

## **CHRONIC BABESIOSIS OF DROUGHT HORSES IN BASRAH PROVINCE, BASRAH- IRAQ**

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### **ABSTRACT**

The aim of the present work was to study chronic Babesiosis in drought horses in Basrah ,Iraq. Sixteen drought local breed horses more than (5) years old of both sexes were used in this study, show signs of generalized debility and icteric mucous membranes .The study were carried out in Basrah ,Iraq .Five clinically healthy local breed horses were considered as controls .Results revealed that diseased drought horses show signs of complete anorexia , severe emaciation and evident loss of body weight with poor tolerance , icteric mucous membranes of eyes, bulging of supra orbital fossa , edema were detected around fetlock joint, dehydration ,hemoglobinuria with intermittent episodes of colicky signs, Moreover , on clinical examination, diseased horses show shallow rapid respiration and accelerated strong heart beats with normal body temperature ,Moreover diseased horses suffering from constipation or diarrhea with presence or absence of cecal borborygmi sounds. Statistically significant increase were encountered in, respiratory , heart rates, and capillary refilling time, Furthermore *Babesia caballi* were detected microscopically on blood smears Giemsa stained, as large paired or crescent-shaped parasites ,Moreover it were also seen as , single and double pyriform with obtuse or acute angle in side the erythrocytes, In addition hematological examination of diseased horses with *Babesiosis caballi* revealed anemia represented by significant decrease in total erythrocytes count ,hemoglobin concentration and packed cell volume which were reflected macrocytic normochromic type due to significant increase in mean corpuscular volume ,Furthermore no significant difference were encountered in total and differential leukocytes count between diseased animals and controls ,in addition results were indicated no significant difference in clotting factors indices .It haven been concluded

that chronic Babesiosis infected horses results in obvious hemolytic anemia and severe debility of diseased drought horses .

## INTRODUCTION

Chronic equine Babesiosis is one of the tick borne protozoal infection of horses and other equids caused by the hemoprotozoan parasite *Babesia caballi* that were belonging to phylum Apicomplexa, class Sporozoa, subclass Coccidiasina, order Eucoccidiorida, suborder Piroplasmorida and family Babesiidae.(1) .In appetite , malaise with severe anemia and / or icterus, emaciation , edema of supraorbital fossa and fetlock joint, weight loss , poor exercise tolerance. and really hemoglobinuria were the main characteristic signs showed by diseased horses (2,3).

The disease were endemic in different tropical and subtropical regions of the world , However it were also recorded in different parts of Iraq(4,5). The development of *Babesia caballi* were found specially in the vertebrate host's red blood cells , since within the host's red blood cells, the pyriform merozoites were detected as pairs form with an acute angle, In addition, this parasite causes usually a very low parasitaemia of infected erythrocytes (1).

*Babesia caballi* were transmitted mainly by ticks (A biological vectors) that become infected if they ingest parasites in the blood of infected equids mostly of the genus *Rhipicephalus*, *Hyalomma* and *Dermacentor*(6), Moreover direct or mechanical transmission among animals through contaminated syringes , needles or any infected instruments or by blood transfusions were also assist in disease transmission(7). Furthermore transplacental transmission of *B. caballi* has rarely been reported, and some sources believed to be the evidence for this route to be distrusted (8,9).

Horses infected with *B. caballi* can remain carriers for long time can be up to 4 years or more, and might act as sources of infection for ticks, thereby, in turn act as vectors of the disease and hemoparasitic level (parasitemia) were always low, Nevertheless the disease can reoccur after immunosuppression or strenuous exercise, in addition it believed to be as lower prevalence disease compared with *B.equi* infection (10).

Acute equine Babesiosis have been identified and mentioned previously in Basrah province (11). However little information had been provided of chronic form, therefore the present work were aimed to study the clinical and hematological features of chronic equine babesiosis in Basrah , Iraq

## MATERIALS AND METHODS

The study were conducted on (16) drought local breed horses more than (5) years old of both sexes ,show signs of chronic debility and icteric mucous membranes .The study were carried out in Basrah ,Iraq .Five clinically healthy local breed horses were considered as controls .

