SOME HEMATOLOGICAL AND BIOCHEMICAL PARAMETERS OF DEBILITATING CAMELS AT ALEXANDRIA GOVERNORATE
(With 3 Tables)

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بعض التأثيرات الدموية والبيوكيميائية للجمل المصابة بالهولن

في محافظة الإسكندرية

تتطلب دراسة في هذا البحث تكوّن جمال - منطقة ليس - محافظة الإسكندرية، على

Ale 4 تأثيرات الدموية والبيوكيميائية للحمام، علاج الحمام، والاستفادة من

تستعمل كمجموعة متنوعة. إذا العثوراً على جمللان نتائج، والتي تشمل بس

تارد حالي في الحمام في مجموعة نتائج لغاملاً، وتشمل في تلل لس

المختبرات على النتائج التي كثرت الدم الحمام، ونسو أهل جامع

للمصابين بالهولن في فصل الصيف، كما

لعب تأثير رفع الوعي في القدرة على مكافحة داء الحمام، ونفس الحمام

الإيجابية، كأو أواج للمركزيات البيوكيميائية للمؤثرات في فصل الصيف.

البيوكيميائيات والمسحطات. ولكون البكالوريوس في إعداد ملفات

للمصابين بالهولن. وتظهر النتائج، وتمثل نتائج الفحوصات البيوكيميائيات

للمصابين بالهولن. وتتضح النتائج، والتي تبين أن الصيدو، وعدم

الأطوار المناسبة للهولن، والتي تبين أن الصيدو، وعدم

انخفض تعداد الخلايا الدموية، ونسبة النورفانية والسكاليتود.

البرقية والمصابين تمد هذه الإحصائيات.
SUMMARY

Thirty camels were used in this investigation at the sixth village of Abusir, Alexandria. Ten of them were clinically normal and free from internal, external and blood parasites and act as control group. Twenty of them were suffered from debilitation and enemiation. Blood samples were collected from each animal for determination of complete blood picture. The hematological examination revealed anemia in debilitated camels represented by significant decrease of R.B.Cs, Hb, PCV %, while total white blood cell count and its differentiation revealed significant leucocytosis with eosinophilia in debilitated camels. The biochemical analysis of blood serum showed significant decrease of calcium, phosphorus, magnesium, sodium, potassium, chloride, iron and copper levels with insignificant decrease of blood serum zinc level in debilitated camels. From the previous results we can conclude that gastrointestinal nematode infestation was one of the important causes of camel debilitation. Further more, addition of different deficient elements as feeding supplement considered as a supportive therapy in such cases.

Key words: Hematological and biochemical parameters, camels

INTRODUCTION

Camels are considered as one of the oldest fundamental constituent of animal breeding. In Egypt, the total number of camels was about 170,000 (UNSO, 1990). Camels as productive animals need healthy alimentary tract, which is responsible for prehension, digestion and absorption of food and water. The prevention of disease rather than treatment becomes the main aim in the veterinary medicine. Therefore, the clinical signs, blood and biochemical constituents were considered to be the most important diagnostic aids for maintaining health and disease conditions (Burakot and Abd El-Fattah, 1970).

Although camels are considered as environmental tolerant animals, can suffer from debilitating effect’s connected with a bad and sudden changes in management that can upset camels with several debilitating diseases as trypanosomiasis, mange diarrhea and chronic parasitic infestation (Higgins, 1986 and Sayed, et al, 1997).
Chronic parasitic infestation is one of the dangerous disorders, which leads to debilitation among camels (Richard, 1979). This infestation may lead to malabsorption and/or malnutrition leading finally to malnutrition. Chronically infected camels exhibit lower hemoglobin content, total red blood cell count and packed cell volume (El-Magawey, 1983; Omran et al., 1984; Manaa, 1990; and Mohamed, 1996). Anemia, emaciation, decrease of hump size or even absence of it, atrophy of the thigh muscles, edema of the limbs, alopecia and diarrhea (Olfy, 1981; Georgi, 1985; Nassar, 1992; Mohamed, 1996 and Sayed, 1998).

Trace elements as copper, iron and zinc play an important role in general health condition of livestock (Manaa, 1990; Selim, 1992 and Mohamed, 1996). Parasitic infested camels showed additionally to anemia, chronic diarrhea that affect major blood serum levels such as calcium, inorganic phosphorus and magnesium (Manaa, 1990; and Mohamed, 1996). The aims of this study were:

1- Description of clinical picture of the examined animals.
2- Diagnosis of the most probable causes of debilitation among camels.
3- Recording some hematological changes associated with camel's debilitation.
4- Determination of some major and minor blood serum constituents associated with camel’s debilitation.

MATERIALS and METHODS

Animals:

Clinical examinations were conducted on thirty camels of both sex belonging to a private flock in Abes area, Alexandria. The owner's complaint was emaciation and debility of some individuals while other did not show any abnormal clinical manifestation. These animals were accordingly classified into two groups according to their general health conditions, after complete clinical examination of the suspected animals (Higgins and Kock, 1984), and fecal and blood films examinations. The first group was proved both clinically and laboratory to be healthy. The second group showed emaciation, decrease of hump size, edema, alopecia and some animal's suffered from chronic diarrhea with some degree of dehydration.

