CLINICAL, DIAGNOSTIC AND THERAPEUTIC STUDIES ON THEILERIASIS (Theileria annulata) IN CATTLE IN UPPER EGYPT

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ABSTRACT

The goal of the present study is to evaluate the endemic situation of theileriasis in the different localities in Upper Egypt, and also to evaluate the efficacy of some drugs in treatment of acute and chronic theileriasis. A total of 120 cows showed clinical signs varied from rise of body temperature, nasal and ocular discharge, corneal opacity, diarrhea, pale mucous membranes, associated with enlargement of lymph nodes in some cases (18), belonged to villages of Assiut, Sohag and El-Wadi El-Gadid Governorate were subjected to study. Animals were examined clinically and then blood samples were collected from all animals under investigation. In addition, lymph samples were collected from cases with swelled lymph nodes. Blood and lymph smears were prepared directly after collection. The results revealed that, 31 cows (25.8%) out of the total number were positive for Theileria infection by blood film. All animals with enlarged lymph nodes (18) were positive for Theileria infection by lymph smear and negative by blood film. The incidence of Theileria infection in the different localities was 17.5%, 20% and 40% in the Assiut, Sohag and El-Wadi El-Gadid Governorate respectively. The percent of infection was more in summer (27.5%) than in winter (22.5%). From the present study, the incidence of Theileria infection is more in El-Wadi El-Gadid Governorate than in other localities under study, and more in summer than in winter. In addition, lymph smear is the method of choice for diagnosis of theileriasis in suspected cases with enlarged lymph nodes. It is recommended to treat chronic theileriasis with long acting oxytetracycline and Berinil (Dimenazine citrate).

Key words: cattle, Theileria, Upper Egypt, treatment
INTRODUCTION

Tropical theileriosis caused by the haemoprotozoan parasite *Theileria annulata*, is exclusively transmitted by ticks of the genus *Hyalomma* (Uilenberg, 1981). *Theileria annulata*, a protozoan parasite of cattle and domestic buffaloes, is transmitted by ticks of the genus *Hyalomma*, and causes a disease named Mediterranean or tropical theileriosis (Mirzaei, 2007).

*T. annulata* is very pathogenic and causes tropical theileriosis with high morbidity and mortality in cattle. The disease threatens an estimated 250 million cattle and acts as a major constraint on livestock production and improvement in many developing countries. *T. annulata* is more widely distributed in many areas of the world, extending from southern Europe to southern Asia (Brown, 1990).

*Theileria* parasites enter the bovine host during tick feeding as sporozoites, which rapidly invade mononuclear leukocytes. Here, they mature into macroschizonts and induce proliferation of the host cell.

Macroschizonts develop further into microschizonts and ultimately into merozoites, which are released from the leukocyte. The merozoites invade erythrocytes and develop into piroplasms (Radostitis et al., 1994).

The clinical signs in the infected animals were pyrexia (40.5–41.5 °C), enlargement of superficial lymph nodes, nasal and ocular discharges, salivation, anemia, respiratory distress and eye lesions (Osman and Al-Gaabary, 2007).

Diagnosis of theileriosis in acute cases is mainly based on clinical signs of the infected animals and confirmed by microscopic examination of Giemsa stained thin blood and lymph node smears. However, expertise in piroplasm microscopy is required in subclinical or chronic infections because parasitaemias are often extremely low and *Theileria* piroplasms may be difficult to find in stained blood smears or otherwise may be missed (Aktas et al., 2006).

Diagnosis of clinical *T. annulata* infection in cattle is usually based on the detection of macroschizonts in Giemsa-stained lymph node biopsy smears. After recovery, a long-lasting carrier state occurs, in which low numbers of erythrocytes remain infected with *Theileria* piroplasms (Neitz, 1957).

Antitheilerial drug as buparvaquone has been used effectively in the treatment of tropical theileriosis in the field (Unsuren et al., 1988). There is no safe and efficacious vaccine against tropical theileriosis in Egypt and control of the disease is mainly based on the chemotherapy and tick control (Osman and Al-Gaabary, 2007).
Butalex (Buparvaquone) can be used in the treatment of recently infected animals with *Theileria annulata* in single dose of 2.5 mg/kg body weight intramuscular with efficacy varied from 88.7% (*Hashemi-Fesharki, 1991*) to 100% (*Mourad, 1999* and *Osman and Al-Gaabary, 2007*). The goal of the present study is to evaluate the endemic situation of theileriasis in the different localities in Upper Egypt, and also to evaluate the efficacy of some drugs in treatment of acute and chronic theileriasis.

