Effect of *Fasciola gigantica* Infection on Some Blood Physiological and Biochemical Aspects of Infected Cows in Babylon Governorate

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Abstract

This study was carried out to reveal the Epidemicity of *Fasciola gigantica* infection in cows and heifers in Babylon Province and its effects on some blood physiological and biochemical aspects. The results show the following:

The percentage of cows and heifers infected with *F. hepatica* during the study period reached about 50% and the percentage of infection increased significantly with age progress ($P<0.05$).

The total count of R.B.C. and Hb of infected animals were decreased significantly which is reached 4.3700 cell/mm^3 and 8.592 mg/100ml, alternatively as compared with those of healthy animals which is reached 5.515 cell/mm^3 and 11.427 mg/100ml ($P<0.05$). Significant increases were noticed in the total count and differential counts of W.B.C. of infected animals which is reached 10.402 cell/mm^3 as compared with uninfected animals which is reached 5.515 cell/mm^3.

The amount of ALP, T. Bilirubin and GOT enzymes in the infected animals which are increased reached 30.362U/L, 62.925 μmol/L and 17.412U/L, alternatively. However, GPT enzyme was not affected.

Introduction

The infection with liver flukes is worldwide. It infect both human and animals . the disease is caused by important species such as *Fasciola hepatica* and *F. gigantica* .

There are high infection percentages with this parasites in sheeps and nanny goats in Iraq at last years (Al Taae, 1983; Makawy , 1989; Al Dabag , 1997) . Also it infect cows , pigs and rabbits in addition to man (Talon, 1994; Ovington, 1998; Kojima, 1998) this infections causes liver inflammation , hepatocyte fibrosis , sever anemia and changes in blood enzymes and proteins (Sinclair, 1964; Makawy , 1989) .

The infection of ruminants with the parasite *F. gigantica* is a cause of important economic loss throughout Asia and Africa. The disease causes weight loss, reduced productivity and poor milk production.

Due to bad conditions in Iraq at last little years caused by wars and economic blockages leading to absence of drugs and agricultural exterminators and visible ignoring to breeding of animal wealth also never treating of diseases and parasitic infections such as liver flukes.

Materials and Methods

From visiting of the central butchery in Babylon Province from September 2004 to March 2005, (97) cows and heifers livers (aged from 6 months to 5 years) were collected and tested to detect the parasite infection through sectioning of bile ducts .

The diagnosis of species of *F. gigantica* was down depending on worm size and shape in addition to confirming the diagnosis the worms sent to Veterinary College / Baghdad University for diagnosis.

The blood specimens was collected from the animals before the butchering and placed in both heparinized and non heparinized tubes (Schaim *et al*., 1972).

The blood physiological and biochemical testes was don as follows:

1- **Red Blood Cells Count**: R.B.C. count was made according to Hall and Malia (1984).
2- **Hemoglobin Assessment**: By using of HB Meter and depending on Sood (1992).
3- **White Blood Cells Count**: W.B.C. count was made according to Brown (1976).
4- **Differential Leukocytes Count**: D. L. count was down By making of blood smears and depending on Brown (1976).
5- **Serum GPT and GOT Assessment**: S. GPT and GOT were determine consistent with Randox Co. kit .
6- **Serum Bilirubin Assessment**: S. B. was determine consistent with Biomacrib Co. kit .
7- **Serum Alkaline Phosphatase Assessment**: S. ALP was determine consistent with Biomacrib Co. kit .

Statistical Analysis

Chi square test, and analysis of variance (Campbell, 1967) were employed for the statistical analysis.

Results

Figure (1) reveals the identification of species of *F. gigantica*.

Figure (1) : *F. gigantica*

1- Infection percent

The total infection percentage of cows with *F. gigantica* is 50% divided into 31.7% for males and 64.2% for females with. Significant differences were noticed (P≤ 0.05) Table (1).

Table (1): Numbers and infection percentages of infected cows with *F. gigantica*.

Sex	Number of Total Animal Tested	Number of Infected Animals	Infection Percentage
Male	41	13	31.7
Female	56	36	64.2*
Sum.	97	49	

* Significant differences (P≤ 0.05).

2- Effect of the infection with *F. gigantica* on some blood physiological and biochemical parameters.

Table (2) show significant decreasing (P≤ 0.05) in total R.B.C. (4.3700 cell/mm^3) and Hb value (8.592 mg/100ml) in infected animals in comparison with non infected animals total R.B.C. and Hb value were (5.515 cell/mm^3) and (11.427 mg/100ml) .
Total W.B.C. (10.402 cell/mm^3) show significant increasing in infected animals in comparison with non infected animals (5.515 cell/mm^3).

Table (2): Effect of the infection with *F. gigantica* on some blood physiological parameters.

Treatment	Red Blood Cells $\times 10^6$cell/mm^3	Hemoglobin mg/100 ml	White Blood Cells $\times 10^6$cell/mm^3
Infected animals	4.3700 ∓ 5.148 a	8.592 ∓ 0.1166 a	10.402 ∓ 0.2303 a
Non infected animals	5.515 ∓ 4.911 b	11.427 ∓ 0.1456 b	5.515 ∓ 4.911 b

The number of Eosinophile (7.178%) increased significantly (P≤ 0.05) in infected animals .
There are no changes in numbers of lymphocytes, neutrophiles and monocytes in both infected animals and non infected animals (table 3).

Table (3): Effect of the infection with *F. gigantica* on differential leukocytes .

