Biochemical parameter evaluation Buffalos and Cows with brucellosis in Missan Province

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Abstract

The present study was undertaken to assess and compare the serum biochemical parameters of buffalos and cows brucellosis with negative ones .A total of ninety three blood samples were collected randomly from different age and flocks of non vaccinated local buffalos and cows. Rose Bengal Plate Test was depended for screening the collected blood samples in addition to measure serum biochemical parameters included total protein, albumin, cholesterol, triglyceride, urea, creatinine, aspartate transaminase (AST) and alanine transaminase (ALT). It was observed that 12 (12.9%) samples positive for *Brucella* spp. The results of biochemical parameters shown that ALT, AST and total protein were increased significantly ($p<0.05$) in buffalo positive for brucellosis than those of negative results .The values of the albumin, cholesterol, triglyceride, urea and creatinine did not show significant variation between the *Brucella* positive and negative buffalo. The values of serum cholesterol, triglyceride and creatinine concentrations for *Brucella* positive cows were declined significantly ($p<0.05$) when compared to negative ones . The value of AST was elevated significantly ($p<0.05$) in *Brucella* positive cows. It was noticed that there were no significant differences between positive and negative cows considering total protein, albumin, urea and ALT. cows .These changes in biochemical parameters of the blood indicate that brucellosis causes deteriorative effects on health of buffalo and cows infected with *Brucella*.

Introduction

Brucellosis is an important bacterial zoonotic infection with a worldwide distribution among humans and animals, caused by different *Brucella* species (Pappas *etal*. 2006 ; Maadi *etal*., 2011). The recognized *Brucella* species are named according to their host preferences such as *B. abortus* which infects cattle (Corbel , 1997).The incidence of Brucellosis varies considerably

among breed , areas and country(Ghani *etal*.,1995).Brucellosis may cause considerable economic losses especially it reduces productivity and lead to abortion (EL-Boshy *etal*.,2009).Abortion in last trimester, birth of unthrifty newborn, retained placenta in female and orchitis, epididyimitis in male animals are the most manifestations of brucellosis in animals

(Radostit *etal*. 2007) and it may lead to temporary or permanent infertility in affected animals (Cutler *etal*. 2005). Human infection usually occurred by the consumption of raw milk and its products as well as occupational exposure to infected live animals or carcasses during slaughter (Young ,1995).

The study of biochemical parameters in the blood can give valuable information about the animal health. *Brucella* is a significant animal pathogen with adverse effects on different vital organs such as heart, liver, kidney and muscle which can cause damage, functional disorders which may cause alterations in biochemical parameters (Sker *etal*. 2001; Bouhroum *etal*. 2012). Several tests such as Rose Bengal Plate Test (RBPT), Standard Tube Agglutination Test (STAT), Enzyme Linked Immunosorbent Assay (ELIZA), Milk Ring Test (MRT) and the Fluorescence Polarization Assay are commonly used for the detection of anti-*Brucella* antibody (Altuglu *et al*., 2002; Kumar *et al*., 2015). Little informations are available about the biochemical parameters in buffalos and cows with Brucellosis. This study was conducted to evaluate any alterations in different biochemical parameters of the buffalos and cows diagnosed with brucellosis.

Material and Methods
1- Animals
The present study was carried out at the department of biology, college of Science, Missan University in Missan proviance, Iraq. In period from 26/11/2016 to 22/3/2017 .A total of (93) blood samples (57 male and 36 female) were collected randomly from different ages about (1- 4) year , and flocks of non-vaccinated local buffalos and cows. The collected blood samples were kept and transferred in a polyethylene cool box to the laboratory.

2- Blood samples
Ten ml of blood was collected in vacationer EDTA- tube. Plasma was separated from the blood by centrifugation at 3000 rpm for 15 min. Each sample was labeled using codes describing the specific animal and stored at -20℃ until examination.

3- Serological test
The collected samples were screened for *Brucella* using RBPT according to the procedure recommended by (Aldomy *et al*. 2009). Fifty μL of RBPT antigen and 50 μL of the tested serum were placed alongside on the plate, and then mixed thoroughly. The plate was shaken for 5 min and the degree of agglutination reaction was recorded. Agglutination indicated positive results while no agglutination considered as negative.

4- Biochemical analysis
Serum concentration of total protein, albumin, cholesterol, triglyceride, urea, creatinine, aspartate transaminase (AST) and alanine transaminase (ALT) were determined using commercially available kits (made by Randox Company in United Kingdom and Biomerieux Company in France).

5- Statistical analysis
The obtained data were analyzed statistically using student's t-test. The values present as mean ± SE (Al-Mashadani and Hermz, 1989).

Results

Out of 93 screened sera samples by RBPT 12 (12.9%) were positive for *Brucella* spp., eight buffalos were positive (15.4 %), while four cows were positive (9.8 %) (Figure, 1).

Mean values of serum ALT , AST and total protein activities were increased significantly (p<0.05) in serologically positive buffalos in compare to negative ones (Table,1).The mean values of the albumin , cholesterol, triglyceride , urea and creatinine were not significantly different between seropositive and seronegative buffalos(p-values are 0.239 , 0.110, 0.231, 0.222 and 0.477 respectively) (Table,1). The mean values of serum cholesterol, triglyceride and creatinine concentrations among seropositive cows were declined(84.50 ± 5.12 , 19.75 ± 2.86 and 0.95 ±0.12 respectively) (p-values are 6.295 , 6.363 and 2.800 respectively) when compared to seronegative ones, while the mean value of AST was elevated significantly (68.25 ±2.92) (p-value is 7.262) (Table ,2). There were not significant different between seropositive and seronegative cows considering total protein, albumin, urea and ALT (p-values are 0. 870, 1.480, 0.247 and 0.508 respectively) (Table,2).