History data ( using clinical data sheet )were collected from the horse owners and complete clinical investigation had been carried out for the diseased and control animals .

Five milliliter of blood were drained from jugular vein under aseptic precautions ,2.5 mL were mixed with EDTA used to determine total erythrocyte count, hemoglobin concentration ,packed cell volume ,mean corpuscular volume ,mean corpuscular hemoglobin concentration ,thrombocytes count , mean thrombocytes volume , thrombocytes distribution width , total and differential leukocytes count, (Hematology analyzer, Genex, USA), another , 2.5 milliliter of blood mixed with Trisodium citrate were used to determine prothrombine time ,activated partial thromboplastine time and Fibrinogen using commercial kits (Biolabo, France).

Thick and thin blood smears were obtained from peripheral ear veins of diseased horse , fixed in methanol and stained with Giemsa to identified the parasite as described by (1). The parasitaemia was estimated by counting infected erythrocytes in five different fields consisting of an average of 500 erythrocyte per field using a formula in which the number of parasized red blood cell is divided by the total number of uninfected RBC x 100.(12).

Statistical analysis between diseased horses and controls were done using (SPSS) t-test, (13).

## RESULTS

Diseased drought horses show signs of anorexia , severe emaciation and evident loss of body weight with poor tolerance , icteric mucous membranes of eyes, Fig:1 .bulging of supra orbital fossa , edema were detected around fetlock joint ,Fig:2, dehydration ,hemoglobinuria with intermittent episodes of colicky signs, Moreover , on clinical examination, diseased horses show shallow rapid respiration and accelerated strong heart beats with normal body temperature .Moreover diseased horses suffering from constipation or diarrhea with presence or absence of cecal borborygmi sounds .Table 1.



*Fig:1* :Icteric mucous membranes



*Fig:2*: Edema of fetlock joint

**Table 1:Clinicl sings of horses infected with chronic Babesiosis caballi**

Clinical signs	Infected horses	%
Anorexia	14	87.5
Severe emaciation ,loss of body weight	14	87.5
Poor tolerance	14	87.5
Icteric mucous membranes of eyes	14	87.5
Bulging of supra orbital fossa	12	75
Edema were detected around fetlock joint	10	62.5
Dehydration	8	50
Hemoglobinuria	6	37.5
Intermittent episodes of colicky signs	6	37.5
Shallow rapid respiration	14	87.5
Accelerated strong heart beats	14	87.5
Constipation with presence or absence of cecal sound	8	50

Statistically significant increase ( $p < 0.05$ ) were encountered in, respiratory , heart rates, and capillary refilling time with normal body temperature (Table 2).

**Table 2: Body temperature, Respiratory , Heart rate and Capillary refilling time of infected horses and controls.**

Parameters	Controls	Infected horses
Body temperature C °	37.88 ± 0.54	37.6 ± 1.2
Respiratory rate/mint	22.4 ± 3.61	66.7 ± 10.49 **
Heart rate/mint	38.2 ± 2.8	92.3 ± 12.3 **
Capillary refilling time / mint	1.21 ± 0.54	5.23 ± 1.63 **

Values are mean ± standard error of mean. \*\* ( $P < 0.05$ ).

*Babesia caballi* was detected microscopically on blood smears Giemsa stained, as large paired or crescent-shaped parasites ,Moreover it were also seen as , single and double pyriform with obtuse or acute angle in side the erythrocytes ,Fig:3,4

