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Therapeutic management of acute hepatic dysfunction due to canine ehrlichiosis

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Abstract
Infection with *Ehrlichia canis* is indicated by anaemia, an initial fever, anorexia, significant weight loss, black urine, hepatomegaly, and splenomegaly in canines. A 6-year-old golden retriever dog was presented with a history of fever, anorexia, dullness, reduced water intake, increased panting, lethargic behaviour which revealed pyrexia of 104 °F, swollen lymph nodes, tachycardia and tachypnoea on clinical exam. Blood smear examination revealed presence of morula of *E. Canis*. Heamatobiochemistry revealed anemia, thrombocytopenia increased ALT, ALP, AST and BUN parameters. Hepatomegaly was observed as radiographic finding. Therapeutic management was done with Tab. Doxycycline @ 5 mg/kg B.W. PO BID for 28 days and additionally Silymarin @ 2tsp BID PO and tab. Ursodeoxycholic acid @ 15 mg/kg PO OD as a therapy for hepatic damage. Blood smear tested negative for *Ehrlichia canis* 28 days post treatment.

Keywords: *Ehrlichia*, lymph nodes, hepatomegaly, thrombocytopenia, doxycycline

Introduction
Canine ehrlichiosis is a tick-borne infection which is mainly caused by *Ehrlichia canis*, a gram-negative intracellular bacterium that mainly infects monocytes, macrophages and neutrophils (Mylonakis and Theodorou, 2017) [9]. The infection is mainly transmitted by red dog tick known as *Riphihephlus sangueneus* (Dhavalagi *et al* 2021) [5]. The disease is often referred to as tropical canine fever and is endemic in countries like India (Mittal *et al*., 2017) [8] where it is most likely to occur in summer followed by rainy and winter season respectively (Kottadamane *et al*., 2017) [6]. Diagnosis of the infection can be done by the presence of morula in monocytes and lymphocytes during blood smear examination (Rahamin *et al.*, 2021) [11]. Other diagnostic tests include indirect fluorescence antibody test and enzyme linked sorbent assay. Moreover, indirect fluorescence antibody test in gold standard test for diagnosis of canine ehrlichiosis (Kottadamane *et al*., 2017) [6]. Ehrlichiosis in dogs progresses in three stages: Subacute acute and chronic manifesting a variety of clinical signs (Bhadesiya and Raval, 2015) [2]. In general, clinical symptoms includes anaemia, an initial fever, anorexia, significant weight loss, black urine, hepatomegaly, and splenomegaly (Barman *et al.*, 2015) [4]. Effective treatment of spontaneously occurring ehrlichiosis in dogs is based on a better understanding of the fundamental pathophysiology and changes in organ function. (Bhadesiya and Raval, 2015) [2]. The disease usually affects dogs but genotype of E. canis is also reported in humans (Bouza *et al.*, 2017) [3] thus making it an important disease.

Case presentation
A 6-year-old female golden retriever dog weighing about 32 kg was presented to Dr. I. P singh Teaching veterinary Clinical complex, college of veterinary and animal sciences, Pantnagar with a history of ticks, fever, anorexia, dullness, reduced water intake, increased panting, lethargic behaviour since 15 days. The dog was previously treated with amoxicillin, chlorpheniramine maleate (Avilin vet®) and NSAIDs but had not shown any improvement. Clinical examination revealed fever 104 ◦F, swollen prefemoral and submandibular lymph nodes, tachycardia (170bpm) tachypnoea (48/min). Blood samples were collected for blood smear examination and evaluation of hematobiochemical parameter.

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Blood smear examination revealed presence of morula of *E. canis.* Hematobiochemical examination demonstrated a lowered haemoglobin count, TEC, thrombocytopenia and increased level of alanine amino transferase (ALT), alkaline phosphatase (ALP), aspartate amino transferase (AST) and blood urea nitrogen (BUN). Radiological examination on lateral view manifested hepatomegaly. Based on above findings the dog was diagnosed with canine ehrlichiosis.

Table 1: Haemato-biochemical changes in blood parameter of dog both before and after treatment

Blood Parameter	Before Treatment	After Treatment	Reference Value
Haemoglobin (g/dl)	9.7	11.94	12-18
PCV (%)	29.8	39.64	37-55
TEC (10^6/µl)	4.98	7.42	5.5-8.8
TLC (10^3/µl)	14.62	12.25	6-17
Neutrophils (%)	68	62	60-76
Lymphocytes (%)	25	24	12-30
Eosinophils (%)	3	2	2-10
Monocytes (%)	2	2	3-10
Thrombocytes thou/mm3	128	286	200-500
Total bilirubin mg/dl	0.36	0.2	0-0.3
ALT U/L	176	79	10-109
AST U/L	75	46	9-49
ALP U/L	218	108	21-170
Total Protein g/dL	5.08	5.5	5.4-7.5
Albumin g/dL	1.6	2.8	2.3-3.1
Globulin g/dL	3.48	2.7	2.4-4.1
A: G	0.54	1.03	0.6-1.3
Creatinine mg/dl	1.5	1.1	0.5-1.7

