Some Studies on Prevalence and Effect of Thieleria Infection on Erythrocytes Profile in Camel in Some Localities at New-Valley, Governorate, Egypt

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Abstract

*Theileria spp* is protozoan parasites infecting wild and domestic animals throughout the world and affected the healthy state of the infected animals for that this study was carried to evaluate the effects of natural infection of camels with *Theileria spp* on blood picture and efficacy of indirect fluorescent antibody technique in diagnosis this infection, where blood samples were obtained from 125 apparently healthy dromedary camels aged 1-9 years, held in some localities in New-Valley governorate and classified into two groups, the first group (100 camels) as infected group and the rest number 25 as a control group where all of them examined by direct smear and indirect fluorescent antibody technique. Direct smear revealed 9 out 100 camel are positive for *Theileria spp* in ratio of 9% while indirect fluorescent antibody technique revealed 11 out of 100 camels are positive (11%), with one sample as false negative and 3 samples as false positive so we can consider the indirect fluorescent technique remain the most convenient test for *theileria spp* diagnosis in camels. Hematological analysis revealed significant decrease in PCV, HB, RBCs count with significant increase in MCV, MCH and MCHC in infected group than control one. The frequency of theileriosis in camels is considerable and *Theileria spp* do not seem to induce significant alteration in clinical signs in naturally-infected dromedary camels but laboratory seem to induce significant decrease in hematological parameters which translated to anemia.

**Keywords:** Camel, *Theileria spp*, prevalence, erythrocyte profile, new-valley governorate.
SOME STUDIES ON PREVALENCE AND EFFECT OF THIELERIA INFECTION ON...

Introduction

A camel is an even-toed ungulate within the genus Camelus, bearing distinctive fatty deposits known as "humps" on its back. The two surviving species of camel are the dromedary, or one-humped camel (C. dromedarius), which inhabits the Middle East and the Horn of Africa; and the bactrian, or two-humped camel (C. bactrianus), which inhabits Central Asia. Both species have been domesticated; they provide milk, meat, hair for textiles or goods such as felted pouches, and are working animals with tasks ranging from human transport to bearing loads, it has been largely domesticated in the arid regions of western Asia and Northern Africa as the chief beast of burden and the “ship of the desert” (Wikipedia, 2011). The one humped camel or Camels dromedaries is physiologically and anatomically adapted to survive harsh conditions also it is a widely distributed domestic animal in arid and semi-arid regions of Africa, Arabia and Western Asia up to India. (Wernery and Kaaden, 2002). Piroplasms belonging to the genera Babesia and Theileria are suspected of infecting dromedaries' camel. These tick-borne apicomplexans were generally considered as highly specific for a given host species, (Uilenberg, 2006). Indirect fluorescent antibody technique (IFAT) has been effectively employed by many authors as a speedy and accurate serological test for detection of bovine theileriosis as (Farah, 1995, Handemir and Dick, 1998 and Lawal, et al., 1998). Theileria camelensis is an intra-erythrocytic protozoan parasite infecting camels; its presumed vector is Hyalomma dromedarii. The parasite forms in the erythrocytes were predominantly rod shaped and no schizonts were detected in the prescapular lymph node impression smears as reported by (Nasser, 1992). The predominant clinical findings of camels infected with theileria are fever, ocular watery discharge, severe emaciation, diarrhea in the form of intermittent bouts, in addition to the systemic signs, enlargement of superficial lymph nodes were also noticed. (El-Fayoumy et al., 2005). On the other hand, camels may be apparently healthy in spite of theileria infection (Boid et al., 1985) reported that's Thieleria.camelensis has been reported from most of the regions which camels are raised in and transmitted by common camel tick Hyalomma dromedaries. (Nassar, 1992), while (Kaufmann, 1996), provided that the erythrocyte piroplasm stage of the parasites present. No microschizont stages have been yet described and the taxonomic status of these parasites remains unclear and T.comeliness is generally thought to be non-pathogenic and its economic impact appears to be small, (Boid et al., 1985). Understanding the pathogenesis and immunology of infectious diseases helps policy makers define control strategies. These control plans become more important in developing nations where control measures are not properly designed and implemented (Singh et al., 2006 and Tanwar et al., 2009). The aim of the study was to investigate the effect of camel theileriosis on erythrocytes parameters in area of study, understanding the patterns of the immune response of theileria disease in addition to the efficacy of indirect fluorescent antibody technique (IFAT) in diagnosis of camel theleriosis.

Materials and Methods

Study Area and Examined Animals

Study Area

This study was carried out in some localities in New-Valley Governorate (in the western Egyptian desert).This area is a depression that lies between the Nile, Sudan and Libya with its capital at the Kharga Oasis where the rainfall is almost scare throughout the year and the ground water is the main source of water.

