BENHA VETERINARY MEDICAL JOURNAL, VOL. 22, NO. 2, DEC. 2011: 118-126

HEMATOLOGICAL AND BIOCHEMICAL INVASTIGATION IN BOVIN BABESIOSIS AND THEILERIOSIS

Alam, T.H.[a] **and Nasr, S.M.**[b]

[a] *Biochemistry and* [b] *Parasitology laboratory, Animal Health Research Institute, Zagazig branch)*

A B S T R A C T

Fifteen out of 75 native cattle 5-7 years old from different localities at Sharkia Provence were used to study hematological changes in Babesia and Theileria infestation verified with the clinical signs during period from May 2009 to the end of April 2010. Animals were allotted into three groups (n=5/each), 1st group were healthy cattle free from blood parasite (control), 2nd group were suffering from babesiosis and 3rd group were suffering from theilerosis. Clinical examination included body temperture, rate of respiration and ruminal movment. Two blood samples were collected from each animals for determination of erythrogram and leukogram changes in whole blood and some biochemical parameters in seprated sera. The results revealed that body temperture and respiration rate were significantly increased in cattle suffering from babesiosis and thelariosis while ruminal movement were significantly decreased. Hematological picture revealed a significant reduction in RBCs, HB and PCV in cattle infected with eitheir babesiosis or theileriosis. Babesiosis induce significant reduction in MCV, MCH and MCHC (microcytic hypochromic anaemia) while theileriosis induced increase in MCV and decrease in MCH and MCHC (macrocytic hypo-chromic anaemia). Bovine infected with babesiosis and thelariosis revealed leukopenia, neturopenia and eosinopenia accompanied with lymphocytosis, monocytosis and basophilia compared to that of control group. The result of biochemicaly analysis showed that cattle infected with babesiosis and theileriosis revealed significant reduction in total protein, albumin, globulin, cholesterol, Triglycerides and glucose levels associated with significant increase in the activities of liver enzymes (AST, ALT, alkaline phosphatase) and total bilirubin. It could be concluded clinical signs namely red brown to coffee urine (in babesiosis), enlargement of superfacial lymph nodes, corneal opacity and macrocytic hypochromic anaemia (in theileriosis) in addition to hematological picture (microcytic and macrocytic hypochromic anaemia in babsiosis and theilorosis, respectively) could be useful for easily diagnosis of blood parasites

KEY WORDS: Biochemical, Blood Parasite, Hematological, Theileriosis

(BVMJ 22(2): 118-126, 2011**)**

1.INTRODUCTION

Parasitic infection as blood parasite constituent a major problem in cattle breeding due to severe economic losses and lowered vitality which lead to decrease of animal production and increase the susceptibility to bacterial and viral infections [16]. The main clinical signs in the animals infected with blood parasite were fever (41.0–41.5°C), congested mucous membranes, anorexia, nasal discharge, lacrimation, haemoglobinuria, anemia, respiratory distress and eye lesions beside presence of ticks on the animal body [6]. Theileriosis and babesiosis cause severe economic losses and have effect on the immune status of the body [57].

Babesiosis is a tick-borne hemolytic disease of domestic and wild mammals caused by intraerythrocytic protozoan

parasites of the genus Babesia [15]. Babesiosis is endemic in tropical and subtropical regions as Egypt [14]. Babesiosis is initiated by tick-borne transmission of the sporozoites, which subsequently invade host red blood cells in the infected animals [62]. It is mainly transovarian transmitted by ticks [34].

Theileriosis is an important parasitic disease of animal in Egypt which causes great economic losses in animals and their products. Theileria species is a protozoan parasite of cattle and domestic buffaloes, transmitted by ticks of genus Hyalomma and causes a disease named theileriosis [36]. Theileriosis have high morbidity and mortality rate in cattle [9].

Diagnosis of blood parasite in acute cases is mainly based on clinical signs of the infected animals which confirmed by microscopic examination of a thin blood film stained with Giemsa stain [53]. However, expertise in piroplasm microscopy is required in subclinical or chronic infections because parasitaemias are often extremely low and Theileria piroplasms may be difficult to be found in stained blood smears or otherwise may be missed [2].