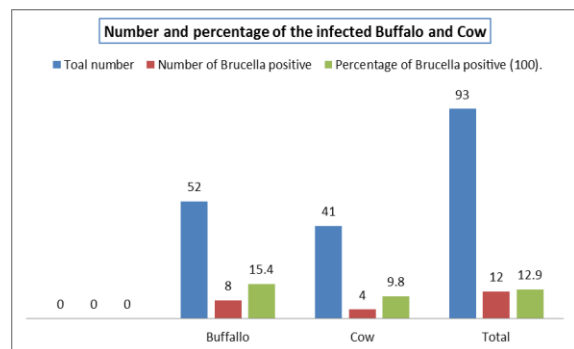Figure (1): Number and percentage of the infected buffalo and cow.

Table (1): Biochemical parameters in health and *brucella* infected buffalo.

Parameters	Brucellosis Positive	Brucellosis Negative	p-value (0.05)
Total protein	8.04 ± 1.46	6.61± 0.69	2.772
Albumin	2.51 ± 0.38	2.74± 0.19	0.239 (NS)
Cholesterol	75.50 ± 21.23	61.38± 8.57	0.110 (NS)
Triglyceride	24.13 ± 7.77	29.00± 6.18	o.231 (NS)
Urea	43.13 ± 14.95	27.25± 11.45	0.222 (NS)
Creatinine	1.56 ± 0.85	1.83± 0.33	0.477 (NS)
ALT	66.75 ± 12.32	41.38±11.23	2.874
AST	208.38± 67.83	115.38±45.20	3.672

∗Values are expressed as mean ± SE.

∗ NS: Non-significant.

Table (2): Biochemical parameters in health and *brucella* infected cow.

Parameters	Brucellosis Positive	Brucellosis Negative	p-value (0.05)
Total protein	7.62 ± 0.40	7.27 ± 1.18	0.870 (NS)
Albumin	2.57 ± 0.15	2.80 ± 0.07	1.480 (NS)
Cholesterol	84.50 ± 5.12	116.75 ± 6.20	6.295
Triglyceride	19.75 ± 2.86	38.00 ± 2.90	6.363
Urea	14.50 ± 2.02	15.00 ±1.90	0.247 (NS)
Creatinine	0.95 ±0.12	1.30 ± 0.01	2.800
ALT	26.25 ±2.95	24.75 ± 2.70	0.508 (NS)
AST	68.25 ±2.92	47.00 ± 4.21	7.262

∗Values are expressed as mean ± SE.

∗ NS: Non-significant.

Figure (1): Number and percentage of the infected Buffalo and Cow

Discussion

Brucellosis is one of the most serious animal and human diseases .It provokes placentitis, abortion, retention of the placenta and metritis and can affect the economy of a country by inflicting heavy loss to the livestock and dairy industries (Ghani *etal*. 1990 ; Poester *etal*. 2013).

In this study the results showed that the percentage rates of brucellosis using RB was 15.4% and 9.8% in buffalo and cows respectively, which agreed with observations reported by Arslan with his co-workers in 2011, where they found that the percentage of brucellosis in sheep using RBPT was 8.77% in Mosul city , Whereas the results recorded by Al- Naqshabendy and his coleagues in 2014 were relatively higher (39.1%) than observations reported in the current study although they depended on I-ELISA to screen for brucellosis from the different areas of Duhok city. EL Bahgy and Ali in 2017 who reported that the percentage of Brucellosis were 15 and 5% among cows from Kafr- EL Sheikh and Qualyobia governorates respectively.

This study showed that the Brucellosis may be behind a significant elevation in serum level of AST and ALT in buffalos and AST only in cows which was agreed with results reported in new study (Nath *et al*., 2014; Merhan *et al*., 2017) who found significant elevations in serum AST and ALT of *Brucella* seropositive animals. The serum activities of the aminotransferase are measured to detect hepatocellular injury (Abou Eiazab, 2015) due to liver damage caused by *Brucella* which can explain increased release of liver enzymes into the plasma (Hoffman and Solter, 2008).

The current study revealed that the Brucellosis may be behind a significant elevation in serum total protein among tested buffalos which was similar to results recorded by Abou Eiazab in 2015 who found significant elevation in the total protein levels among cows infected with *Brucella*. Moreover other investigators reported significant increase in serum total protein among cattle infected with Brucellosis (Nath *et al*., 2014).

From the current study elevation in cholesterol, triglyceride and creatinine among tested cows were reported which was parallel to observations found by EL Bahgy and Ali in 2017. Moreover in a past study done by Nath *et al*., (2014), it was observed that serum cholesterol and triglyceride were significantly increased among cattle infected with Brucella. Also others recently found that total cholesterol and LDL values were increased while triglyceride, HDL and VLDL values were decreased among cattle with Brucellosis (Merhan *et al*., 2017). Elevation in lipid profile in cow infected with *Brucella* may be resulted from higher levels of free fatty acid caused by high levels of cortisol due to stress of abortion as well as increased sensitivity of infected animals to epinephrine hormone which leads to the increase in serum free fatty acid concentration (Al-Hussary and Al-Zuhairy, 2010).

The current study revealed that were no significant in albumin, cholesterol, triglyceride, urea and creatinine in seropositive buffalo, , whereas among cows significant changes were reported only for total protein, albumin and urea was agreed with observations recorded by Bouhroum and co-workers in 2012. Moreover, Hamada

et al., (2013) found no significant difference in albumin and total protein between Brucella seropositive cows.

In conclusion, *Brucella* infection was detected to cause important changes in the biochemical parameters especially in animals. The assaying of biochemical parameters in buffalo and cows may be helpful in elucidating the etio- pathogenesis of the adverse effects associated with brucellosis.

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