

Evaluation of Buparvaquone in the treatment of *Theileria annulata* in Calves

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Abstract

The study was conducted on 40 calves during summer season as acinical cases in Al- Azragia district which is a village of Fallojah city, Al- Anbar province. 37 calves are Friesian breed and 3 are native breed.

Diagnosis depends on lymph smear stained with Giemsa taken from mother cows and the calves and the presence of koch blue bodies in the lymphotes. 30 Friesian calves are injected with Butalex (Buparvaquone) at the rate of 2.5 mg/ B.W, IM at the neck region during the incubation period (7- 10 days) at 5- 6 days old of *Theileria annulata* infection 10 calves served as a control group. 7 of them are died, which are Friesian, after 14- 25 days from symptoms appeared. 3 calves, which are native breeds, are suffer from moderate to severe clinical symptoms but they remain alive. This is revealed the efficiency of Butalex at the rate of 2.5 mg/k.g. B.W.

تقييم كفاءة عقار Buparvaquone في علاج داء الثايليريا انيولاتا في العجول

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الخلاصة

أجريت هذه الدراسة في منطقة الازركية التابعة لمدينة الفلوجة في محافظة الأنبار على 40 عجل وعجلة. 37 من سلالة الفريزيان و3 من السلالات المحلية، في فصل الصيف وكانت الحيوانات في طور الحضانة للإصابة بالوالي الثايليريا انيولاتا *Theileria annulata*.

شخصت الحالات اعتمادا على اخذ مسحات من الغدد اللمفاوية من الأمهات والعجول التي ظهرت عليها الإصابة وكان وجود أجسام كوخ الزرقاء في المسحات اللمفاوية مما يدل على إصابة الحيوانات بهذا الطفيلي. قسمت الحيوانات إلى مجموعتين ضمت المجموعة الأولى 30 حيوان عولجت بعقار Butalex (Buparvaquone) بجرعة 2.5 ملغم/ كغم من وزن الجسم. بينما تركت مجموعة السيطرة 10 حيوانات بدون علاج.

ظهرت أعراض سريرية على جميع حيوانات المجموعة الأولى حيث شملت ارتفاع في درجة الحرارة وتضخم متوسط في الغدد اللمفاوية أمام الكتف وبعدها تماثلت جميعها للشفاء. بينما أظهرت حيوانات مجموعة السيطرة ارتفاعا شديدا في درجة الحرارة وتضخم كبير في الغدد اللمفاوية أمام الكتف وهلك منها 7 بعد ظهور الأعراض عليها 14- 25 يوم وشفيت منها 3 عجل فقط وكانت هذه العجول من العجول المحلية.

بينت نتائج هذه الدراسة إمكانية استخدام عقار Butalex (Buparvaquone) بجرعة 2.5 ملغم/ كغم من وزن الجسم للعجول المولودة من أمهات حاملات لمرض التاييليريا كإجراء وقائي لحمايتها من الإصابة بهذا المرض.

Introduction

Theileriosis are tick- borne intracellular protozoan diseases caused by *Theileria* species in cattle, sheep and goats as well as in wild and captive ungulates (1).

Bovine *Theileria* species cause severe and mild infections in their hosts. Two of them, *Theileria annulata* and *T. parva* cause lymphoproliferative disease with high mortality and morbidity in cattle, commonly known as tropical theileriosis and East Coast Fever, respectively (2, 3, 4).

T. sergenti, *T. buffeli* and *T. orientalis* cause mild or asymptomatic disease in cattle well known as benign bovine theileriosis (5).

Distribution of *T. parva* is limited to eastern, central and Southern Africa, whereas *T. annulata* is more widely distributed in many areas of the world, extending from Southern Europe to Southern Asia (6), Certain Ixodid ticks such as *Hyalomma anatolicum*, *H. anatolicum*, *H. m. marginatum* and *H. a. excavatum*, known to transmit *T. annulata*, are found in large numbers in the Mediterranean region, especially in semi-arid areas (7).

In 1982, it is estimated that 250 million cattle were at risk from the disease (8), with extremely high losses to the agriculture output of developing countries. Losses of 800 million \$/ year due to tropical theileriosis are reported in India alone (9).

Theileriosis represent a threat to exotic cattle and their crosses in the country and cause substantial losses of both animals and their products (10).