For these reasons, the present study was planned to determine hematological picture and with protein profile, to confirm clinical signs for clinical diagnosis of babesiosis and theileriosis.

2. MATERIALS AND METHODS

2.1. *Animals*

The study was conducted on 75 native cattle of 5-7 years old from different localities at Sharkia Provence in the period from May 2009 to the end of April 2010.

2.2. *Blood smears*

Blood smears were prepared from ear vein, left to dry, fixed in methanol and stained by freshly prepared Geimsa stain for 45 minutes to look for parasites [53].

2.3. *Experimental Design*:

Fifteen cattle out of seventy five native cattle which divided into three equal groups,1st group healthy cattle as control,2nd group cattle suffering from babesiosis and 3rdgroup cattle suffering from theilerosis. Clinical examination body temperature, rate of respiration and ruminal movement were done, Two blood samples were taken from each animal by jugular vein puncture, 1st sample was taken in tub contain EDTA for determination of erythrogram, leukogram and blood indices (Mean Corpuscular Volume ,Mean corpuscular hemoglobin and Mean Corpuscular Haemoglubin Concentration) according to (26), meanwhile 2nd sample was taken in centrifuge tube to obtain clear serum for estimation of total proteins [12], albumin [13] and globulin mathematically, transaminases (AST, ALT) [47], alkaline phosphatase (27), glucose [54], cholesterol [46] and triglycerides [48].

2.4. *Statistical analysis*:

The obtained data were statistically analyzed according to [42].

3. RESULTS AND DISCUSSION

Clinical investigations (table 1&2) revealed that cattle suffering from babesiosis were showed clinical symptoms, including fever, anorexia, congested mucous membranes, with presence of tick on the animal body and presence of hemoglobinuria in cattle suffering. Same clinical signs were reported previously [18] where cattle suffering from babesiosis show

fever, anorexia, congested mucous membranes and dark brown to coffee urine and this brown urine may be due to severe haemolytic process associated with the presence of Babesia within red blood cells. Cattle infected with theilerosis showed enlargement of the superficial lymph nodes beside anorexia, congested mucous membranes. Clinical observation of the cattle infected with thelaria species were in agreement with the findings of other studies [40, 59] who stated that the main clinical signs in buffaloes infected with Theileria were pyrexia (40.5–41.5°C), slight nasal discharges, enlargement of superficial lymph nodes, salivation, decreased milk yield, and respiratory distress.

The results of the hematological investigation in cattle suffering from babesiosis and thelariosis revealed significant reduction in erythrocytic count, haemoglobin content, packed cell volume%. Microcytic hypochromic anaemia was occurred to significant reduction in MCV and MCHC in case of babesiosis, while in theileriosis there was macrocytic hypochro- mic anemia, increase in MCV and decrease in MCHC table (3). These results were identical to that recorded formerly [10] in cattle suffering from babesiosis. Changes in erythrogram picture might be due to destructive effect of the parasites on erythrocyte [44, 58] in cattle infected with babesiosis. Also, Homer et al. [24] mentioned that protozoan intraerythrocytic parasites induced lyses of the infected RBC, which resulting in severe clinical symptoms, such as anemia, fever, and hematuria. Microcytic hypochromic anaemia observed in cattle infected with babesiosis could be attributed to intravascular haemolysis of red blood cells in this field [41]. Besides, theileriosis induced general anemia with fall in total erythrocytic count, packed cell volume% and hemoglobin content [17, 49].

Table 1 Incidence of Babesia and Theileria infection in cattle in different localities at Sharkia Province based on blood film examination.