Animals

One hundred and Twenty five camels aged 1-9 years from both sex were carried out in this study and classified into two groups, group 1 (Disessed group) and include one hundred camels, group 2 (control group) and include twenty five camels, all of these camels reared in different localities in New-Valley governorate as in Table 1.
Table 1: Number of camels under study from different localities in New-Valley governorate.

<table>
<thead>
<tr>
<th>Camel group</th>
<th>Group 1</th>
<th>Group 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Localities</td>
<td>EL-Karga</td>
<td>EL-Dakla</td>
</tr>
<tr>
<td>Number of animals</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>EL-Farafra</td>
<td>EL-Karga</td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>EL-Dakla</td>
<td>EL-Farafra</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>5</td>
</tr>
</tbody>
</table>

Samples

Blood Samples

5 ml blood samples were obtained from ear vein of 125 apparently healthy dromedary camels aged 1 year to 5 years into clean and dry sterile tubes containing Ethylene Diamine Tetra-acetic Acid (EDTA) as an anticoagulant for preparation of blood smears and hematological examination, the smears were air dried, fixed in methanol and stained with Giemsa (Levine, 1985). Jugular vein. These samples were used for preparation of blood films and stained with Giemsa stain and examined microscopically for presence of Theileria camelensis.

5 ml blood samples were collected from jugular vein for obtaining serum for seriological analysis by indirect fluorescent antibody technique (IFAT) according to (Oie, 2009).

Fig. 1: Blood film from infested camels stained by Giemsa stain showing schizont of Theileria camelensis in lymphocytes. (X100).
Fecal Sample

Fecal samples were collected from Camels positive for theleiriosis (treatment with ant parasitic drug, Albendazol twice one week interval) fifteen days after last treatment to confirm these camels free from internal parasite.

Slid Antigen

preparation make from the blood of high parasitism (2%) put on the different slide wells and fixed by acetone in goblin jar and washes three successive time with PBS and the slide dried by Schwarz and keep in deep freeze until used as described by (Oie, 2008).

IFA Test Procedure

50 µml of undiluted tested serum added for each slid well and incubated for half hours fallowed by three successive washing by PBS then added ant bovine conjugated with fluorescence dye (1; 80 dilution) and incubated for 3/4 hours, three successive washing by PBS and finally added the cover on the slid with glycerin and mounted by fluorescence microscope. The technique adopted for IFAT was described by (Oie, 2008), using Rabbit-ant bovine IgG fluorescent isothiocyanate (FITC).

Hematological Analysis

Hematological values between various sexes, and infection and parasite free camels were analyzed using long established techniques according to (Soulsby, 1978). The following parameters were determined: total red blood cell (RBC) counts, packed cell, Volume (PCV), total white blood cell (WBC) counts with differential cell count and haemoglobin (Hb) concentration, while mean corpuscular volume (MCV), mean corpuscular haemoglobin (MCH) and mean corpuscular hemoglobin.

Statistical Analysis

Data were analyzed by SPSS 16 software, using independent Student’s t-test. Non infected animals were considered as control for comparison of results.

Results

Out of 100 camels examined by thin smear for camel theileriosis, 9 (9%) were found to be positive for theleriosis but with indirect fluorescent antibody technique 11 out of 100 (11%) were found to be positive where the sample number 7 positive by direct con smear is negative by (IFAT) and consider as false negative while 3 sample were negative by...
direct smear were positive by (IFAT) and consider as false positive, all of them being mature and over 3 years old, Table 2. The hematological analysis showed significant decrease in (RBCs) count, hemoglobin and packed cell volume (PCV), where that reflecting macrocytic normochromic anemia also we recorded asignificant increase in MCV, MCH and MCHC (P<0.01) of infected group than control group (Table 3).

Table 2: The result of both direct smear and indirect antibody flouresence technique.

<table>
<thead>
<tr>
<th>Method</th>
<th>No of examined camels</th>
<th>No of positive camels</th>
<th>False positive</th>
<th>False negative</th>
<th>Ratio (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct smear</td>
<td>100</td>
<td>9</td>
<td>------</td>
<td>------</td>
<td>9%</td>
</tr>
<tr>
<td>Indirect flouresent antibody technique (IFAT)</td>
<td>100</td>
<td>11</td>
<td>3</td>
<td>1</td>
<td>11%</td>
</tr>
</tbody>
</table>

