A Therapeutic trial with Doxycycline and Prednisolone in Dogs affected with Ehrlichiosis

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Ehrlichiosis in dogs is an important tick-borne febrile disease of dogs characterized by anaemia, pancytopenia and severe debilitation caused by the organism Ehrlichia canis. There are several clinical, haematological and biochemical abnormalities associated with the disease. Diagnosis can be confirmed by detection of morulae/inclusions in blood/buffy coat smears, though IFAT and molecular methods can be more conclusive. Three phases of infection are there – acute, subclinical and chronic. The clinical signs in the acute phase may be mild and non specific, provided the animal is immunocompetent and elimination of infection does occur with suitable therapy. Dogs that do not successfully eliminate the parasite during the subclinical stage may subsequently proceed to the chronic phase that may be refractory to the treatment. Though tetracycline and oxytetracycline have been considered to be the initial drugs of choice, doxycycline and minocycline are also used as drugs of choice. Short-term therapy with glucocorticoids may also be beneficial early in the treatment period (Neer, 1998).

Materials and Methods

In this study, sixteen animals were confirmed positive for ehrlichiosis by observing morulae/inclusions in the blood/buffy coat smears. They were subjected to treatment trial with doxycycline (T. Vibazine – 100 mg) given @ 5 mg/kg body weight once daily orally for 14 days and prednisolone (T. Wysolone – 5 mg) given @ one mg/kg body weight orally for five days followed by 0.5 mg/kg body weight for five days and 0.25 mg/kg body weight for the remaining days.

After 14 days of therapeutic trial (three animals didn't turn up), clinical response of each case was recorded. Blood and serum of each animal were collected and subjected to haematological and biochemical evaluation. The data obtained from various parameters were compared between pre-treatment and post-treatment groups. The data obtained were analysed statistically by paired t-test.

Results and Discussion

Response to treatment was assessed by remission of clinical signs, absence of intracytoplasmic inclusions in the leukocytes, improvement of abnormalities (haematological and biochemical) in the laboratory findings). All the animals showed clinical cure by 14 days therapy except for one which showed an elevated temperature even after therapy for which the treatment was extended to one more week. Haematological parameters and serum profile of the treatment group before and after therapeutic trial are given in the table I & II respectively.

Table I. Haematological parameters of treatment group before and after therapeutic trial

		Before treatment	After treatment	
No. of animals		13	13	
ESR(mm/hr)		6.04±0.71	2.31±0.33	**
PCV (%)		33.69±0.99	45.02±1	**
Hb(g/dl)		10.81±0.33	14.64±0.41	**
RBC count x 106/mm^3		5.00±0.15	6.82±0.09	**
MCV (fl)		67.86±2.14	65.96±1.08	**
MCH(pg)		21.73±0.6	21.44±0.46	NS
MCHC (g/dl)		32.15±0.63	32.52±0.54	NS
Platelet count x 105/µl		1.23±0.14	2.34±0.16	NS
TLC x 103/mm^3		9.62±0.65	10.44±0.57	NS
DLC (%)	N	66.38±3.29	69±2.63	NS
	L	24.62±2.87	27.15±2.41	NS
	M	8.31±0.80	2.69±0.49	**
	E	0.54±0.27	1.08±0.33	NS

** bearing column differs significantly ($p<0.01$)
NS: Non significant

Table II. Serum profile of treatment group before and after therapeutic trial

Treatment	No of animals	Total protein(g/dl)	Albumin (g/dl)	Globulin (g/dl)	A/G ratio	ALT(IU/l)	AP(IU/l)	Creatinine (mg/dl)
Before	13	9.23±0.55	2.18±0.17	7.07±0.5	0.32±0.02	65.42±7.12	264.35±17.54	2.38±0.21
After	13	6.11±0.17	3.1±0.07	3.01±0.13	1.05±0.04	25.04±2.4	113.03±14.34	1.78±0.11
		**	**	**	**	**	**	*

* bearing column differs significantly
* - significant ($p<0.05$)
** -Highly significant ($p<0.01$)

In the present study, the clinical response was quite encouraging. All the animals showed dramatic clinical improvement with the remission of clinical signs except for one which also had an uneventful recovery after an extended treatment to one more week. This 100% rate of recovery after treatment with doxycycline or in combination with glucocorticoid therapy had been reported by the previous workers (Egenvall et al., 1997; Breitschwardt et al., 1998). Though the standard dosage of doxycycline is considered @ 10 mg/kg body weight orally once daily for a period of three weeks (Harrus et al., 1997), dosage used in the present study was also found to be effective proven by gaining apparent recovery more or less rapidly. A similar result with doxycycline at the same rate for same duration was reported by Egenvall et al. (1997).This rapid recovery might be indicating that the dogs under trial were either mild or moderately ill. Doxycycline successfully eliminates the infection since it restores phagosome – lysosome fusion probably by inhibiting a protein secreted by the bacterium which hinders fusion (Waner et al., 2001). Also, the choice of doxycycline among the tetracyclines has had an added advantage that the dogs under trial need not be presented to the clinics every day as it can be given orally at home and the drug was cost effective compared to its injectable counterparts. Doxycycline can fairly eliminate the infection provided treatment is given in the acute phase itself. The earlier the treatment , the more favourable is the prognosis (Price et al., 1987; Neer, 1998; Breitschwerdt, 2000).

Short-term prednisolone therapy in this study was helpful to suppress the exaggerated immune response which was

partially responsible for thrombocytopenia. It may also be helpful in in the treatment of other immune-mediated conditions related to ehrlichiosis such aspolyarthritis, vasculitis and meningitis (Neer, 1998). It may improve vascular integrity or platelet function by blocking dog's immune reaction to E. canis and help to relieve from secondary immune-mediated complications, characteristic of ehrlichiosis.(Codner et al., 1985; Ristic and Holland, 1993).

Significant haematological improvement to therapy was observed in the values of haemoglobin, PCV and RBC count after treatment. Similar finding in the acute phase of infection was reported by earlier workers (Parthasarathy et al., 1989; Neer, 1998). Mild thrombocytopenia observed in the infected dogs in this study was also relieved after therapy which conform to the findings of Ristic and Holland, (1993) and Neer (1998).

Serum profile, in the present study, revealed significant change in the values of total protein, albumin, globulin, A/G ratio, serum ALT, AP and creatinine after treatment that reflected apparent recovery from the abnormalities in laboratory findings. Price et al. (1987) viewed that acute kidney damage was more easily treated with tetracycline with a simultaneous regression of clinical signs whereas the same was unsuccessful for treating chronic kidney damage.

It was apparent from the above findings that, all the dogs under trial might have been presented during the acute phase of infection and that the treatment started in due time ensured complete recovery clinically as well as with respect to the data pertaining to the haematological and biochemical findings.

Summary

In the present study, thirteen dogs confirmed positive for ehrlichiosis based on detection of morula/ inclusions in the blood/buffycoat smears were subjected to the treatment trial with doxycycline and prednisolone for a duration of two weeks. All the animals responded well in terms of remission of clinical signs and improvement from abnormalities (haematological & biochemical) in laboratory findings, after a 14 day therapy.

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