The mortality rates of tropical theileriosis in cattle introduced to endemic areas are high ranging from (40- 90)% (8, 11), but in less productive local breeds is low (12) where the indigenous animals in affected areas show some degree of resistance, and animals surviving infection are immune to subsequent challenge, although subclinical infection can be as high as 90% in adult cattle (13, 14) and a long- lasting carrier status occurs in which low numbers of erythrocytes remain infected with *Theileria* piroplasms for 9- 12 months or more (14, 15), and become sources of infection for vector ticks (2).

Typically, fever occurs 7- 9 days after parasites are introduced by feeding ticks(16).

Usually, the infected calves die due to acute infection 15- 25 days after infection depending on sporozoite dose, showing inappetance, fever, lymphoproliferative disorders and enlargement of superficial lymph nodes, varying degrees of leucopenia and/ or anemia, in addition to mucous membrane discharge, cessation of rumination, dyspnea and haemorrhage diarrhea (1, 17).

Laboratory diagnosis is usually based on the light microscopy detection of the parasite in thin smears of blood and on the presence of macroschizonts of *Theileria* in Giemsa- stained lymph node biopsy smears (5).

Immunization can be achieved by administering parvaquone 7- 9 after infection(16).

The study was designated to know the diagnostic procedures used and the efficacy of the use of (Butalex) to treat the Theileriosis in calves during I.P.

Materials and Methods

Study design.

The study was conducted on 40 newborn calves at age of 4- 6 days during summer in the Al- Azragiya district, Fallujah city, Al- Anbar province, 37 calves are Friesian and 3 calves are native breed.

Selection of this location was based on its being the main potential area for livestock rearing.

Lymph smear from the prescapular lymph node were collected from dams of the calves and stained by Giemsa- stain to investigate the presence of Koch blue bodies in the lymphocytes which indicates that the dams are carrier, and their calves in contact with them are more vulnerable to theileriosis.

Clinical examination.

All calves were subjected to clinical examination, with a special attention paid to examination of the prescapular lymph nodes which considered as the main target of *Theileria* spp, and investigate the presence of ticks on calves body especially the ear.

Plane of treatment.

The calves were divided into two groups as the following:

Group 1: Contained 30 calves treated with Buparvaquone* i.m. in a dose 2.5 mg/ kg B.W. at the neck muscle.

Group 2: Contained 10 calves and considered as control group. 3 calves out of them are from local breeds (native breed).

All calves in both groups kept under observation, at least, for 7 days.

Results

All the number of Friesian calves (30) were diagnosed as a mild infection with *Theileria* according to the clinical signs appeared on the calves which includes; rise of body temp between 39 5C⁰, enlargement of prescapular lymph nodes.

Inappetance and laboratory investigation through lymph smear stained with Gimza and characterized by the presence of Koch- blue bodies in lymphatic cells. The results of the treatment with Bupar vaguone showed a high response (100%).

The enlarged prescapular lymph nodes regression in size 7- 10 day after treatments.

The control untreated group showed severe symptoms which includes, fever ranged from 40- 41 5C⁰, prominent enlarged prescapular lymph nodes and the animals die within 2 weeks except 3 local breed calves that resist the infection. The cattle examined (mothers of the calves) appeared carriers of *T. annulata*.

Discussion

In the present study, *T. annulata* were detected among calves in Al- Azragiya district, with high infection rate. The diagnosis of *Theileria* infection is based on clinical findings and microscopic examination of Giemsa stained lymph node smear in acute cases. However expertise in microscopy of piroplasm is required in subclinical or chronic infections because parasitemias are often extremely low and many other wise missed. For this reason, PCR recently has been the most preferred method for detection of *Theileria* spp. in epidemiological studies (2).

These results agreed with El- Metenawy(18) and Aktas, etal., (2). This might be due to the effectiveness of the method of diagnosis.

The infection of the calves with an early age (5- 7 days) might be due to the infection of their mother (carrier) (2).

* Coopers Animal Health limited, Berkhamsted, Hertfordshire, U.K.

The results of treatments showed very high success rates (100%). Butulex was a parvaquone analogue in which cyclohexyl moiety is 4- substituted by alkyl group which is obviously slows down metabolic degradation of parent compound, and thus increasing their efficacy against *T. annulata* and *T. P. parva* in vivo.

It is showed a marked therapeutic effect at 2.5 mg/kg, Buparvaquone appears to be the most active compounds in the hydroxynaphthoquinone series, It proved to be active during incubation period, and after outbreak of bovine theileriosis with high safety (19).

It has been also demonstrated that immunization can be stimulated (Defence mechanism) by administering parvaquone 7- 9 days after infection (6).

It was concluded from this study that lymph node smear stained with Giemsa efficient to diagnosis *Theileria* calves although the use of Butalex was highly effective in that of *Theileria*.