Infection	Lymphocyte	Neutrophile	Monocyte	Eosinophile
Infected animals	68.075 ∓ 0.6008	26.95 ∓ 0.417	2.48 ∓ 0.6122	7.187 ∓ 2.585 *****
Non infected animals	68.025 ∓ 0.5808	26.48 ∓ 0.459	1.82 ∓ 9.205	4.687 ∓ 1.097 *****

* Significant differences (P≤ 0.05).

The results in table (4) show significant increasing (P≤ 0.05) in S.T.B. (30.362 μmol/L), S.A.L.P. (62.925 U/L) and S.G.O.T. (17.4125 U/L) in infected animals in comparison with non infected animals.
There is no change in S.G.P.T. in both infected animals and non infected animals.

Table (4): Effect of the infection with *F. gigantica* on liver enzymes.

Infection	T.Bilirubin μmol/L	ALP U/L	S.G.O.T. U/L	S.G.P.T U/L
Infected animals	30.362 ∓ 1.315 a	62.925 ∓ 1.155 a	17.4125 ∓ 7.1294 a	12.3000 ∓ 0.2914 a
Non infected animals	13.037 ∓ 0.3699 b	39.475 ∓ 10.336 b	13.575 ∓ 0.7735 b	12.2875 ∓ 0.3233 b

Different letters means significant differences.

Discussion

The infection percentage of cows with *F. gigantica* (50%) was high (table 1). increasing number of infected animals due to the grazing of this animals in contaminated areas with snails such as *Lymnea* spp. That represents the intermediate host for *F. gigantica*. Also there is no controlling for these snails in these areas, In addition to absence of persons knowledge how work in cows breeding (Petalia, 2000).

The blood physiological testes show decreasing in R.B.C. and H.B. while number of W.B.C. was increased significantly (table 2). These results agreed with Makawy (1989) and Abood (1992).

This parasite infection causes anemia due to some reasons such as mechanical injuries of worms migration in liver tissue causing intensive bleeding, in chronic infection anemia caused by parasite blood sucking, removing of epithelium lining bile duct (Makawy ,1989; Abood ,1992) .

Dargie and Berry (1978) pronounced that anemia in infected animals resulting from haemodilution, intrahepatic hemorrhage and Billiary hemorrhage.

Anemia occurred because of iron massive utilization by animal body to restitution missed iron and intestine unable for absorption iron again (Dargie, 1975; Dargie and Mulligen, 1970).

The reasons of R.B.C. deficiency are bleeding and insufficient of bon marrow responding to new R.B.Cs. formation because of the infection in addition to sucking of 0.2 ml of blood daily by worms and bleeding of 0.5 ml of blood daily in muscles also flow of immature R.B.C. to the circulatory system (Ali, 1984; Abass, 1980; Sewell and Hammond, 1968).

Increasing of Eosinophiles in infected cows in comparison with non infected others (table 3) resulting from ability of Eosinophiles to destroy the parasites larval stages by their attachment on parasite wall and secretion of granules act in external parasite wall destructing (Roberts, 1968; Al-Zubaidy, 1989; Al-Kubassie, 1996) .

In general the increasing of leukocytes due to cellular immunity as responding of cells that able to attached antigens and encircle it, finally digest it by phagocytsosis in addition to lymphocyte activity such as T- lymphocyte and plasma cell (Maclaren and Lacani, 1982; Tizard, 1987).

The results in table (4) show increasing of S.G.O.T. that agreed with Ross *et al.* (1967) that the elevation of S.G.O.T. indicates to hepatocyte damage and it important to assessment the degree of hepatocyte damage or liver fluke infection.

Thorpe (1965) indicated that the S.G.O.T. is more sensitive than S.G.P.T to liver tissue destroying; S.G.P.T is low response to hepatocyte damage (Yasuda, 1988).

Increasing of S. T. Bilirubin and S.G.P.T due to hepatocyte death from liver fluke infection. In addition to complete or partial bile ducts obstruction causing returning of Bilirubin to hepatocyte then increased it in serum and elevation of S.G.P.T (Dias, 1996; Pulperio, 1991; Kilad *et al*., 2000).

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تأثيـر الإصابـة بدودة الكبـد *Fasciola gigantica* في بعض معايير الدم الفسلجية والكيموحيوية للابقار المصابة في محافظة بابل

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الخلاصة :

تناولت هذه الدراسة وبائية الاصابة بدودة الكبد *Fasciola gigantica* في الابقار والعجول بمحافظة بابل وتاثير هذه الاصابة على بعض معايير الدم الفسلجية والكيموحيوية وتم التوصل الى النتائج الاتية :

كانت نسبة الاصابة الكلية في الابقار والعجول بدودة الكبد *F. gigantica* بهذه الدراسة 50% وتزداد هذه النسبة معنويا مع زيادة العمر .

العدد الكلي لكريات الدم الحمر وكمية خضاب الدم تناقص بشكل معنوي في الحيوانات المصابة ووصل الى 4.3700 خلية / ملم^3 و 8.592 ملغم / 100مل ، على التوالي بالمقارنة مع الحيوانات الغير مصابة حيث كانت 5.515 خلية / ملـم^3 و 11.427 ملغم / 100مل ، على التوالي وتحت مستوى دلالة 0.05 .

ازداد معنويا العدد الكلي لكريات الدم البيض في الحيوانات المصابة وبلغ 10.402 خلية / ملم^3 بالمقارنة مع الحيوانات غير المصابة (10.402 خلية / ملم^3) .

كمية البيلاروبين الكلي وانزيمات A.L.P. و G.O.T. في المصل ازداد معنويا فـي الحيوانـات المصـابة وكـان 62.925 مايكرومول / لتر ، 30.362 وحدة / لتر و 17.412 وحدة / لتر ، على التوالي بينما لم تتأثر كمية انزيم G.P.T. في المصل .