City	Total number.	No. of cattle				Babesiosis		theileriosis	
		healthy		diseased					
		No	%	No	%	No	%	No	%
Abu-Kabeer	12	10	83.33	2	16.67	2	16.67	-	-
Kafr-Sakr	10	9	90	1	10	-	-	1	10
Menia-lkamh	13	9	69.23	4	30.77	1	7.69	3	23.08
Abo-Hamad	14	12	85.71	2	14.28	1	7.14	1	7.14
Ibrahimia	15	14	93.33	1	6.67	-	-	1	6.67
Blibas	11	9	81.82	2	18.18	1	9.09	1	9.09
Total	75	63	84	12	16	5	6.67	7	9.33

Table 2 Clinical examination of animals (Body temperature, respiratory rates & ruminal movment of healthy and diseased cattle (n= 5)

Parameters	Healthy cattle	Diseased	
		Babesiosis	Thelariosis
Body temperature (°C)	38.6±0.62	40.54±0.52*	40.90 ± 0.55*
Respiratory rate/min	22.17±1.93	32.20±2.04**	31.19±1.96**
Ruminal contraction/2min	4.39±0.25	2.52±0.41**	2.79±0.56*

* = P< 0.05 and ** = P < 0.01

Our observations were in accordance with those documented previously [1, 33, 45] stated that Theileria induce significant decrease in packed cell volume, total erythrocytic count and hemoglobin content. Besides, theileria in calves induced macrocytic hypochromic anaemia [52]. This might be attributed to the toxic metabolites of theileria species which have harmful effect on bone marrow and interfere with the process of erythropoiesis [21]. In the present study, it has been shown that bovine babesiosis and theilariosis evoked leukopenia, neturopenia and eosinopenia accompanied with lymphocytosis, monocytosis and basophilia compared to that of control group (Table, 4). Also, there was significant increase in monocytes in Babesia infection due to their role as active mediators in the innate immune response [11]. Formerly it was mentioned that babesia disintegrates the leukocytes resulting in leukopenia [29, 37]. Our results were in accordance with that recorded previously [15] mentioned that monocytosis in animals infected with babesiosis species occurred as a mean of body defense against infection. The increased number of lymphocytes in our result was previously reported [8]. Similar findings were reported formerly [38, 40] as a significant increase in lymphocyte counts was fund in buffaloes with theleriosis. In this field, former authors [35, 52] mentioned that theileria infection induced significant decrease in leukocytic count. This finding was supported by earlier observations [43, 51] found that leukopenia, neturopenia and eosinopenia accompanied with lymphocytosis, monocytosis and basophilia in cattle infected with Theileria. The obtained data were in accordance with those previously obtained [50] who mentioned that in cattle infected with theileriosis induced significant elevation in lymphocytes and decrease in total leukocytic count. Benjamine [8] postulated that the lymphocytosis was marked during the formation of antibodies in response to antigens and also during theileria infection.

The obtained of biochemical analysis reported in the table (5) showed significant decrease in serum total protein, albumin and globulin levels while A/G ratio was insignificantly decreased in cattle infected with babesiosis or theileriosis .These results were in consistence with that illustrated in buffaloes[3, 37]. Earlier studies [19, 31] stated that babesiosis in dogs induced hypoalbuminemia.

Table 3 Erythrogram of healthy and diseased cattle (n=5)

Groups	R.B.C.(10^6/mm^3)	H.B (gm %)	P. C.V. (%)	MCV (fl)	MCH (Pg)	MCHC (%)
Control	8.06± 0.89	13.22±1.18	34.72±113	43.08±0.44	16.40±0.66	38.0±0.42
Babesiosis	4.52± 0.92*	9.09 ± 1.34*	27.17±2.18*	40.20±0.51**	13.47±0.59*	33.51±0.83**
Thelariosis	5.47±0.61*	10.18±1.22*	28.61±0.33*	56.16.±2.94**	14.95±0.17*	26.6±1.48**

* = P < 0.05 and ** = P < 0.01.

Table 4 Erythrogram of healthy and diseased cattle (n=5)

Groups	R.B.C.(10^6/mm^3)	H.B (gm %)	P. C.V. (%)	MCV (fl)	MCH (Pg)	MCHC (%)
Control	10.27±0.17	3.12±0.22	3.23±0.21	1.32±0.10	1.65±0.15	0.95±0.12
Babesiosis	9.75±0.16*	1.93±0.35*	3.88±0.19*	1.80±0.17*	0.90±0.26*	1.24±0.03*
Thelariosis	9.70±0.19*	1.59±0.42**	3.90±0.20*	1.64±0.12*	1.19±0.13*	1.33±0.10*

* = P < 0.05 and ** = P < 0.01.

