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Case Report

Vestibular Signs in a Siberian Husky Dog with Chronic *Ehrlichia canis* Infection - A Case Report

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Abstract

Canine monocytotropic ehrlichiosis (CME), caused by Ehrlichia canis, is a significant tick-borne disease among canines, particularly in the tropical regions and urban areas of India. CME affected dog with neurologic signs and Evans' syndrome is a rare finding. A two-year-old intact Siberian Husky female presented with a history of epistaxis, head tilt, pyrexia, and anorexia for the past two days. Clinical examination revealed pale conjunctival mucous membrane, bleeding tendencies, splenomegaly, nystagmus and vestibular ataxia. A haemogram showed pancytopenia, while smear examination revealed spherocytes. Further confirmation was obtained through flow cytometry, which revealed 22.64% of anti IgG antibodies against RBC and 27.51% to platelets, confirming Evans syndrome. Bone marrow aspiration and cytology showed a myeloid to erythroid ratio of 3:1, with erythroid hypoplasia. Polymerase chain reaction confirmed the presence of E. canis 16 sRNA in blood, bone marrow, and cerebrospinal fluid. The vestibular ataxia with head tilt and nystagmus might be attributed to meningoencephalitis or ischemic brain infarction in Evan's syndrome cases. The animal was treated with doxycycline, prednisolone, and meclizine for over a month, and an uneventful recovery was observed. In conclusion, this case of Ehrlichiosis in a dog presented with vestibular signs and Evans syndrome, responding well to doxycycline, prednisolone, and meclizine therapy.

Keywords: Ehrlichiosis, Evans' s Syndrome, Vestibular Lesion, Meclizine.

Introduction

Ehrlichia canis is acknowledged as the primary cause of canine monocytic ehrlichiosis (CME) (*Sainz et al. 2015)*. This disease is prevalent in every continent except Australia (*Harrus and Waner 2011)*. The brown dog tick, Rhipicephalus sanguineus, serves as the primary vector for transmitting *E. canis* bacteria, both transovarial and intrastadially (*Bremer et al. 2005)*. Rhipicephalus is the predominant tick species in urban India (Rani et al. 2011). Experimental *E. canis* infections have been associated with the detection of platelet-bound antibodies (Waner et al. 2000). The occurrence of Evans' syndrome, a combination of immune-mediated thrombocytopenia and anemia, is low in dogs (0.01%) (Saberi et al. 2012). Dogs with cerebral Ehrlichiosis may exhibit progressive brain lesions leading to vestibular and cerebellar ataxia (*Kaewmongkol et al. 2016)*.

Case History and Description

A two-year-old female Siberian Husky was presented to the Madras Veterinary College Teaching Hospital with a history of dullness, left side unilateral epistaxis, left-sided head tilt, horizontal nystagmus, and ataxia over the past two days. The animal had a recurrent history of tick infestation, and an episode of anemic and thrombocytopenic crisis was reported four months ago, for which it had received symptomatic treatment and recovered.

Results and Outcome

General clinical examination, the dog appeared dull and depressed, with pale mucous membranes, peripheral lymphadenopathy, an elevated rectal temperature (104.9 °F), heart rate (132 beats/minute), and respiratory rate (38 breaths/minute). Physical examination revealed mild abdominal distension due to splenomegaly, left-sided head tilt, nystagmus, vestibular ataxia and petechial and ecchymotic hemorrhages on the ventral abdomen. Ticks were also observed on the body. Following clinical examination, the animal underwent peripheral blood smear analysis for blood protozoal infection, and EDTA blood was collected for a complete blood count (CBC). The sample was analyzed using automated hematology analyzers, revealing pancytopenia (Table 1). While no blood parasites were observed in the peripheral blood smear, spherocytosis was the predominant finding. Given the history of intermittent tick infestation, anemia, and recurrent thrombocytopenic crises, EDTA blood and cerebrospinal fluid was submitted for molecular testing to diagnose blood parasite infections (Babesiosis, Ehrlichiosis, Trypanosomiasis, and Hepatozoonosis). Considering the drastic drop in hematocrit and platelet levels, flow cytometric analysis was conducted to diagnose immune-mediated anemia and thrombocytopenia, detecting anti-platelet and anti-red blood cell antibodies and/or confirming Evans syndrome (IMHA and IMTP. Significant increase in the anti-erythrocytic antibodies and anti-platelet antibodies (Table 2) confirmed Evans's syndrome in this case. *Ehrlichia canis* was identified at 817 bp through PCR analysis of the 16S rRNA gene. Bone marrow aspiration was performed in femur as per standard procedure, revealing a hypoplastic bone marrow with less than 25 percent of hematopoietic space occupied by precursor cells and a myeloid to erythroid ratio of 3:1, indicating erythroid hypoplasia. Neurological examination showed left head tilt and vestibular ataxia. Routine cerebrospinal fluid (CSF) analysis revealed no significant changes, although CSF fluid was positive for *E. canis* at 817 bp. The case was ultimately confirmed as *Ehrlichia canis* infection with associated vestibular lesions and Evans syndrome.