References

1. Radostits, O. M.; Gay, C. C.; Hinchcliff, K.W. & Constable, P. D. (2007). Veterinary medicine, textbook of the diseases of cattle, horses, sheep, pigs and goats. 10th edition, Philadelphia, Saunders Elsevier. .
2. Aktas, M.; Altay, K. & Nazir, D. (2006). A molecular survey of bovine theileria parasites among apparently healthy cattle and with a note on the distribution of ticks in eastern Turkey. Vet. Parasitol., 138: 179- 185.
3. Schnittger, L.; Katzer, F.; Biermann, R.; Shayan, P.; Boguslawski, K.; McKellar, S.; Beyer, D.; Shiels, B. R. & Ahmed, J. S. (2002). Characterization of a polymorphic *Theileria annulata* surface protein TaSP closely related to PIM of *Theileria parva*: implications for use in diagnostic tests and subunit vaccines. Molec. and Bioch. Parasitol., 120: 247- 256.
4. Shiels, B.; Langsley, G.; Weir, W.; Pain, A.; McKellar, S. & Dobbelaere, D. (2006). Alteration of host cell phenotype by *Theileria annulata* and *Theileria parva*: mining for manipulators in the parasite genomes. Intern. J. Parasitol., 36: 9- 21.
5. Uilenberg, G. (1981). Theilerial species of domestic livestock. In: Advances in the control of Theileriosis. Irvin, A. D.; Cunningham, M. O. & Young, A. S., Martinus Nijhoff, The Hague, PP. 4- 37.
6. Brown, C. G. D. (1990). Control of tropical theileriosis *Theileria annulata* infection of cattle. Parassitologia., 32: 23- 31.
7. Viseras, J. & Garcia- Fernandez, P. (1999). Studies on theileriosis in Southern Spain. Parassitologia., 1: 111- 115.
8. Robinson, P. M. (1982). *Theileria annulata* and its transmission- a review. Trop. Anim. Health Prod., 14: 3- 12.
9. Devendra, C. (1995). In global Agenda for livestock research. DS ILRI, Nairobi., PP. 41- 48.
10. Hashemi-Fesharki, R. (1988). Control *Theileria annulata* in Iran. Parasitol. Today., 4: 36- 40.
11. Gamal, A. & El- Hussein, A. M. (2003). Economic impact of theileriosis on a dairy farm in Northern Sudan. Sud. J. Vet. Sci. Anim. Husb., 42: 272- 278.
12. Oudich, H.; Flach, E.; Hasnaoui, M.; Kachani, M. & Ouhelli, H. (1993). Resistance to theileriosis of imported and local breeds in Morocco, in: Uilenberg, G., Hamers, R. (Eds.), Resistance or Tolerance of Animals to Disease and Veterinary Epidemiology and Diagnostic Methods. CIRAD-EMVT, Maisons-Alfort, France, pp. 78–81.

13. Flach, E. J.; Ouhelli, H.; Waddington, D.; Oudich, M. & Spooner, R. L. (1995). Factors influencing the transmission and incidence of tropical theileriosis *Theileria annulata* infection in cattle in Morocco. *Vet. Parasitol.*, 59:177- 188.
14. Swell, M. & Roklispy, D. (1990). Hand book of animal diseases in the tropics, 4th ed., Bailliere Tindall, London.
15. Urquhart, G. M.; Armour, J.; Duncan, J. L.; Dunn, A. M. & Jennings, F. W. (1996). *Veterinary Parasitology*. Blackwell, Oxford.
16. Kahn, C. M. & Line, S. (2005). *The Merck Veterinary Manual*. 9th ed., Merck & Co. INC, Whitehouse Station, USA.
17. Preston, P.M.; Brown, C.G.D.; Bell-Sakyi, L.J.; Richardson, W. & Sanderson, A. (1992). Tropical theileriosis in *Bos taurus* and *Bos indicus* calves. Response to infection with graded doses of sporozoites. *Res. Vet. Sci.*, 53: 230–243.
18. El- Metenawy, T. M. (2000). Prevalence of blood parasites among cattle at the central area of Saudi Arabia. *Vet. Parasitol.*, 87: 231- 236.
19. McHardy, N. (1989). Buparvaquone, the new antitheilerial: a review of its efficacy and safety. In: Dolan, T.T. (Ed.), *Theileriosis in Eastern, Central and Southern Africa*. Proc. Workshop on East Coast Fever Immunisation held in Lilongwe, Malawi, 20- 22 September 1988. ILRAD, Nairobi, pp. 158-165.