The changes in the protein picture in animals suffering from babesiosis and theileriosis could be due to decrease protein production as a result of deprivation of diet protein resulting from anorexia and fever accompanied Babesia species and Theileria species infection [28]. The decrease in serum total protein in cattle infected with Babesia species or Theileria species might be due to decrease in albumin and globulin as a result of liver insufficiency [30]. Similarly, former studies [22, 39] recorded that Babesiosis and theileriosis has harmful effects on the hepatocytes leading to disturbid hepatic functions as decreased synthesis of albumin accompanied by an increase in albumin catabolism [38]. Also, decrease in protein picture might be due to distructed RBCs and its excretion in urine as albuminuria occurs during disease [23]. Our results revealed significant increase in the liver enzymes (AST–ALT and alkaline phosphates) and total bilirubin in cattle suffering from babesiosis or thalariosis as presented in table (6). These results were supported by that obtained before [5, 61, 56]. Our Also, babesiosis in dogs was found to induce a significant increase in serum activity of AST and ALT [19]. Also, Singh et al. [55] who mentioned that liver enzymes (AST, ALT and alkaline phosphates) and total bilirubin were significantly increased in calves infected with theileriosis. On other hand [7] stated that the elevation in liver enzymes in babesiosis may be due to the hepatic damage and lesions induced by the parasite during its multiplication in the blood followed by disturbed liver function. Elevated liver enzymes could be due to necrosis and lysis of the erythrocytes or hyperbilirubinemia during Babesia infection [31, 32].

The obtained results showed significant decrease in cholesterol, Triglyceride and glucose in cattle suffering from babesiosis and theileriosis (Table, 7). Calve and adult infected with Theileria species had a lower levels of glucose, triglyceride and cholesterol [20, 25, 60], which might be attributed to partial anorexia and metabolic disturbances of the diseased animals [41]. It was concluded that diagnosis of both babesiosis and theileriosis could be easily reached as babesiosis associated with red brown to coffee urine and microcytic hypochromic anaemia, while theileriosis is associated with enlargement of the superficial lymph nodes, corneal opacity and macrocytic hypochromic anemia.

Table 5 Proteins profile and Liver enzymes of healthy and diseased cattle (n=5)

Group	Total proteins (g/ml)	Albumin (g/ml)	Globulin (g/ml)	A/G Ratio
Control	7.64±0.51	3.91 ±0.22	3.71±0.16	1.05±0.17
Babesiosis	5.82±0.24**	2.83±0.18**	2.99±0.18*	0.95±0.09*
Thelariosis	5.58±0.33**	2.58±0.41*	3.00±0.325*	0.86±0.08

* $P < 0.05$ and ** $P < 0.01$

Table 6 Liver function of healthy and diseased cattle (n=5)

Group	ALP (U/L)	AST (U/L)	Alk.ph. (I.U/ml)	T. bilirubin (mg/dl)
Control	61.32±3.14	34.94±2.13	46.32±1.93	0.37± 0.07
Babesiosis	76.13±4.81*	42.42±2.31*	56.08±3.87*	0.60±0.04*
Thelariosis	73.71±3.54*	41.49±1.15*	59.95±3.91*	0.58±0.03*

* $P < 0.05$ and ** $P < 0.01$

Table 7 Lipogram and glucose of healthy and diseased cattle (n=5)

Group	Cholesterol (mg/dl)	Triacylglycerid (mg/dl)	Glucose (mg/dl)
Control	119.84±1.42	63.12 ± 2.67	65.08±3.04
Babesiosis	104.34±0194**	47.39 ± 1.92**	48.53±1.92**
thelariosis	107.40 ±1.09**	51.45 ±2.81*	50.17±1.83**

