

Diagnosis of some blood parasites in cattle and sheep in Mosul, Iraq

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Abstract

Sixty blood smears from cattle and sixty blood smears from sheep were collected from various regions in Mosul city during October 2010 till October 2011. These were examined for parasites (Eperythrozoon, Haemobartonella, and Trypanosoma) and some clinical signs were observed on the affected animals. The percentage of infections in cattle were 28.33%, 10% and 3.33% for *Eperythrozoon wenyoni*, *Haemobartonella bovis* and *Trypanosoma congolense* respectively. Mixed infection with *E. wenyoni* and *H. bovis* was 18.33%. Percentage of infection with *E. ovis* was 40% with the mean parasitaemia of 2.29% in sheep. This study is the first report in Mosul city.

Keywords: Blood parasites; Eperythrozoon; Haemobartonella; Trypanosoma.
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تشخيص بعض الطفيليات الدموية في الابقار والضأن في الموصل، العراق

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الخلاصة

تم في هذه الدراسة اجراء فحص ٦٠ مسحة دموية من الابقار و ٦٠ مسحة دموية من الضأن جمعت من مناطق مختلفة من مدينة الموصل خلال الفترة من تشرين الاول ٢٠١٠ ولغاية تشرين الاول ٢٠١١ للكشف عن الاصابة بالطفيليات الدموية (Eperythrozoon, Haemobartonella, Trypanosoma). وتم ملاحظة بعض العلامات السريرية الظاهرة على الحيوانات المصابة والتي قد تكون ناشئة عن الاصابة بهذه الطفيليات. اظهرت النتائج ان نسبة الاصابة في الابقار بلغت ٢٨,٣٣% ، ١٠,٠% ، ٣,٣٣% بطفيلي *Eperythrozoon wenyoni* و *H.bovis* و *T.congolense* على التوالي، ونسبة الاصابة المختلطة بكلا الطفيليين *E.wenyoni* و *H.bovis* كانت ١٨,٣٣%. وبلغت نسبة الاصابة بطفيلي *H.ovis* ٤٠% والنسبة المئوية للتطفل في الدم ٢,٢٩% في الضأن. وتعتبر هذه الدراسة الاولى في الموصل للطفيليات المدروسة.

Introduction

Among the blood parasites in mammals are Eperythrozoon, Haemobartonella and Trypanosoma species. Which are extracellular of RBCs. Their effects on the susceptible hosts vary from mild effect to death (1-3). Haemobartonella and Eperythrozoon species are currently classified as Rickettsiae (order: Rickettsiales) because of their small size and staining properties; their uncultivated status; their transmission by arthropod vectors and their haemotrophic character (4,5). Haemobartonella and Eperythrozoon differ from Anaplasma in that they are wall less attach to the surface of red cells and do not invade

erthocytes (6). Haemobartonella and Eperythrozoon species in different animals have been shown to be transmitted by various blood – feeding arthropods, including tick, lice, fleas, flies and mosquitoes (1,2).

Recently, Eperythrozoon and Haemobartonella have been reported in cattle, sheep, goat, pigs, dogs and cats as well as humans in several parts of the world (1,2,7,8).

The difference between Haemobartonella and Eperythrozoon that Haemobartonella does not occur free in the plasma. In electron micrographs Haemobartonella appears more closely associated with the erythrocyte. Eperythrozoon adheres to the surface of erythrocytes and may occur as free (7,9).

Many infections caused by Eperythrozoon and Haemobartonella are clinically inapparent, but severe clinical signs, particularly in stressed animals usually includes haemolytic anaemia, icterus, poor weight gain and morbidity in lambs (2,6,10,11).

Trypanosoma congolense is the smallest of the African Trypanosomes of about 9-18 µ in length (2). It is considered as the most economically important animal trypanosomosis in Africa (12). The effect of Trypanosoma species such as *T.congolense* and *T.vivax* on the ruminants range from anaemia, immunosuppression, retarded growth, low milk production and weight loss (13-16). As well as *T. congolense* causes scruffy hair coats appear "potbellied" and have fever, intermittent diarrhea and exercise intolerance (17).