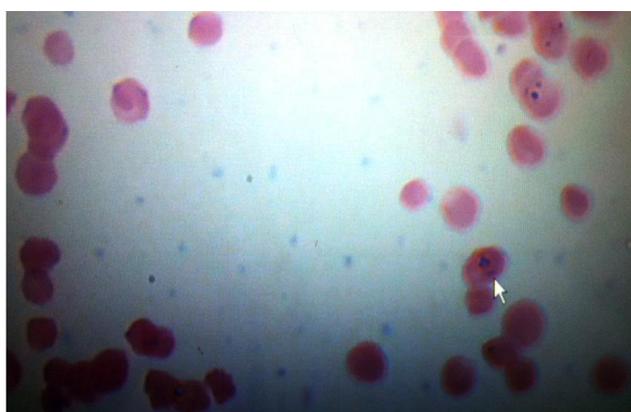


Fig: 3: *Babesia caballi* , large paired form

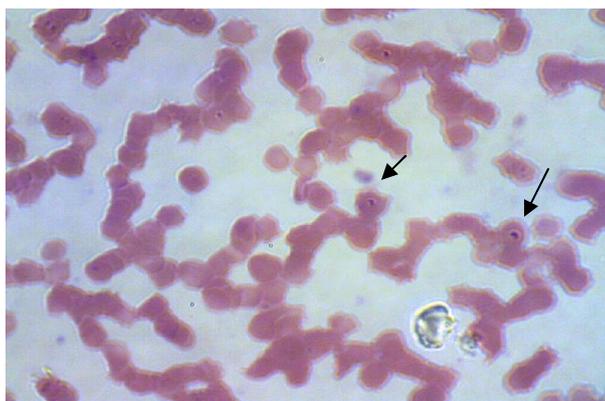


Fig.4: *Babesia caballi* , Crescent-shaped parasites

Hematological examination of diseased horses with chronic Babesiosis revealed anemia represented by significant decrease ( $P < 0.05$ ) in total erythrocytes count ,hemoglobin concentration and packed cell volume that were reflected macrocytic normochromic type due to significant increase ( $P < 0.05$ ) in mean corpuscular volume ,Moreover no significant difference were encountered in total and differential leukocytes count between diseased animals and controls ,in addition results were indicated no significant difference in clotting factors indices .Table 3.

**Table 3: Blood parameters of infected horses and controls**

Parameters	Controls	Infected horses
RBC $\times 10^6$	7.63 $\pm$ 1.25	4.71 $\pm$ 1.61 **
Hb g/dl	13.8 $\pm$ 2.62	7.32 $\pm$ 1.29 **
PCV %	32.4 $\pm$ 5.28	24.2 $\pm$ 3.39 **
MCV /fl	41.4 $\pm$ 5.34	51.35 $\pm$ 4.18 **
MCHC/dl	42.2 $\pm$ 9.33	28.17 $\pm$ 7.22 **
Parasitemia %	0	5.22 $\pm$ 0.48 **

Values are mean  $\pm$  standard error of mean. \*\* ( $P < 0.05$ ).

## DISCUSSION

In the current study chronic equine Babesiosis were diagnosed in drought horses, since diseased animals show different clinical manifestations which were belong to the disease and were mentioned by others (1,14,15) ,as anorexia , severe emaciation ,loss of body weight and poor tolerance were all reflected the chronic syndrome stage of the disease and described its occurrence because of lowering of the vitality of any one part of the body is bound to react harmfully upon the health of the whole, Moreover with the weakening of physical power is associated also a weakening of those powers by which the body is enabled to resist the onset of disease and to overcome the results of infection (16).

Icteric mucus membranes reflected the chronic stage of the disease and the advanced progressive anemia which were affected the infected horses beside the bilirubinemia specially due to increase indirect bilirubin as a reflex of excessive destruction of red blood cells and erythrophagocytosis by the reticuloendothelial system which were developed in diseased horses (17).

Chronic Babesiosis were manifested by obvious edema which were detected on the supra orbital fossa as well as around fetlock joint , Romerrio and Dyson (18) who explain that the present edema will developed due to change in one or more of a forces in a direction that may supported an increase in net filtration, results from increase in capillary hydrostatic pressure, difference in capillary permeability, or by decrease in the plasma oncotic pressure , Nevertheless , edema were always pits on pressure (19).

Episodes of colic showed by some diseased horses might occur due to digestive disturbances, since disturbances of intestinal movements either in the form of diarrhea with passing of watery fecal materials or constipation with dry feces mixed with mucus were also mentioned by (4,20).