* $P < 0.05$ and ** $P < 0.01$

4. REFERENCES

1. Ahmad, A., Ahmad, M. and Ahmad, R. 2007. Studies on the occurrence, clinical features and clinic-pathological aspects of theileriosis in buffaloes. *Ital. J. Anim. Sci.* **6**: 32-34.
2. Aktas, M., Altay, K. and Dumanli, N. 2006. A molecular survey of bovine Theileria parasites among apparently healthy cattle and with a note on the distribution of ticks in eastern Turkey. *Vet. Parasitol.* **138**: 179–185.
3. Al-Aboud, A., Al-Deoun, M. and Maroun, E. 2005. Haematological and pathological in sheep and goats naturally infected with some single blood protozoa. *Bas J Vet Res.* **4**:10-14.
4. Ali, M., pramanik, A. and Gula, C. 1995. Babesiosis in calves and its treatment. *Indian Vet. J.* **72**: 1291- 1293.
5. Attia, H. 2001. Haematological and biochemical response to haemolytic anaemia of clinical babesiosis in farm animals. *Zag. Vet. J.* **28**:113 -119.
6. Awadalla, S. and El-Kholany, K. 1998. Some studies on piroplasmosis in native cattle in Sharkia Governorate. 4th Congress of Zag. Vet. Med.
7. Bork, S., Okamura, M. and Igarashi, I. 2004. Identification of *Babesia bovis* lactate dehydrogenase as a potential chemotherapeutical target agaist bovine babesiosis. *Mol. Biochem. Parasitol.* **136**: 165-172.
8. Benjamine, M. 1979. Veterinary Clinical Pathology. 3rd. Ed. Iowa State. Univ. Press, Ames, Iowa U.S.A.
9. Brown, C. 1990. Control of tropical theileriosis (Theileria annulata infection) of cattle. *Parasitological* **32**: 23–31.
10. Corrier, D. and Guzman, S. 1997. Effect of natural exposure to anaplasma and Babesia infections in cattle in an endemic area of Colombia. *Trop. Anim. Health. Prod.* **8**: 47 – 51.
11. Court, R., Jackson, L. and Lee, R. 2001. Elevated anti-parasitic activity in peripheral blood monocytes and neutrophils of cattle infected with *Babesia bovis*. *Inter. J. Parasit.* **31**: 29-37.
12. Doumas, B., Carter, R., Peers, T. and Schaffer, R. 1981. Method for determination of total protein in serum. *Clin. Chem.* **27**: 1642-1643.
13. Drupt, F. 1974. Calorimetric method for determination of albumin. *Phar. Bio.* **9**: 777.
14. El-Ghayash, H. 1993. Studies of Babesia species infecting cattle and water buffaloes in Egypt. Ph. D. Thesis Parasitology. Fac, Vet. Med., Cairo Univ.
15. El-Sifi A., Degheidy, N., Neweehy, T., Abdu, O. and Abdon Zeina, H. 1990. Studies on blood picture of sheep naturally infected with piroplasmosis in Egypt. 4th Sci. Cong. Fac. Vet. Med. Assiut. Univ.
16. Friedhoff, K. 1988. Babesiosis of Domestic Animals and Man. CRC Press. Inc. Boca Raton, Florida. Pp. 23-53.
17. Friedhoff, R., Radley, D. and Newson, M. 2001. Maintainance of *Theileria annula* infection in an endemic area of Kenya. *Vet. Parasit.* **93**: 207-210.
18. Fujinaga, T. 1981. Bovine Babesiosis in Japan clinicopathological studies on cattle experimentally infected with Babesia ovata. *Jpn. J. Vet. Sci.* **43**: 803-813.
19. Furlanelloa, F., Fiorioa, M., Caldina, G. and Gallego, L. 2005. Clinico-pathological finding in naturally occurring cases of babesiosis caused by large form Babesia from dogs of north

