerning serum cortisol level, the significant increase of serum cortisol level may t attributed to the activation of Hypothalamus piutitary axis due to stress. and result agree with Ghanem, (1986) and Campbell and Coles, (1986). In conclusion infection of Baladi turkey with *E. coli* 0157: H7 injured live, and Kidneys. The change in liver and kidney function were more severe in days of infection.

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