Table 3: Erythrocytes parameters in both diseased and control camels.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Infected camels</th>
<th>Control camels</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCV (%)</td>
<td>17.5±6.0↓</td>
<td>28.4±9.31</td>
</tr>
<tr>
<td>HB (g/dl)</td>
<td>7.27±2.06↓</td>
<td>10.25±2.09</td>
</tr>
<tr>
<td>RBCs</td>
<td>8.46±5.62↓</td>
<td>14.38±5.67</td>
</tr>
<tr>
<td>WBCs</td>
<td>19.28±7.56</td>
<td>19.78±7.61</td>
</tr>
<tr>
<td>MCV (fl)</td>
<td>68.6±0.2↑</td>
<td>60.1±0.4</td>
</tr>
<tr>
<td>MCH (pg)</td>
<td>20.3±0.1↑</td>
<td>11.9±0.0</td>
</tr>
<tr>
<td>MCHC (g/dl)</td>
<td>44.3±0.2↑</td>
<td>33.2±0.1</td>
</tr>
<tr>
<td>Neutrophile (%)</td>
<td>41.1±0.9</td>
<td>43.50±1.3</td>
</tr>
<tr>
<td>Band cell (%)</td>
<td>1.8±0.1</td>
<td>0.6±0.01</td>
</tr>
<tr>
<td>Lymphocytes (%)</td>
<td>56.5±0.9</td>
<td>54.6±1.3</td>
</tr>
<tr>
<td>Monocytes (%)</td>
<td>0.7±0.1</td>
<td>0.7±0.1</td>
</tr>
<tr>
<td>Eosinophile (%)</td>
<td>0.8±0.1↑</td>
<td>0.6±0.1</td>
</tr>
<tr>
<td>Basophil (%)</td>
<td>0.0±0.0</td>
<td>0.01±1.0</td>
</tr>
</tbody>
</table>

* P<0.05 was considered statistically significant.

Discussion

Theileriosis is considered to be the second most important hemoprotozoal disease following trypanosomosis affecting dromedary camels in tropical and subtropical countries and there are different types of Theileria species implicated as etiologic agents of the disease. *Theileria camelensis* appears to be the principal cause of camel theileriosis particularly in Egypt (Nassar, 1992, El-Refaii et al., 1998, El-Fayoumy et al., 2005). The current study indicated that 9 % (9 out of 100) of the examined camels were harboring the erythrocytic forms of *Theileria camelensis* by direct smear and most of the positive cases had no apparent characteristic clinical signs. This may be attributed to the chronic nature of Theileria infection and/or to the investigated *Theileria camelensis* was probably a pathogenic and that agreement with, (Nasser., 1992), who examined 200 apparently healthy camels under Egyptian field conditions and found that 30% of them were infected with Theileria camelensis and indicated that theileriosis in camels is asymptomatic infection.

The prevalence rate of Theileria infection in one-humped camel various in different studies as the fallowing study. (Nasser.,1992, El-Refaii et al., 1998, El-Fayoumy et al., 2005) were 30% (60 of 200), 62.1% (46 of 74), 44.8% (56 of 125) respectively, where these result higher than that reported by the present study which agree with the result reported by Maha et al., (2011), who recorded
6.75 % (15 of 224), these variations in the different results may be attributed to different localities, population density of camels, environment, hygienic measures and camel management. Serological tests may not be sensitive enough to detected all infected camels with theleriosis due to cross-reaction occur between different species and cannot detected antibodies in latent infection, but we can see that the indirect fluorescent antibody technique (IFAT) remains so far the most commonly used test for seroepidemilogical of theleriosis in camel where in the present study we attributed the result might be due to misdiagnosis by microscopic examination, it is difficult to differentiated morphological structure of theleria spp also it may be explained by cross-reactivity among haemoparasites.spp,also believe that these antibodies might be derived from immunization against theleriosis.

Anemia was found in caml suffering from theleriosis where MCV value for infected camels was significantly higher than the control group as result of the large number of immature RBCs in response to anemia and higher value of MCHC in infected camels may be due to lyses of red blood cells that agreement with (Mahran, 2004) and Jalaludeen et al., 2011). Finally we can see anemia in camel theleriosis could be attributed to the direct effect of parasite on the infected erythrocytes (Incriminated of RBCs, decrease life span of RBCs and suppression of hemopiotic system), also anemia could be attributed to extensive erythrophagocytosis in the reticulendothelial system initiated by parasite damage to erythrocytes.

**Conclusion**

Theileriosis in Egypt is economically one of the most serious tick borne protozoan parasitic diseases where in the present study Theileria spp identified in camels in considerable value without induce any effect on clinical signs but induced anemia with laboratory test, also we can concluded the indirect fluorescent antibody technique (IFAT) remains so far the most commonly used test for seroepidemilogical of theleriosis in camel.

**References**


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