The aim of this study is to investigate the presence of blood parasites which are extra cellular of red blood cells in cattle and sheep in Mosul city.

Material and methods

Random blood samples were collected from jugular veins of local undescriptive breed of 60 cattle and 60 sheep of both sexes and in different ages from animals which brought by owners to the Teaching Veterinary Hospital, College of Veterinary Medicine, University of Mosul, from various regions in Mosul city (Al-rashedia, Al-nahrawaan, Al-shalalaat, Al-kahera, Al-arbagia, felfeel, Goggegi), during the period from October 2010 till October 2011. All animals were examined clinically and sings were recorded before blood samples were taken.

Blood smears were made fixed and Giemsa stained as described by (18) then examined microscopically to identify blood parasites, and parasitaemia were estimated (7,9) and photographed by digital camera.

Results

In this study, some clinical sings were observed on animals during sampling. The clinical findings included pale mucous membrane, jaundice and emaciation. The examination of blood smears of cattle revealed the percentages of infection with *E.wenyoni*, *H.bovis*, *T.congolense* in the affected animals. Highest percentage infection was 28.33% with *E.wenyoni* in cattle with lowest 3.33% with *T.congolense*.

Mixed infection with *Eperythrozoon* and *Haemobartonella* was 18.33% in cattle. see (Table 1, Fig 1).

The percentage of parasitaemia ranged between 0.36-3.5%, with mean of 1.81% in cattle while that in sheep was 0.4-4.5% with a mean of 2.29% (Table 2).

The examination of sixty blood smears of sheep revealed *E.ovis* was detected in sheep smears with percentage 40%, in 24 of affected animals (Table 1).

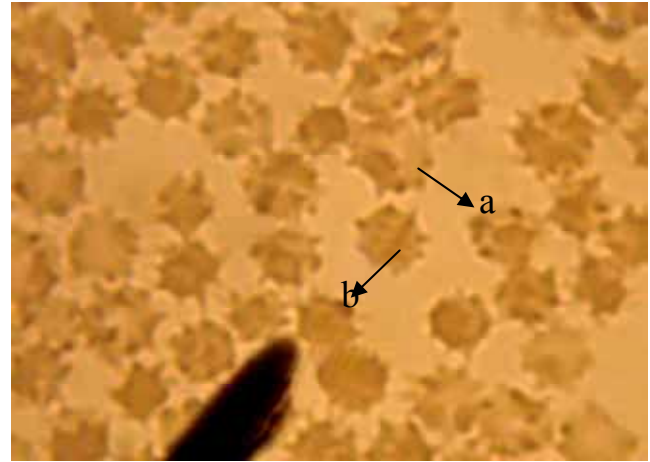


Figure 1: Mixed infection with a: *E. wenyoni* and b: *H.bovis* in blood smear of cattle (100x).

Table 1: The percentages of infection in cattle and sheep with blood parasites (extracellular).

The parasite	Number of affected animals (cattle)	The percentage of infection%
<i>E.wenyoni</i>	17	28.33
<i>H.bovis</i>	6	10.0
Eperythrozoon and Haemobartonella	11	18.33
<i>T.congolense</i>	2	3.33
<i>E.ovis</i>	24 (sheep)	40.0

Table 2: The percentages of parasitaemia from *E.wenyoni* and *E.ovis* in 30 blood smears.

The parasite	The percentage of parasitaemia%	
	Range	Mean S.E.
<i>E.wenyoni</i> in cattle	0.36-3.5	1.81 ± 0.14
<i>E. ovis</i> in sheep	0.46-4.52	2.29 ± 0.09

The parasite of the genus Eperythrozoon appeared in blood smear as cocci, spheres clustered on the surface of the red cells (extracellular) and are found in the intercellular space. In heavy infections, chains of the parasites surrounding the margin of the red cell, measuring about 0.8-1µ (Fig 2).