**MATERIALS & METHODS**

**Animals:**

A total number of 120 cows belong to different localities in Assiut, Sohag and El-Wadi El-Gadid Governorate, were subjected to study. All animals showed clinical signs of theileria infection, out of them only 18 cows showed enlargement of superficial lymph nodes.

**Clinical examination:**

A thorough clinical examination was performed on all animals. The signs in clinical cases of *Theileria annulata* infection were observed and recorded. Thin blood smears were prepared from the ear veins of all animals. Lymph node aspirates were collected from suspected cases suffered from enlarged superficial lymph nodes.

**Samples:**

Two samples were collected from animals under study; blood and lymph samples. Blood sample was collected from the ear vein, and used for making blood film. Lymph node aspirates were collected from enlarged lymph nodes and used for lymph smear. Blood and lymph smears were prepared directly after collections, fixed with absolute methanol and stained with Giemsa. Samples were collected again from positive animals 3 weeks' interval after treatment.

**Treatment of diseased cows**

10 cows were selected from the confirmed positive cases of theileriasis, and classified into two equal groups; acute theileriasis group and chronic theileriasis group. Animals in the two groups were treated intramuscularly with Butalex (Schering-Plough) (Buparvaquone) at a dose 2.5 mg/kg b.w (1ml/20kg).

Another 10 cows were selected from the confirmed positive cases of theileriasis, and suffered from chronic theileriasis, were treated with oxytetracycline long acting and Berinil (Dimenazine citrate) in 2 doses in rate 3.5 mg/kg with 48 hours interval time intramuscularly.

Tick control by spraying all infected cattle and the surrounding environment with deltamethrin (Butox, Hoechst) was performed twice, 2 weeks apart.
RESULTS

Clinical and laboratory findings:

Animals subjected to study showed clinical signs varied from rise of body temperature up to 41.5°C, nasal and ocular discharge, corneal opacity, diarrhea, pale mucous membranes and presence of tick on the animal body, associated with enlargement of lymph nodes in some cases (Fig. 1).

Laboratory examination of blood and lymph smears revealed that, 31 cows (25.8%) out of the total number were positive for theileria infection by blood film (Fig. 2). All animals with enlarged lymph nodes (18) were positive for theileria infection by lymph smear and negative by blood film, infected lymphocyte cells showed schizonte stage of the parasite which called Koch's blue bodies as in (Fig 3).

Effect of localities and season:

As shown in Table 1, based on blood film examination, the incidence of Theileria infection in the different localities was 17.5%, 20% and 40% in Assiut, Sohag and El-Wadi El-Gadid Governorate, respectively. The incidence of infection was more in summer (27.5%) than in winter (22.5%).

Treatment of diseased cows

All cows suffered from acute theileriasis and injected with buparv-aquone (Butalex, Schering-Plough) were recovered from the disease (100% efficacy), however, there was no response observed for treatment with Butalex in cows with chronic theileriasis.

All cows treated with oxytetracycline and Berinil (Dimen-azine citrate) suffered from chronic theileriasis were recovered from the disease.

Table. (1): Incidence of Theileria infection in cattle in different localities in upper Egypt based on blood film examination.

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<tr>
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<th>Assiut</th>
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<th>Sohag</th>
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<th>El-Wadi El-Gadid</th>
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<td>17.5</td>
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Fig. (1): Clinical signs of theileriasis in cattle showing; mucopurulent nasal discharge (A), corneal opacity (B), enlarged pre-femoral lymph node (C).

Fig. (2): Blood smear stained with Giemsa stain showing the typical form of the trophozoit (signet ring inside R.B.Cs.).
DISCUSSION

The incidence of Theileria infection in the present study was more in El-Wadi El-Gadid Governorate (40%), than in Assiut (17.5%), and Sohag (20%) Governorates, this may be attributable to the peak of activity of the ticks in this region (Bouattour et al., 1996 and Darghouth et al., 1996). In the field, diagnosis is usually achieved by finding Theileria parasites in Giemsa-stained blood smears and lymph node needle biopsy smears. Results of the current study revealed that, 31 cows (25.8%) out of the examined cattle (120) were positive for Theileria infection by blood film, however, blood film was negative for cases that showed enlargement of lymph nodes. Furthermore, all the cows (18) with enlarged lymph nodes were positive for theileriasis by lymph smear, this indicate that lymph smear is the best rapid test for diagnosis of theileriasis in cows with enlarged lymph nodes.

