

EFFECT OF BRUCELLA MELITENSIS ON THE SERUM LIPIDS PROFILES IN EWES

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ABSTRACT

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The present study aimed to determine the seroprevalence of brucellosis in the serum of non vaccinated ewes by indirect enzyme-linked immunosorbent assay (I-ELISA), and to investigate possible effect of brucellosis on the serum lipids profiles in infected ewes and find correlation coefficients among all parameters. These study included examination of 120 blood serum samples (collected from non-vaccinated ewes) in different areas of Duhok Governorate, Iraq. Results showed that prevalence of brucellosis (by using I-ELISA) was 39.1% and also showed significant increased in total cholesterol, triglyceride (TG), in the investigated ewes (one week post abatement) low density lipoprotein and high density lipoprotein levels, whereas very low density lipoprotein value is significantly decreased compared with the (negative for I-ELISA)-group.

Key words: *Brucella melitensis* infection, lipid profiles, ewes.

INTRODUCTION

Brucellosis is an important re-emerging zoonosis with a worldwide distribution. *Brucella* infection is contagious for humans and the disease, unless diagnosed and treated both promptly and effectively, will become chronic, affecting multiple body systems (Young, 1995). Human infection usually occurred following ingestion of contaminated dairy foods and from occupational exposure to infected live animals or carcasses during slaughter. While, sheep and goats are the major reservoirs of *B. melitensis* infection, there is increasing evidence of emergence in cattle and camels (Young, 1995).

Lipids are essential for energy utilization, lipid deposition, steroid hormone production, and bile acid formation. The lipoprotein consists of esterified and unesterified cholesterol, triglycerides, phospholipids and protein. There are many major lipoproteins in blood including very low density lipoprotein (VLDL), intermediate density lipoprotein (IDL), low density lipoprotein (LDL) and high density lipoprotein (HDL). Each of these classes of lipoproteins carries cholesterol and triglyceride to a varying degree, with LDL carrying the majority of cholesterol, and VLDL carrying the majority of triglyceride (Gagan, 2014).

In general, infected animal care issues related to screening and diagnosis are based on the results of the measurement of serum lipids, which is generally

accomplished by obtaining a lipid profile. On occasion, measurement of serum lipoprotein is necessary for one or more of these purposes (Amal, 2009).

The aims of our study are to determine seroprevalence of brucella infection in the serum of non-vaccinated aborted ewes by indirect enzyme-linked immunosorbent assay (I-ELISA), and to investigate possible effect of brucella infection on the serum lipids profiles in infected ewes and find the correlation coefficients among all parameters.

MATERIALS and METHODS

1- Animals:

The present study was carried out at the Faculty of Veterinary Medicine, Duhok University in Duhok, Kurdistan region-Iraq. A total of 120 blood serum samples were collected randomly from different ages and flocks of non vaccinated local ewes within one month after abortion in Duhok governorate of Iraq from February to May 2013. Blood samples were kept and transported in a polyethylene cool box to the laboratory.

2- Blood samples:

Blood samples of the tested animals were collected aseptically. Serum of the collected samples were separated and kept in a screw capped plastic vials and stored at - 20 °C until examination.

3- Serological test (ELISA):

The brucella I-ELISA antibody test (*B. melitensis* antigen) kit, along with the user manual was obtained from Svanova Biotech AB, Sweden. The test was performed based on the protocol outlined in the user manual. The samples were found negative results for I-ELISA are considered as a control group. All optical density (OD) values for the test samples as well as the negative control related to the OD value of the positive control are calculated, a positivity values (PP) value equal or more than 15 was taken as positive.

4- Lipids profiles analysis:

Serum concentration of total cholesterol, triglycerides, high density lipoprotein, were measured enzymatically with a commercial kit (Biolabostandard kits, France). While low density lipoprotein and (LDL) and very low density lipoprotein (VLDL) were measured according to formula that used by Burtis and Ashwood, (1999):

$$\text{LDL Cholesterol} = \text{Total Cholesterol} - \text{HDL} - (\text{TG} / 5)$$

$$\text{VLDL were measured according to } \text{VLDL} = \text{TG} / 5$$

5- Statistical analysis:

All data were analyzed by one-way analysis of variance, the specific group differences were determined by T test (Bowers, 2008) and the correlation coefficients by using SAS 2001. The accepted level of significant was $P < 0.05$.

RESULTS

A total of 120 sera from ewes were processed for antibody detection, 47(39.1%) samples by I-ELISA were founds positive for *B.melitensis* antibodies. While, 73 samples were found negative results for I-ELISA.

Brucella infection caused significant increase in mean values of TC, TG, HDL, LDL, and VLDL when compared with control group. (Table 1 and Figure 1).

Table 1: Effect of *B.melitensis* on serum lipid profiles in ewes.

Parameters	Control group (n=73)	Infected group (n=47)
TC mg/dl	90.3 ±11.24 b	143.73 ±8.29 a
TG mg/dl	77.00 ±13.39 b	111.60 ±13.39 a
HDL mg/dl	19.67 ±3.27 b	46.42 ±19.82 a
LDL mg/dl	53.22 ±1.62 b	75.08 ±19.20 a
VLDL mg/dl	15.42 ±1.31 a	22.29 ±4.22 b

*a,b Values carrying the different letters are significantly different at $P \leq 0.05$.