Fig 1: Lateral radiograph indicating hepatomegaly

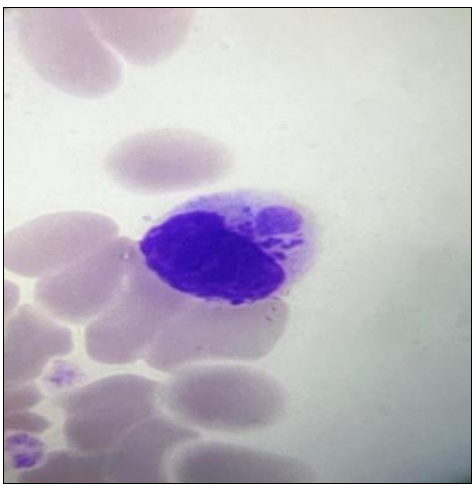

Fig 2: Morula of *Elhrichia canis* under microscope (1000X)

Treatment and Discussion

Treatment was started with Tab. Doxycycline @ 5 mg/kg body weight orally twice daily for 28 days. Additionally, syrup Sylimarin @ 2tsp orally twice daily and tablet Urosdeoxycholic acid @ 15 mg/kg orally daily were prescribed to revert the hepatic damage. Injection Meloxicam @ 0.2 mg/kg body weight intra muscularly daily for 2 days, infusion NSS @ 20 ml/kg body weight intravenously for 2 days, injection pantoprazole @ 1 mg/ kg body weight intravenously for 2 days were administered as supportives. Body temperature returned to normal on 3rd day of treatment and the dog showed eventful recovery following treatment. Hematobiochemical parameters were normal and blood smear was negative for *Ehrlichia canis* 28 days post treatment.

Discussion

Canine ehrlichiosis is a canine tick-borne infection that is prevalent all over the world. Clinical manifestations of acute infection of *Elrichia canis* include anorexia, fever, depression, lymphadenopathy, depression and loss of body weight (Kasondra *et al.,* 2017) [7]. Similar clinical manifestations were observed in this study. Decreased Hb and TEC levels might be due to petechial haemorrhages or bone marrow hypoplasia because of parasites that result in diminished generation of blood cellular components (Rao *et al.,* 2022) [12]. Thrombocytopaenia is hallmark of infection and might be related to a drop-in platelet circulating half-life, platelet inefficiency, generation of anti-platelet antibodies, and an increase in platelet destruction (Roopali *et al.,* 2018) [15]. Main clinical manifestation of acute canine ehrlichiosis includes symptomatic hepatitis (Mylanokis *et al*., 2010) [10]. Increase in liver enzymes such as ALT, AST and ALP might be due to damage to liver membrane due to infiltration of mononuclear cells (Bai *et al*., 2017) [1]. Decrease in total protein and albumin might be due to decreased production of protein as a result of hepatic damage or glomerulonephritis or might due to loss of plasma protein due to vasculitis caused by *Elhrichia canis* (Singh *et al.,* 2021) [17]. Increased blood urea nitrogen might be due to affection of kidney due to glomerulonephritis due to infection (Silva *et al.,* 2016) [18]. Similar Hematobiochemical findings were observed by Rao *et al*., 2022_a [13]; Roopali *et al,* 2018 [15]. Doxycycline is often regarded as medicine of choice for *Ehrlichia canis* infection in dogs. (Sharma *et al*., 2015) [16]. Tetracycline hydrochloride, oxytetracycline, minocycline, imidocarb chloramphenicol are some other medicines with recognised effectiveness against E. canis (Rao *et al*., 2022) [12]. This case study suggests that doxycycline has a satisfactory response in canine ehrlichiosis which was in accordance with Reddy *et al.,* (2015) [14].

Conclusion

The treatment regimen consisting of Doxycycline, Sylimarin and Urosdeoxycholic acid along with supportive therapy proved to be effective in managing the hepatic manifestations of canine ehrlichiosis. The study highlights the importance of timely and appropriate therapeutic interventions in mitigating the impact of this tick-borne infection on dog's health. Furthermore, doxycycline demonstrated its efficacy as a preferred treatment option for *Ehrlichia canis* infection, validating previous research in this field.