Samples:

1- Fecal samples: were collected individually in clean plastic bags for examination of gastrointestinal parasites according to Coles (1986).
The detected parasitic eggs were diagnosed according to manual of veterinary laboratory parasitological techniques (1971).
2. Skin scraping - were collected from anemic animals to exclude of external parasites after Coles, (1966).
3. Blood films - were examined against blood parasites and differential leukocyte count by Leshman stain after Coles (1986).
4. Blood samples - Two blood samples were collected from each animal. The first was collected on (EDTA) for hematological examinations (RBCs, TBWCs, Hb, PCV, MCV, MCH, and MCHC) after Coles (1986). The second one was collected for serum separation to estimate blood serum calcium, inorganic phosphorus, magnesium and iron by special kits on a spectrophotometer according to Gitelman, (1967), Zollinger et al. (1965), Gindler (1971) and Peters (1956), respectively. Blood serum chloride, was estimated according to Pedl (1972). Sodium and potassium were estimated by flame photometer as described by Oser (1965). Serum copper and zinc were estimated by using atomic absorption according to Makino and Takahara (1981).
5. Statistical analysis - Obtained data were statistically analyzed by using t test after Snedecor and Cochran, (1967).

RESULTS

Clinical evaluation:
The physical examination of investigated two groups of camels showed significant changes in body temperature, pulse rate except shallow, rapid respiration in debilitating camels group. Clinical examination of debilitated camels revealed weakness and paleness of mucous membrane, some of them showed decrease of the hump size, obvious appearances of ribs and depletion of subcutaneous fat. Others showed alopecia and chronic pasty feces.

Laboratory examination:
The results of the fecal analysis among the debilitating camels showed eggs of Trichuris and Trichosynenia species. Blood films and skin scraping of diseased animals showed absence of blood parasites and ectoparasites. The results of blood picture and blood biochemical analysis were tabulated in Tables 1, 2 and 3, respectively.
Table 1: Erythrocyte picture in normal control and debilitating camels.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Control group</th>
<th>Group of debilitating camels with chronic intestinal parasitic infestation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hb g/dl</td>
<td>13.30 ± 0.65</td>
<td>10.77 ± 0.33 **</td>
</tr>
<tr>
<td>R.B.Cs x 10^6/mm³</td>
<td>12.38 ± 0.44</td>
<td>9.30 ± 0.14 **</td>
</tr>
<tr>
<td>PCV%</td>
<td>32.50 ± 0.65</td>
<td>26.50 ± 0.95 **</td>
</tr>
<tr>
<td>MCV (fl)</td>
<td>36.26 ± 0.50</td>
<td>28.80 ± 0.65 **</td>
</tr>
<tr>
<td>MCH (pg)</td>
<td>10.79 ± 0.29</td>
<td>11.70 ± 0.19*</td>
</tr>
<tr>
<td>MCHC%</td>
<td>40.90 ± 0.81</td>
<td>40.64 ± 0.80</td>
</tr>
</tbody>
</table>

** Highly significant at P < 0.001
* Significant at P < 0.01

Table 2: Total leukocytes and its differential count in normal control and debilitating camels.

<table>
<thead>
<tr>
<th>Parameters</th>
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<th>Group of debilitating camels with chronic intestinal parasitic infestation</th>
</tr>
</thead>
<tbody>
<tr>
<td>T.W.B.Cs x 10^9/mm³</td>
<td>10.00 ± 0.52</td>
<td>14.11 ± 0.52 **</td>
</tr>
<tr>
<td>Neutrophils %</td>
<td>35.75 ± 2.08</td>
<td>35.38 ± 1.38</td>
</tr>
<tr>
<td>Eosinophils %</td>
<td>3.15 ± 0.25</td>
<td>8.8 ± 0.38 **</td>
</tr>
<tr>
<td>Basophils %</td>
<td>0.19 ± 0.1</td>
<td>0.24 ± 0.09</td>
</tr>
<tr>
<td>Lymphocytes %</td>
<td>57.13 ± 2.10</td>
<td>52.73 ± 1.80</td>
</tr>
<tr>
<td>Monocytes %</td>
<td>2.76 ± 0.37</td>
<td>3.25 ± 0.70</td>
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</tbody>
</table>

** Highly significant at P < 0.001
* Significant at P < 0.01

Table 3: Biochemical serum contents of some major and minor elements in normal control and debilitating camels.