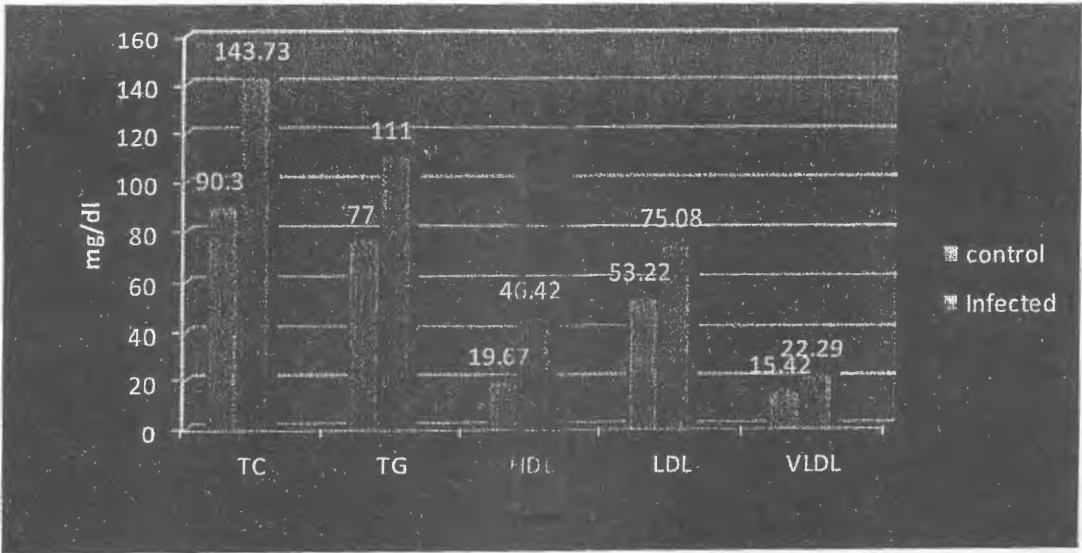


Figure (1): Effect of *B.melitensis* on serum lipid profiles in ewes

Results also showed significant correlation coefficient among all parameters, the results were seen in Table (2).

Table 2: Correlation coefficients among parameters.

Parameters	TC	TG	HDL	LDL	VLDL
TC mg/dl	0.94**				
TG mg/dl	0.81**	0.74**			
HDL mg/dl	0.62**	0.57**	0.52**		
LDL mg/dl	0.64**	0.57**	0.63**	0.53**	
VLDL mg/dl	0.69**	0.61**	0.59**	0.45*	0.49**

* Significant differences correlation at $P \leq 0.05$ ** Highly significant correlation at $P \leq 0.01$

DISCUSSION

Results from our study indicate that 47(39.1%) samples by I-ELISA were founds positive for *B.melitensis* antibodies. While, in northern Iraq and Mosul province using ELISA, a comparative lower values seroprevalence of 23.6 % in sheep were reported by Arslan *et al.* (2011). The lower values of 5.2 % in sheep were also observed by Montasser *et al.* (2011). The high incidence may be due to many factors including the lack of an integrated program to control the disease, the absence of healthy ways to get rid of aborted fetuses and other pollutants, poor nutrition and the methods of management (Kabagambe *et al.*, 2001) as well as the role of wildlife animals, which act as reservoir and spread the disease (Godfroid, 2002).

Our study showed that *B.melitensis* increased serum levels of lipids profiles in infected ewes and this result agreed with that of Arslan *et al.* (2011) who indicated that brucellosis increase in serum total cholesterol, LDL-cholesterol and high level of LDL/HDL ratio in infected animals. Significant increased in total lipids compared to control group could be ascribed to the higher levels of free fatty acids (FFA) in infected ewes, caused by increased level of cortisol due to stress of abortion which induced by brucella infection, as well as increased sensitivity of ewes to epinephrine hormone, which leads to the increase in serum FFA concentrations (Piccione *et al.*, 2009). The triglycerides are increased may be due to presence of brucella endotoxins which are causes bacteremia and septicemia (Arslan *et al.*, 2011) or due to loss of proteins because of glomerulonephritis and nephrotic syndrome resulting from brucellosis (Stockham and Scott, 2003). These variation were related to the physiological adaptations of sheep for their energy needs during pregnancy and abortion (Nazifi *et al.*, 2002) and also the age of the infected animals effect on the serum lipids profiles levels (Gagan, 2014). Nevertheless, it could be noted that brucella infection causes arise in serum levels of TC, TG, HDL and LDL.

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تأثير داء البروسيلة على دهون مصل الدم في النعاج

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استهدفت الدراسة الحالية تحديد نسبة الإصابة بداء البروسيلة مصليا في أمصال النعاج غير المحصنة والمجهضة بالاعتماد على اختبار الأليزا غير المباشر ، فضلا عن معرفة تأثير المرض على مستويات الدهون في المصل serum lipids profiles وكذلك معرفة العلاقة بينها. شملت الدراسة فحص 120 عينة من مصل دم النعاج في مختلف مناطق محافظة دهوك ، إذ فحصت أولا بأجراء اختبار الأليزا ثم أجريت الاختبارات الكيموحيوية على العينات الموجبة والسالبة لاختبار الأليزا لتحديد مستويات الدهون فيها والمقارنة بينهما. أظهرت النتائج أن النسبة الكلية للإصابة بلغت 39.1%. في الحيوانات المختبرة (عقب الإجهاض بأسبوع) وأظهرت النتائج أيضا حدوث ارتفاع معنوي في كل مستويات الدهون والشحوم الثلاثية بينما لوحظ انخفاض معنوي في مستوى اللايبوبروتين ذات الكثافة المنخفضة جدا عند مقارنتها بالمجموعة ذات النتائج السالبة لاختبار الأليزا غير المباشر.