eastern Italy. *Vet. Parasitology* **134**: 77-85.
20. Gupta, S. and Sinha, B. 1988. Clinico-biochemical changes in experimental bovine babesiosis. *Indian. Vet. Reporter* **1**: 15 – 20.
21. Hasanpour, A., Moghaddam, J. and Ahmad, N. 2008. Biochemical, hematological, and electrocardiographic changes in buffaloes naturally infected with *Theileria annulata*. *Korean J. Parasitol.* **46**: 223–227.
22. Hassan, I., Mahmoud, I., Ismail, M., Rady, A. and Adham, K. 1990. Effect of dexametha-zone on protein fractions and erythrocytic antioxidant enzymes and lipid peroxidation in Fasciola infested caws. *Egypt J. App. Sci.* **5**: 433- 445.
23. Henley, M. and Judith. L. 1985. Hormonal changes associated with body weight. *Clin Obes and Gynec.* **28**: 614-620.
24. Homer, M., Aguilar, I. and Persing, D. 2000. Babesiosis. *Clin. Microb. Rev.* **13**: 451-469.
25. Irwin, P. and Hutchinson, G. 1991. Clinical and pathological findings of Babesia infection in dogs. *Aust. Vet. J.* **68**: 204 – 209.
26. Jain, N. 2000. Schalm's Veterinary Haematology. 8th Ed. Lea & Febiger, Philadelphia, USA.
27. John, D. 1982. Clinical Lab. method for determination alkaline phosphatase 9th Ed.
28. Kaneko, J. 1997. Serum Proteins and Dysproteinemias. In: Clinical Biochemistry of Domestic Animals. 5thEd. J. Kaneko, J. Harwey, M., Academic Press, Bruss. Pp. 117-138.
29. Kozat, S., Yuksek, N. and Ercin, F. 2003. Studies on the effect of Iron (Fe) Preparations in addition to Babesiosis treatment on the haematological and some mineral levels in sheep naturally infected with *Babesia ovis*.Vet. *Fak Derg.* **14**: 18- 21.
30. Laiblin, C., Baysu, N. and Muller, M. 1978. Clinical study on experimental *Theileria annulata* infections of cattle. *Berl. Munc. Tierar. Woch.* **91**: 25-27.
31. Lobetti, R. 2000. Canine babesiosis. In: M. Day, A. Mackin and J. Littlewood, Editors, BSAVA Manual of Canine and Feline Haematology and Transfusion Medicine. *BSAVA, Gloucester* **9**: 85–91.
32. Losos, G. 1988. Infectious Tropical Diseases of Domestic Animals. Longman, Scientific and Technical.
33. Madder, M. and Taeymans, J. 2001. Merogony in vitro cultures of *Theileria parva*. In: The 18th International Conference of the World Association for the Advancement of Veterinary Parasitology in Italy. Pp. 26-30.
34. Me-Cosker, P. 1981. The global importance of babesiosis In, M. Ristic and J. P. Kreier (Editors), Babesiosis. Academic Press, New York.
35. Mehta, H., Sisodia, R. and Misraulia, K. 1998. Clinical and haematological observations in experimentally bovine tropical theileriosis. *Indian J. Anim. Sci.* **58**: 584–587.
36. Mirzaei, M. 2007. Treatment of natural tropical theileriosis with the extract of the plant *Peganum harmala*. *Korean J. Parasitol.* **45**: 267-271.
37. Omran, H. and El-Kholany, K. 2003. Field studies on piroplasmosis of Egyptian buffaloes in Sharkia Province. *Egypt. J. Agric. Res.* **81**: 181– 192.
38. Omer, O., El-Malik K., Magzoub, M., Mahmoud, M., Haroun, E., Hawas, A. and Omar, H. 2003. Biochemical profiles in friesian cattle naturally infected with *Theileria annulata* in Saudi Arabia. *Vet. Res. Commun.* **27**: 15-25.
39. Omer, O., Omer, K., El-Malik, O., Mahmoud, E., Haroun, A., Sweeney, H. and Magzoub, M. 2002. Haematological profiles in pure bred cattle naturally infected with Theileria annulata in Saudi Arabia. *Vet. Parasitol.* **107**: 161–168.
40. Osman, S. and Al-Gabary, M. 2007. Clinical, haematological and therapeutic studies on tropical theileriosis in water buffaloes in Egypt. Vet. Parasit., 146, 37-45.
41. Pandy, N. and Misra, S. 1987. Haematological and Biochemical response to haemolytic anaemia of clinical babesiosis in cattle and therapy. *Ind. Vet. J.* **64**: 882-886.
42. Petrie, A. and Watson, P. 1999. Statistics for Veterinary and Animal Science 1st