References

1. Bai L, Goel P, Jhambh R, Kumar P, Joshi VG. Molecular prevalence and haemato-biochemical profile of canine monocytic ehrlichiosis in dogs in and around Hisar,

Haryana, India. J Parasit Dis. 2017;41(3):647-654. https://doi.org/10.1007/s12639-016-0860-8
2. Bhadesiya CM, Raval SK. Hematobiochemical changes in ehrlichiosis in dogs of Anand region, Gujarat. Vet World. 2015;8(6):713-717. https://doi.org/10.14202/vetworld.2015.713-717
3. Bouza Mora L, Dolz G, Morales SA, Zuñiga RJJ, Sánchez SL, Labruna MB, *et al.* Novel genotype of Ehrlichia canis detected in samples of human blood bank donors in Costa Rica. Ticks Tick-borne Dis. 2017;8(1): 36-40. https://doi.org/10.1016/j.ttbdis.2016.09.012
4. Barman D, Baishya BC, Sarma D, Phukan A, Dutta TC. A case report of *canine ehrlichia* infection in a Labrador dog and its therapeutic management. Bangladesh J Vet Med. 2014;12(2):237-239. https://doi.org/10.3329/bjvm.v12i2.21298
5. Dhavalagi P, Kumar MA, Ramesh PT, Kalmath GP. Epidemiological pattern of canine ehrlichiosis in and around Bangalore. J Entomol Zool Stud. 2021;9(1):1270-1274.
6. Kottadamane MR, Dhaliwal PS, Singla LD, Bansal BK, Uppal SK. Clinical and Hematobiochemical response in canine monocytic ehrlichiosis seropositive dogs of Punjab. Vet World. 2017;10(2):255-261. https://doi.org/10.14202/vetworld.2017.255-261
7. Kasondra A, Gupta S, Bhai GABB, Saini VK. Therapeutic management of canine ehrlichiosis with aid of blood transfusion: A case report. J Parasit Dis. 2017;41(2):395-397. https://doi.org/10.1007/s12639-016-0813-2
8. Mittal M, Kundu K, Chakravarti S, Mohapatra JK, Nehra K, Sinha VK, *et al*. Canine monocytic ehrlichiosis among working dogs of organised kennels in India: A comprehensive analyses of clinico-pathology, serological and molecular epidemiological approach. Prev Vet Med. 2017;147:26-33. https://doi.org/10.1016/j.prevetmed.2017.08.012
9. Mylonakis ME, Theodorou KN. Canine monocytic ehrlichiosis: An update on diagnosis and treatment. Acta Vet. 2017;67(3):299-317. https://doi.org/10.1515/acve-2017-0025
10. Mylonakis ME, Konstantinou KM, Dumler JS, Diniz PPVP, Day MJ, Siarkou VI, *et al*. Severe hepatitis associated with acute *Ehrlichia canis* infection in a dog. J Vet Intern Med. 2010;24(3):633-638. DOI: 10.1111/j.1939-1676.2010.0501.x
11. Rahamim M, Harrus S, Biala NY, Baneth G, Aroch I. *Ehrlichia canis* morulae in peripheral blood lymphocytes of two naturally-infected puppies in Israel. Vet Parasitol Reg Stud Reports. 2021;24:100554.
12. Rao LN, Shobhamani B, Rao VV, Subramanyam KV. Clinico-Hematobiochemical alterations in dogs infected with canine monocytic ehrlichiosis. Haryana Vet. 2022;59(1):116-119.
13. Rao LN, Shobhamani B, Rao VV, Subramanyam KV. Comparative efficacy of doxycycline and imidocarb diprionate in the treatment of ehrlichiosis in dogs. Pharma Innov J. 2022;SP-11(4):1304-1309.
14. Reddy KB, Rao VV, Lakshmi JJ. Therapeutic Management of Canine Ehrlichiosis: A Case Report. Intas Polivet. 2015;16(2):353-354.
15. Roopali B, Vivek R Kasaralikar, NA Patil, Ravindra BG, Sandeep H, Dilipkumar D. Clinico, haemato-biochemical changes and therapeutic management of canine ehrlichiosis. Pharma Innov J. 2018;7(9):01-06.
16. Sharma DK, Gupta VK, Bansal S, Joshi V, Mandal RSK, Singh M, Bhanuprakash AG. Therapeutic efficacy of doxycycline with whole blood transfusion in management of thrombocytopenic ehrlichiosis in canines. Int J Adv Res. 2015;3(7):353-357.
17. Singh J, Singh R, Singh H, Gupta D, Randhawa S. Clinical and haemato-biochemical observations in dogs naturally infected with canine monocytic ehrlichiosis. Explor Anim Med Res. 2021;11(2):214-219. https://doi.org/10.52635/eamr/11.2.214-219
18. Silva L, Pinho F, Prianti M, Braga JF, Pires LV, França SA, Silva SM. Renal histopathological changes in dogs naturally infected with *Ehrlichia canis*. Braz J Vet Pathol. 2016;9(1):2-15.

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