<table>
<thead>
<tr>
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<th>Control group</th>
<th>Group of debilitating camels with chronic intestinal parasitic infestation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium (mg / dl)</td>
<td>9.90 ± 0.55</td>
<td>8.59 ± 0.53 **</td>
</tr>
<tr>
<td>Inorganic phosphorus (mg / dl)</td>
<td>6.95 ± 0.18</td>
<td>5.38 ± 0.38 **</td>
</tr>
<tr>
<td>Magnesium (mg / dl)</td>
<td>2.60 ± 0.29</td>
<td>1.98 ± 0.50*</td>
</tr>
<tr>
<td>Sodium (m.mol / L)</td>
<td>145.26 ± 6.13</td>
<td>127.93 ± 2.74*</td>
</tr>
<tr>
<td>Potassium (m.mol / L)</td>
<td>5.62 ± 0.34</td>
<td>4.78 ± 0.33*</td>
</tr>
<tr>
<td>Chloride (m.mol / L)</td>
<td>134.29 ± 3.60</td>
<td>120.03 ± 3.49*</td>
</tr>
<tr>
<td>Iron (mg %)</td>
<td>126.13 ± 3.45</td>
<td>109.39 ± 2.68*</td>
</tr>
<tr>
<td>Copper (mg %)</td>
<td>99.20 ± 2.1</td>
<td>83.20 ± 1.35*</td>
</tr>
<tr>
<td>Zinc (mg %)</td>
<td>133.32 ± 3.72</td>
<td>126.48 ± 1.72*</td>
</tr>
</tbody>
</table>

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DISCUSSION

Camels are exposed to a wide range of affections, which cause their debility. Of these, chronic parasitic intestinal infestation which is recognized to be one of the most serious and damaging disease affecting camels (Higgins, 1986). Various degrees of debility were observed on the examined camels, these are manifested by weakness, anemia, decrease of the hump size, atrophy of the thigh muscles and debility of subcutaneous fat, with chronic diarrhea and dehydration. Hematological picture of camels suffering from chronic parasitic gastroenteritis (Table 1) showed significant decrease in hemoglobin, total erythrocyte count per mm$^3$ blood and in the packed cell volume percent, while there were significant increases in MCV and MCH. These irregular changes of the erythrocytic index were nearly similar to the results recorded by Manna (1990) and Baraka (1995). The marked fluctuation of erythrocytic index may be attributed to the discrepancy in RBC’s count and size, hemoglobin content, PCV% and consequently the erythrocytic indices with concomitant states of dehydration (Yagil et al., 1974).

The total leucocytic count per mm$^3$ blood (Table 2) was significantly increased in diseased animals. This remarkable leucocytosis was due to the significant increase in eosinophils percentage (Ahmed El-Samouni, 1990). Leucocytosis associated with chronic parasitic gastroenteritis was mainly attributed to the chronic inflammatory parasitism and harmful effect of toxins produced by parasites on the haemopoietic organs. This explanation was previously accepted by Coles (1986) and these findings agreed with El Magawary (1983); Higgins (1986) and Sayed (1998). Eosinophilia might be also due to antigen antibody reaction that might be produced by the presence of parasites (Dobson, 1967).

The biochemical analysis of the present study (Table 3) showed that serum calcium, inorganic phosphorus and magnesium values were significantly decreased in diseased camels by chronic parasitic infestation. These results agreed with the results obtained by El Magawary (1983) and Manna, (1990), Radostitis et al. (1995) explained the decrease in both serum calcium and magnesium may be due to the decrease of the both intake and absorption of them which was caused either by anorexia or gastrointestinal atony associated with chronic
parasitic infestation. Serum inorganic phosphorus was regulated by multiple factors as phosphorus intake and absorption, in addition to the dietary level of calcium, magnesium and vitamin D (Parasad, 1977 and Mc-Dannel et al., 1983). These factors were disturbed in case of parasitic infestation. The serum sodium, potassium and chloride levels were significantly decreased in chronic parasitism. Similar results were recorded by Melvin (1970), Parasad (1977), Ommar et al. (1984) and Lalia et al. (1986) who explained reduction in the serum sodium, potassium and chloride by usually losses from the body associated with parasitic infestation, and these serum electrolytes were influenced by the rate of electrolytes lost especially in diarrhea. This might explain the decrease of the electrolytes in such cases.

Regarding to serum trace elements, copper and iron levels were significantly lowered while the serum zinc level showed insignificant decreases. Reduction of blood serum trace element levels in parasitic infested camels, if compared with control clinically healthy ones, can be explained by the fact that the chronic infestation leads to loss of appetite with consequence great loss of blood. (Kameto and Cornelius, 1971). Wagger (1980) attributed such decrease in blood serum trace element levels with chronic parasitic infested animals either through impaired in absorption or increased excretion of concerned elements.

From these results we can conclude that the main cause of camels debility in the examined camels is infestation by gastrointestinal nematodes. Routine and regular fecal examination is considered one of the most important easy methods for diagnosis of gastrointestinal parasites which will enables in the control of the gastrointestinal parasite infestation and to give the prophylactic suitable anthelmintics to overcome one of the most causes of the camel debility. Furthermore, adding of mineral salts during treatment of gastrointestinal nematodes is important to subside the deficiency of these minerals.

REFERENCES