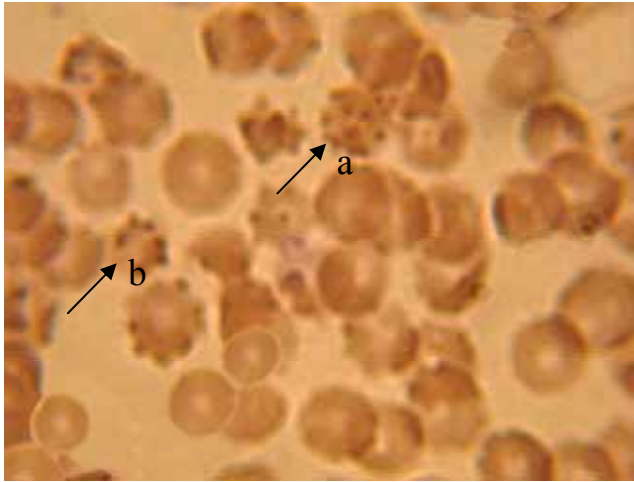


Figure 2: *E.wenyoni* in blood smear of cattle (100x), (a) cocci form, (b) chains of parasites surrounding the margin of red cell.

The genus *Haemobartonella* appeared in blood smears as rod shaped forms are usually located around the periphery of the red cell, and are not free in the plasma (Fig. 3).

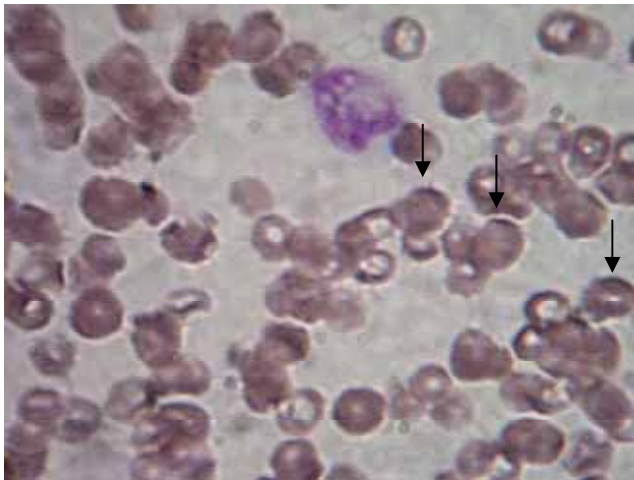


Figure 3: *H.ovis* in blood smears of sheep as rod – shaped form is located around the periphery of the red cells (100x).

The Eperythrozoon were seen free in the plasma in countary to *Haemobartonella* sp. which were not free in the plasma. Morphological alteration of the erythrocytes in the blood smears of the affected animals were observed (see Fig. 1 and 2).

Trypanosoma congolense appeared in blood smears of cattle is monomorphic in form ranging from 8.0-10 μ , the

kinetoplast is marginal and the posterior end is blunt. There is no free flagellum (Fig 4).

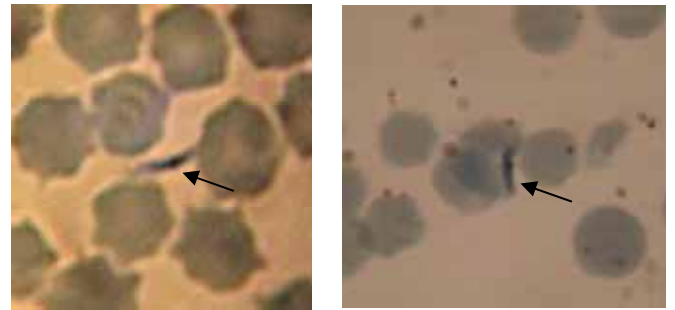


Figure 4 : *T.congolense* in blood smear of cattle (100x).