Ed. 90-99. The Blackwell Sci. LTd, United Kingdom.
43. Radostitis, O., Blood, D. and Gay, C. 2000. Text Book of the Diseases of Cattle, Sheep, Goat, Horse and Pigs. 9th Ed. Billier, Tindall.
44. Radostitis, O., Blood, D. and Gay, C. 2002. Veterinary Medicine A Text Book of the Diseases of Cattle, Sheep, Goat, Horse and Pigs. 10th Ed. Billier, Tindall.
45. Ramazan, L. 2006. Haematological and Coagulation Profiles during Severe Tropical Theileriosis in Cattle. *Turk. J. Vet. Anim. Sci.* **30**: 577-582.
46. Richmond, W. 1973. Cholesterol enzymatic colorimetric test chop-PAP method of estimation of total cholesterol in serum. *Clin. Chem.* **191**: 1350-1356.
47. Ritman, S. and Frandel, S. 1957. A colorimetric determination of glutamic oxalo-acetic and glutamic Pyruvic activity. *Am. J. Clin. Pathol.* **28**: 56– 63.
48. Royer, M. 1969. Determination of triglycerides. *Anal. Biochemical* **29**: 405-416.
49. Salama A. and Magdy H. 2007. Clinical, haematological and therapeutic studies on tropical theileriosis in water buffaloes in Egypt. *Vet. Parasitology* **146**: 337-340.
50. Sahu, P., Misra, S., Panda, A., and Mohapatra, M. 1996. Haematological and biopchemical alterations in *Theileria annulata* infected crossbred cattle. *Indian Vet. J.* **73**: 995-997.
51. Salih, A. and El-Kolany, K.A. 1998. Some studies in piroplasmosis in native cattle in Sharkia Governroate. 4th Vet. Med. Congress. Pp. 7-13.
52. Sandhu, G., Grewal, A. and Brar, R. 1998. Haematological and biochemical studies on *Theileria annulata* infection in crossbred calves. *Vet. Res. Commu.* **22**: 47-54.
53. Soulsby, E. 1982. Helminthes Arthropods and Protozoa of Domestic Animals. 7th Ed., Baillier Tindal, London, Philadelphia, Toronto. Pp. 718-719.
54. Siet, G., Henny, J. and Schiele, F. 1981. Interpretation des examens de laboratior. Karga Ed. Pp. 206.
55. Singh, A, Grewal, A. and Brar, R. 2001. Studies on some blood parameters of calves with experimental *Theileria annulata* infections. *Vet. Res. Comun.* **25**: 289-300.
56. Stockham, S., Kjemtrup, A. and Cuddihee, P. 2000. Theileriosis in a Missouri beef herd caused by *Theileria buffelicase* report, herd investigation, ultrastructure, phylogenetic analysis, and experimental transmission. *Vet. Path.* **37**: 11-21.
57. Urquhart, G., Armour, J. and Jenings, F. 1996. Veterinary Parasitology. 2nd Ed., Blackwell Science LTd. USA.
58. Voyvoda, H, Sekin, S., Kaya,A. and Bildik A. 1997. *Babesia ovis* Enfeksiyonunda Serum Demir. Bakir Konsantrasyona (Fe, Cu) total Ve Latent Demir Baglama Kapasitesi (TD) Modifikasyonlari *Tr. J. Vet. Ani. Sci.* **21**: 31-37.
59. Wael, M. and Emad, E. 2009. Clinical and biochemical studies on *Theileria annulata* in Egyptian buffaloes (*Bubalus bubalis*) with particular orientation to oxidative stress and ketosis relationship. *Vet. Parasit.*: 301-305
60. Yadav, C. and Sharma, N. (1986): Changes in blood chemical components during experimentally induced *Theileria annulata* infections in cattle. *Vet. Parasit.* **21**: 9-18.
61. Yeruham, I., Avidar,Y. and Hadani, A. 2003. Intrauterine infection with *Babesia bovis* in a 2-day- old calve. *J. Vet. Med. B. Infect. Dis.* **50**: 60-62.
62. Yokoyama, N., Okamura, M. and Igarashi, I. 2006. Erythrocyte invasion by Babesia parasites: current advances in the elucidation of the molecular interactions between the protozoan ligands and host receptors in the invasion stage. *Vet. Parasit.* **13**: 22-32.