There is no vaccine against tropical theileriasis in Egypt and control of the disease is mainly based on the chemotherapy and tick eradication. The present study introduced an approach for treatment of Theileria infection in cattle depending on the chronicity of the disease, this achieved by using three drugs, buparvaquone (But-
alex, Schering-Plough), oxytetracycline and Berinil (Dimenazine citrate), the results revealed that buparvaquone (Butalex, Schering-Plough) was effective in treating cases suffering from acute theileriasis. However, oxytetracycline and Berinil (Dimenazine citrate) were effective in treating cases with chronic theileriasis. Early treatment was highly efficient in the elimination of protozoan parasites from blood within 3–4 days post-treatment with a clinical improvement and an eventual 100% cure rate. Low efficacy of buparvaquone in the treated infected cattle may be attributed to a failure to control the respiratory lesion, possibly due to damage or bacterial infection to the lungs. Similar results were reported by Muraguri et al. (2006).

These results in agreement with Mbwambo et al. (2006) who reported that treatment of tropical theileriosis must start as soon as the clinical signs are noticed; early intervention is the key to success. From the present study, the incidence of Theileria infection is more in El-Wadi El-Gadid Governorate than in other localities under study, and more in summer than in winter. In addition, lymph smear is the method of choice for diagnosis of theileriasis in suspected cases with enlarged lymph nodes. It is recommended to treat chronic theileriasis with long acting oxytetracycline and Berinil (Dimenazine citrate).

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هدفت هذه الدراسة إلى تقييم مدى إنتشار الثيليريا في مناطق مختلفة من صعيد مصر. تم اخذ عينات من عدد 120 بقرة من أماكن مختلفة من قرى محافظات اسيوط وسوهاج والوادي الجديد وفي فصول مختلفة من السنة. كانت هذه الحيوانات تعاني من أعراض مرضية مثل ارتفاع درجة الحرارة وأعراضات أنفية وعظامها بالعين وكحة وأساه والاحتقان الجوف وحالات أخرى كانت تعاني من شحوب وبياض الأغشية المخاطية للعين كما لوحظ في بعض الحالات تورم في الغدد الليمفاوية السطحية. تم فحص الحيوانات جميعها فحصا اكلينيكيا وايضاً عملياً وذلك عن طريق اخذ عينات من الدم وال UIApplication المعتمدة، وتقوم بالفيوبست الكبيرة، تم استخدام الصبغة الجيمسا والترشيحات الميكروسكوبية للذكيرة، ثم فحصها بالفيوبست الكبيرة. في هذه الدراسة ومن خلال الفحص المجهرى، أظهرت الدراسة أن نسبة الاصابة من خلال فحص الشرائح الدموية كانت 20% من إجمالي عدد 120 حيوان تعاني من أعراض مرضية. وباستخدام فحص المسح الليمفاوي للعينات التي أخذت من الحيوانات التي كانت تعاني من تورم في الغدد الليمفاوية كانت 18 حيوان إيجابي من إجمالي عدد 18 حيوان يعاني من أعراض مرضية (100%). وكانت نسبة الإصابة في المحافظات المختلفة وذلك باستخدام الشريان الدموي من الحيوانات المريضة كانت النتائج التالية: أسيوط 21 حيوان إيجابية من 160 حيوان (13.1%) وسوهاج 7 حيوانات إيجابية من 140 حيوان (5%). والوادي الجديد 18 حيوان إيجابي من 170 حيوان (10.6%). وكانت نسبة الإصابة في الشهر الحارة 22 حيوان إيجابي من 80 حيوان (27.5%). بينما كانت نسبة الإصابة في الشهر البارد هي 9 حيوانات إيجابية من 80 حيوان (11.3%). وتشمل هذه الدراسة أيضًا علاج الحالات المرضية والتي تثبت بالفحص العادي بأنها إيجابية وذلك باستخدام أنواع مختلفة من العقاقير المغذرة في الحقل البيطرى. وقد استخدمت بعض المبيدات الحشرية مثل البيوتوكس وكذلك للتخلص من القراد الموجود على جسم الحيوان وآلياً في البيئة المحيطة بالحيوان.

الكلمات المرجعية: الثيليريا، الماشية، صعيد مصر، علاج