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ANAPLASMA MARGINALE IN *LEPUS NIGRICOLLIS* (BLANFORD) TREATED WITH OXYTETRACYCLINE

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ABSTRACT

The objective of this study was to test the efficiency and acceptability of oxytetracycline hydrochloride (OTC) in anaplasmosis. Five mg OTC was the only drug given subcutaneous twice by a week to anaplasmotized *Lepus nigrcollis.* The therapeutic results were judged in relation to the parasitized erythrocytes (PE) present, assesment of the clinical acceptability of OTC was perfect in anaplasmosis *(Anaplasma marginale).*

Introduction

The A. marginale of test animal is attributed to the stabilate. This infection causes anaemia, fever, anorexia and icterus (Ristic, 1960). The outer site of PE has a binding site for drugs (OTC) and when this site is occupied, the *A. marginale* is reduced. The chemical and physical changes in PE have been studied by Dimopoullos and Bedell (1962).

OTC *in vivo or in vit*ro causes a dose dependent reduce the A. *marginale* in erythrocytes and therefore this must be attributed to the binding of the OTC to these PE (Ali, 1969).

Till now, the quantitative relationship between these two changes has not been studied. In the present study, the relationship changes of PE, active A. *marginale* and OTC binding in erythrocytes *of Lepus nigricollis* following OTC administration for 7 to 14 days, was worked out.

Materials and Methods

List: 1-Ten *Lepus nigricollis* (average one year of age and 1 kg weight) infected with *Anaplasma m*ar*ginale* were used as test animal. 2-Oxytetracycline hydrocloride (OTC), 5 mg, was used as drug.

Oxytctracycline hydrochloride (OTC), 5 mg, was administered twice a week to each of *the Lepus nigricollis* under experiment. The dose OTC was calculated according

to the surface area of the test animals. Blood samples were drawn twice a week before and following OTC administration. Erythrocytes piroplasma, OTC sensitive efflux and effluxrate constant were measured according to the method of Morgan (1978).

The amount of OTC bound to the PE was measured as a decrease, in the binding of radio-actively labelled OTC at a sufficient high concentration of 10^{-3} mol/1 to ensure the occupation of all available sites (Wilson, 1980). Plasma OTC was measured through radio- immunoassay.

Results and Discussion

OTC administration increased the prepatent period of A. marginate and decreased it efflux rate constantly, so much so the steady state was reached by the 7th day. The results obtained without OTC for a week compared with OTC administration during the same period are given in Table-1. The changes in PE and efflux rate constant *(A. marginale)* were similar; but both were significantly lesser than the change in the OTC binding. The explanation for the difference appears to be that some of the bound OTC had dissociated from the *A. marginate* sites during the preparation of the *PE, or* it was displaced from the PE following addition of imidocarb for measuring the binding capacity.

Only OTC produced a significant increase in the prepatent period as determined by the analysis of variance. Imidocarb, when given after exposure, extended the prepatent period but not sufficient to be considered as significant.

The results demonstrate that the reduction in PE during acute OTC therapy was proportionally more than that accelerated by the number of PE occupied by OTC. It may be stated that OTC diminished the turnover of *A. marginate* through erythrocyte without being bound to it. Schartz (1982) the other possibility was that the effect of OTC on PE or erythrocytes persisted even when OTC had left it and thus the number of inhibited erythrocytes was greater than the number of PE occupied by OTC on a site at any time.

In other words, there was an enzymatic action by the parasites which by the action of binding to the erythrocytes probably maintained low concentration of phospholipids in PE membrane locally (Rao and Ristic, 1963; Dimopoullos and Bedell, 1962). Possibly, this enzymatic action by the parasites was stopped when imidocarb was bound to the external sites of the PE (Wilson, 1980) and the activity of the PE remained diminished until the enzyme occupied its site again. The presence of an unexpectedly large decrease in PE could be due to intropic effect of OTC (Eplad, 1978). It seems that this effect was due to a decrease in the parasites of the blood not entirely due to inhibition of the PE, as a results of OTC bindings to the PE binding site.

Table-1 indicates comparative values of parasitized erythrocytes (PE), the reciprocal imidocarb and sensitive efflux rate constant for A. marginale (E rp/h) and the imidocarb binding capacity (OB, arbitrary unit) in ten parasitized Lepus nigricollis before and after a week's treatment with OTC. The percentage change due to OTC is also shown, A. marginale is calculated for the reciprocal of PE to make it with E rp (mean ± SD).

Table-1

	PE	1/PE	E_{rp}	OB
Pre OTC	30.2 ± 0.40	4.1 ± 0.20	0.014 ± 0.014	120 ± 14
on OTC	25.3 ± 0.20	2.1 ± 0.19	4.3 ± 0.18	90 ± 10
% change	- -	2.0 ± 0.01	4.1 ± 0.04	20.5 ± 8.0

each value is a mean of ten samples with ± SD

Key: Parasitized erythrocytes (PE), Parasites in one erythrocytes (WE), efflux rate of Parasites (E rp) arbitarary Unit (OB).

Conclusion

OTC showed itself to be particularly useful in anaplasmosis. Treatment of adult Anaplasmosis carrier Lepus nigricollis, with long acting OTC at dosage levels is generally successful in eliminating infections. The clinical results were confirmed by serological examination of Lepus nigricollis. Tolerance of OTC was always excellent.

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