مجلة بنها للعلوم الطبية البيطرية
BENHA UNIVERSITY
FACULTY OF VETERINARY MEDICINE

استبيان دموى كيمائى للابقار المصابه بالبابيزيوزسس والثالاريوسس

طارق حسن علام[1]، وسامى شوقى محمد السد نصر[2]

قسم الكيمياء[1] والطفيليات[2] معهد بحوث صحة الحيوان – الدقى – فرع الزقازيق

الملخص العربى

استهدفت هذه الدراسة محاولة تشخيص البابيزيا والثيليريا من خلال الاعراض الظاهرية، صورة الدم، صورة البروتين (البروتين الكلى، الزلال، الجلوبيولين)، ووظائف الكبد فى الابقار المصابه (عدد 75 بقرة) فى أماكن متفرقه بمحافظة الشرقية للمساعدة فى العلاج المبكر. تم أخذ عينتين دم من وريد الاذن من كل الحيوانات على EDTA وعمل فحص طفيلى لشرائح الدم المصبوغه بصبغه جيمسا. اضافة الى قياس البروتين الكلى، الزلال، الجلوبيولين، وظائف الكبد فى مصل الدم. تم تحديد 15 بقرة منها عشر بقرات مصابه بطفيليات الدم تتراوح أعمارها من 5–7 سنوات قسمت إلى ثلاث مجموعات متساوية كلاً منها تضم خمس بقرات.المجموعة الأولى أبقار تتمتع بصحة جيدة (مجموعة ضابطة)، المجموعة الثانية أبقار مصابة بالبابيزيا (كانت تعانى من اعراض مرضية تتمثل فى فقدان الشهية وارتفاع درجة الحرارة واحتقان بالأغشية المخاطية للعين وشوهد بول مدمم فى بعض الأبقار مع وجود أعداد كبيرة من القراد ملتصقة على جسم الأبقار المصابة)، والمجموعة الثالثة أبقار مصابة بالثيليري (كانت تعانى من اعراض مرضية تتمثل فى ارتفاع درجة الحرارة وافرازات انفية وعتامه بالعين وكحة واسهال واحتقان الجفون وحالات اخرى كانت تعاتى من شحوب وبياض الاغشية المخاطية للعين كما لوحظ فى بعض الحالات تورم فى الغدد الليمفاوية السطحية). افادت الفحوصات الاكلينيكيه بوجود تغيير فى درجات الحرارة، عدد مرات التنفس، وحركة الكرش فى كل الحيوانات. اشارت النتائج إلى ان الاصابة بالبابيزيا والثيليريا فى الابقار ادت الى حدوث نقص معنوي فى عدد كرات الدم الحمراء, تركيز الهيموجلوبين، حجم خلايا الدم المرصوصة و فقر دمز بالبابيزيا احدثت فقر دم المصحوب بالكريات الصغيرة قليله الهيموجلوبين. بينما الاصابة بالثيليريا احدثت فقر دم المصحوب بالكريات الكبيرة قليله الهيموجلوبين. كما وجد ان الاصابة بالبابيزيا والثيليريا تسببت فى حدوث نقص معنوي فى العدد الكلى لكرات الدم البيضاء، الخلايا المتعادلة والخلايا الحمضية بينما حدثت زيادة معنوية فى الخلايا الليمفاويه، الخلايا القاعدية، والخلايا الملتهمة الكبيرة. اوضحت النتائج ان الابقار المصابة بالبابيزيا والثيليريا اظهرت نقص معنوى ملحوظ في قيم كل من البروتين الكلى,الزلال, الجلوبيولين الكلى ,الجلوكوز والكوليستيرول. زيادة معنوية فى انزيمات الكبد (الأسبرتيت امينوترانس فيراز,الالنين امينوترانس فيراز والفوسفاتيز القاعدى). نستخلص من هذه الدراسة أن تحديد التغيرات فى صورة الدم بجانب الاعراض المرضيه فى الابقار قد يكون وسيلة مساعدة ومفيدة لتشخيص والتفريق بين الاصابه بطفيليات الدم (البابيزيا والثيليريا).

(مجلة بنها للعلوم الطبية البيطرية: عدد 22 (2)، ديسمبر 2011: 118–126)