Shallow rapid respiration with accelerated strong heart beats were occur due to both anemia and hypoxia as anemic hypoxia mostly occurs when there is a deficiency of hemoglobin per unit volume of blood which always associated with blood parasitic infection (21).

*Babesia caballi* were detected on blood smears Giemsa stained, as large paired or crescent-shaped parasites ,Moreover it were also seen as , single and double pyriform with obtuse or acute angle in side the erythrocytes, same results were also detected by (22,23,24).

Blood parameters of infected horses with chronic Babesiosis indicated anemia due to significant decrease in total erythrocytes count ,hemoglobin concentration and packed cell volume, although it were arise from low parasitemia but reflected macrocytic normochromic type of anemia ,indicated the presence of reticulocytes circulating in the blood streams of diseased horses and stimulating the bone marrow for regenerative anemia (2,17). Chronic Babesiosis were reflected no change in clotting factors indices and this will disagree with(11,25).whom always mention the thrombocytopenia and hypofibrinogemia which were indicated in acute stages of the disease, However it seems chronic staged of the disease have no disorganization of

hemostatic mechanism which must be enhanced, Therefore disseminating intravascular coagulopathy were neither developed nor detected in diseased horses .

### الخمج المزمن لخيول السحب بالنوع *Babesia caballi* في محافظة البصرة، البصرة – العراق

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#### الخلاصة

تهدف الدراسة إلى متابعة الخمج المزمن بالنوع *Babesia caballi* في خيول السحب في البصرة – العراق. إذ استخدم ستة عشر حصاناً من خيول السحب بأعمار أكثر من خمسة سنوات ومن كلا الجنسين والتي أظهرت علامات سريريته تمثلت بالضعف العام واصفرار الأغشية المخاطية كما استخدمت خمسة حيوانات من خيول السحب السوية سريرياً عدو كمجموعة سيطرة. أظهرت الخيول المريضة علامات سريريته تمثلت بالانحلال الحاد مع تناقص في وزن الجسم والتحمل السيء، اصفرار الأغشية المخاطية المبطنة للعين، انتفاخ الحفرة الصدغية، كما سجل تواجد الودمة محيطه بمفصل العرقوب، الانكاز، البيلة الهيموكلوبينية، وقد عانت بعض الخيول من نوبات مغصية متفاوتة الشدة وعند الفحص السريري لوحظت علامات التنفس الضحل السريع مع تسارع ضربات القلب القوية الشدة وكانت درجات حرارة الجسم ضمن مداها الطبيعي فضلاً عن ذلك إذ أظهرت الخيول المريضة أيضاً علامات الإمساك أو الإسهال مع سماع أو اختفاء أصوات الأعور. أظهرت نتائج الدراسة أيضاً زيادة معنوية في معدلات تردد التنفس وضربات القلب مع تناقص معنوي في زمن رجوع الدم في الأوعية الدموية في الخيول المريضة مقارنة مع حيوانات السيطرة، كما شخص النوع *Babesia caballi* في الشرائح الدموية المصبوغة بصيغة الكمزا داخل كريات الدم الحمر بشكل كمثري مزدوج أو مفرد كبير الحجم وقد يظهر أحياناً بشكل منفرد أو حاد الزاوية أو هلال، كما توضح إصابة الخيول الخمجة بفقر الدم من خلال التناقص المعنوي للعد الكلي لكريات الدم الحمر، تركيز خضاب الدم وحجم خلايا الدم المرصوفة كما توضح إن نوع فقر الدم من النوع ذي الكريات كبيرة الحجم سوية الصباغ بسبب الزيادة المعنوية في معدلات حجم الكرية، فضلاً عن ذلك إذ لم يلاحظ أي اختلاف معنوي في العدد الكلي أو التفريقي لخلايا الدم البيض في الخيول المريضة بالمقارنة مع حيوانات السيطرة كما لم يلاحظ أيضاً أي اختلاف معنوي في معدلات معاملات تخثر الدم. استنتج من خلال الدراسة ان الإصابة المزمنة بداء الكمثریات الخيلي يحدث فقر الدم الانحلالي مع إصابة الخيول بالانحلال الشديد.

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