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Detection of *Babesia equi* and *Babesia caballi* antibodies in horses and donkeys in Mosul, Iraq

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Abstract

The objective of the present study was to detect *Babesia equi* and *Babesia caballi* antibodies in clinically normal horses and donkeys in Mosul, Iraq using c-ELISA test. Serum samples were collected from 46 healthy horses and 45 donkeys which were selected randomly from different herds. Results indicated that 33 horses (71.73%) and 19 donkeys (42.22%) were seropositive for *Babesia equi*, whereas, 9 horses (19.56%) and 2 donkeys (4.44%) were seropositive for *Babesia caballi*.

Keywords: Equine piroplasmosis; Horses; Donkeys c-ELISA

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Introduction

Equine piroplasmosis is a disease of equids including horses, donkeys, mules and zebras, caused by the blood-borne protozoan parasites *Babesia caballi* or *Babesia equi*. These parasites are naturally transmitted from host to host via tick vectors (Barros, 2008). Ixodid tick vectors of the genera *Rhipicephalus*, *Hyalomma* and *Dermacento*r are known to transmit the disease and dual infection with both organisms has been reported in equids. (Battsetseg et al., 2002; Boldbaatar et al., 2005). Equine piroplasmosis can also be transmitted through the use of blood contaminated syringes and needles and this route is thought to be responsible for outbreak of the disease in Florida (Florida Department of Agriculture and Consumer Services Division of Animal Husbandry, 2009). Moreover Transplacental transmission of *T. equi* has been reported and although suspected, evidence of *B. caballi* infection via vertical transmission in utero is lacking (Allsopp et al., 2007; USDA.–APHIS, 2009; Georges et al., 2011).

The clinical signs of equine piroplasmosis are often variable and non-specific some times. Acute infection results in high fever, depression, reduced appetite, anemia and jaundice, dyspnoea, petechiation, sweating, colic, eyelid and distal limb oedema and incoordination (Uilenberg, 2006). Massive destruction of erythrocytes results in haemoglobinuria. Nevertheless the disease may also be chronic and sub-clinical, where the infected animal can aid in transmission of the organisms (Radostitis et al., 2007). Subclinical infection from which the diseased state arises may negatively affect the animal's performance (Ueti et al., 2008).

Piroplasmosis is a major problem to the international movement of equines. The parasites that cause equine piroplasmosis are endemic in many tropical and subtropical regions including parts of Africa, the Middle East, Asia, Central and South America, the Caribbean and Europe. To a lesser extent, they may be found in temperate areas, In contrast, Australia, New Zealand, Canada, Japan and some other countries are free of these parasites (Knowles, 1996; USDA- APHIS, 2008; Mark, 2010).

In Iraq the disease are endemic and distributed in all rejoins and have been reported in adults horses and foals (Alsaad et al., 2009; Alsaad et al., 2010). Moreover, *T. equi* is thought to have a wider distribution than *B. caballi* in endemic countries and more pathogenic (Knowles, 1996; Katz et al., 2000).

For diagnosis of equine piroplasmosis, direct microscopic identification of the parasite in stained

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blood films is confirmatory, but it is usually difficult to find the organisms in blood smears of carrier animals. Therefore, for epidemiological studies, a serological test is preferred (Kumar et al., 1997). This study was aimed to detect *Babesia equi* and *Babesia caballi* antibodies in horses and donkeys serum in Mosul, Iraq, using ELISA test.

Materials and Methods

Serum was collected randomly from clinically normal horses and donkeys (including 46 horses and 45 donkeys), aged between 3-8 years (both sexes). Animals were reared indoor or grazing during the day. None of the tested animal had been vaccinated against babesiosis. Serum samples were kept at -20 ºC for further analysis. Commercial c-ELISA kits (VMRD, Inc, Pullman, and WA99163/USA) were used for detection of *B. equie* and *B. caballi* antibodies in serum samples according to manufacturer's instruction.

Results

Results indicated that 33 horses and 19 donkeys (71.73 and 42.2% respectively) were seropositive for *Babesia equi* whereas 9 horses and 2 donkeys (19.56 and 4.44% respectively) were seropositive for *Babesia caballi* as shown in Table 1 .

Table 1: Results of seroprevalnce of *B. equi* and *B. caballi* in clinically normal horses and donkeys

Babesia spp.	Animal	No. of Samples	Sero-positive	Percentage
B. equi	Horses	46	33	71.73
	Donkeys	45	19	42.22
B. caballi	Horses	46	9	19.56
	Donkeys	45	2	4.44

Discussion

Equine piroplasmosis is a tick-borne protozoal disease of horses, mules, donkeys and zebra. It causes economic losses to the equids. Infected animals may remain carriers of these parasites for long period. Ticks act as vectors, therefore, the introduction of carrier animals into areas where tick vectors are prevalent can lead to an epizootic spread of the disease (Balkaya and Erdogmus, 2006; Balkaya et al., 2010). It is generally accepted that diagnosis depending on clinical observations and occasional laboratory testing does not reveal the prevalence and epidemiology of diseases. Therefore, for more accurate epidemiological studies, a serological tests is preferred (Camacho et al., 2005; Asgarali et al., 2007).

The current results indicate that equine piroplasmosis is widespread in Mosul, Iraq. In the present study, horses and donkeys were clinically normal and seemed to be healthy, thus it was not fully understood how babesiosis in these animals could have been occurring. However, clinically healthy animals, positive for this disease suggest that disease may have arisen from a sub-clinical infection, precipitated by factor such as strenuous exercise (Hailat et al., 1997). Furthermore different infection rate may be related to management practices and due to a difference in the prevalence of tick vector for *B. equi* and/or *B. caballi between* different regions, where climatic factors such as temperature, humidity and rainfall influence the habitat for ticks (Oncel et al., 2007).

c-ELISA has been shown highly specific for each of the two species of piroplasmosis agents (OIE, 2010; Abdullah et al., 2012). Shkap et al. (1998), Salim et al. (2008) and Sevinc et al. (2008) stated that c-ELISA may be an alternative for increased and sensitive detection of acute and latent babesial infections. Nevertheless, clinical signs of equine piroplasmosis are variable and non-specific and it is not possible to differentiate between *T. equi* and *B. caballi* infections based on clinical signs alone, and mixed infections may occur (Ali et al., 1996; de Waal and van Heerden, 2004a).

T. equi appears to be more common and is often involved in clinical signs (Katz et al., 2000; Piskin et al., 2008; Sar et al., 2010). Once infected, animals may remain lifelong carrier of *T. equi* infections, while horses may remain carriers of *B. caballi* for up to 4 years. Animals born and raised in endemic areas usually develop a 'carrier state' (de Waal and van Heerden, 2004b). Moreover, Abutarbush et al. (2012) added that *T. equi* is more pathogenic. This is also supported by the finding that *B. caballi* is difficult to detect in blood smears at any stage of the disease except the early acute phase of infection. In addition, *T. equi* is not completely eliminated from the blood of horses after treatment or natural recovery as compared to *B. caballi*.

In general, possible explanations for grazing being a significant risk factor is the fact that when horses graze, they will be more exposed to external environment and have direct contact with ticks. Survey indicates that animals should either be tested or prophylactically treated for *Babesia* infection prior to or entering the paddock from farms because a considerable of horse have become asymptomatic carriers of the parasite.

Conclusions

Equine piroplasmosis was detected in clinically normal horses and donkeys in Mosul, Iraq. Therefore, animals should be periodically tested and

prophylactically treated. Moreover, c-ELISA test appears to be more credible, dependable and proper in estimating the seroprevalence of the disease as well as identifying carrier horses for Babesiosis.

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