Discussion

In this study the diagnosis of *E.wenyoni*, *H.bovis* and *Trypanosoma congolense* in blood smear of cattle and *E.ovis* in blood smear of sheep, was made in Mosul city. It is noteworthy that there was no previous reports for the occurrence of these blood parasites in native breeds of animals in northern part of Iraq. Therefore this is the first report on the parasites in Mosul, Iraq. Previous study by (9) reported *E. wenyoni* in Turkey in cattle. And *E.wenyoni* was also reported in cattle of Saudi Arabia (19-21).

The results of this study showed that the clinical sings observed in infected animals were in agreement with the results of other studies carried out in other countries (9,10,19,22). These parasites cause anaemia, fever, anorexia, weight loss and decreased milk production and infertility (23-25). Most of the tested animals were subclinical infected (25). In this study the percentages of Eperythrozoon in cattle and sheep were 28.33%, 40.0% respectively. Whereas Al-khalifa *et al.* (19) recorded 1-4% of infection with *E.wenyoni* in cattle and 2-9% of infection with *E.ovis* in Saudi Arabia. The mixed infection with Eperythtozoon and *Haemobartonella* were diagnosed in blood smears of cattle, which were also described by (9,24)

In Australia Eperythrozoon infection was reported in 10% of weaner and 51% of adult sheep (26). Eperythrozoon and *Haemobartonella* observed in this study could be due to the favourable environmental conditions for the survival and proliferation of the arthropods vectors such as fleas, mosquitos, and tick. (6,27) referred that the Eperythrozoon and *Haemobortonella* are transmitted mechanically by arthropods such as Fleas and Mosquitos transmission the Eperythrozoon in sheep and goats, Ticks (*Rhipicephalus*) are vectors of Eperythrozoon for cattle, also transmission may occur via surgical procedures through blood contamination of instruments (needle contamination during vaccination).

In present study, the result revealed that the *E.wenyoni* and *E.ovis* appeared as minute bluish coloured cocci, rings, spheres clustered on the surface of RBCs and found free in plasma. *Haemobartonella bovis* appeared chains of rods are usually around the periphery of RBCs. Many authors made similar reports on these parasites (7,28,29). The percentages of parasitaemia of *E.bovis* and *E.ovis* were 1.81%, 2.29% respectively. Cem Ecmel SAKi 2009 (9) mentioned that the parasites numbers of *E.wenyoni* ranging from 1-50, in highly dense parasitaemia, While (29) attributed to the anaemia. Parasitaemia develops during the pyretic stage at which time parasites can be found in great numbers on the red cells and in the plasma (28). In case of Eperythrozoon infection, the mechanism of disease appears similar to that occurs of other blood parasites, where in immune-mediated hemolysis within macrophages follows attachment of the organisms to erythrocytes (17)

In this study, during the examination of 60 blood smears of cattle, *Trypanosoma* was diagnosed in 2 animals with percentage of 3.33%. These parasites appear in blood smear as a small size about 8-10 μ in length, with blunt posterior end, and no free flagellum therefore determined the species as *T.congolense* depended on (2,7).

Probably introduced the affected animals with *T.congolense* from different regions into the Mosul city and because the transmission of *T.congolense* by Glossina and as well as they can also be transmitted mechanically by other biting flies such as Tabanas and Stomoxys.

Authors (30) mentioned that after trypanosomes have been introduced into a herd transmission is possible even in the absence of Glossina-Biting flies such as Tabanidae, Stomoxynae and Hippoboscidae are capable of mechanically transmitting trypanosomes. Mechanical transmission can be through the needle during inoculations and in carnivores infected carcasses.

Samdi *et al* 2011 (31) recorded that 50% in cattle in Kaduna central abattoir, North central Nigeria were infected with *T. congolense*. whereas Ohaeri (32) recorded the percentage of infection in cattle with *T.congolense* of 42% in Nigeria. However these parasites are more predominant in small ruminants. The variation in results in different studies may be because of the variation in strain of parasite, the vector, breed and management of animals as well as the season of the year during the study. Some of the factors that affect the prevalence of trypanosomiasis in Nigeria include: animal breed, type of management season, of the year and the type of vegetation (33).

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