Table 1: Changes of blood values in *Ehrlichia canis* infected dog with IMHA and IMTP

Parameters	DAY 0	DAY 5	DAY 14	DAY 28
Hb (g/dl)	6.2	6.8	8.1	12.6
PCV (%)	18.2	21.4	26.2	36.7
RBC ($\times 10^6$/µL)	2.57	3.02	3.8	5.21
WBC ($\times 10^3$/µL)	5100	5800	7200	11500
PT($\times 10^4$/µL)	36000	80000	174000	274000

The treatment regimen commenced with Inj. Doxycycline at a dosage of 10mg/kg IV and Inj. Prednisolone at 2mg/kg IM for the initial five days. Subsequently, the treatment continued with Tab. Doxycycline at 10mg/kg SID PO for 25 days and Tab. Prednisolone initiated at 2mg/kg PO for 30 days, followed by a tapering schedule of 1mg/kg PO for 15 days and then on alternate days. Additionally, Tab. Meclizine at 1mg/kg PO was administered for a month

until the reduction of vestibular signs. Supportive medications included iron supplementation (Syp. aRBC, Vetoquinal, India) at 5 ml SID PO and syrup. H-thromb at 5 ml BID PO for 30 days. Hematological alterations were monitored before and after therapy (Table 1). An uneventful recovery was observed after 28 days of therapy. Clinical improvements, such as increased alertness, appetite, neurologic improvements, and elevated hematology values, were also noted. The case was followed upto 6 months during post recovery period.

Table 2: Flow Cytometry values in *Ehrlichia canis* infected *dog* with IMHA and IMTP

Parameter	IgG level (%)
IMHA	22.64
IMTP	27.51

Discussion

Ehrlichia canis, a tick-borne *pathogen* primarily transmitted by *Rhipicephalus sanguineus*, is responsible for canine monocytic ehrlichiosis (CME), a disease with multisystemic involvement leading to hematologic abnormalities and various sequelae, including respiratory, ocular, or neurologic manifestations (Harrus et al., 1997). The main etiology for tropical pancytopenia was *E. canis* (Kottadamane et al., 2017). Coagulation disorders, mainly due to severe thrombocytopenia and platelet dysfunction, are prominent signs of *E. canis* infection. Common clinical signs of ehrlichiosis include anorexia, fever, depression, lethargy, pale mucosae, splenomegaly, poor body condition, and thrombocytopenia9 (Taboada and Lobetti 2006). The clinical signs exhibited in your case are consistent with other reports. Ehrlichial meningoencephalitis can result from plasma cell infiltration of the meninges or hemorrhage in cerebral or spinal cord parenchyma (Baba *et al.* 2012). Reports from Japan (Baba *et al.* 2012) and Thailand *(*Kaewmongkol *et al.* 2016) have documented *E. canis* antigens in the cerebrospinal fluid of dogs with ataxia. In our case, the vestibular ataxia, along with head tilt and nystagmus, could be attributed to similar causes, such as meningoencephalitis or ischemic brain infarction in cases of Evans' syndrome.

Fig 1. Epistaxis in the affected dog

Fig 2. Left side head tilt

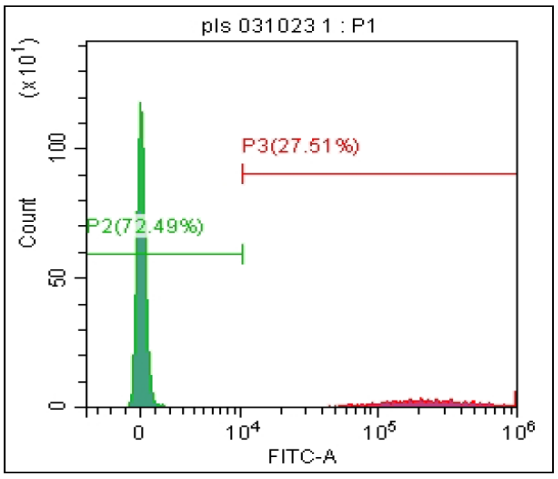

Fig 3. Flowcytometry for Platelets

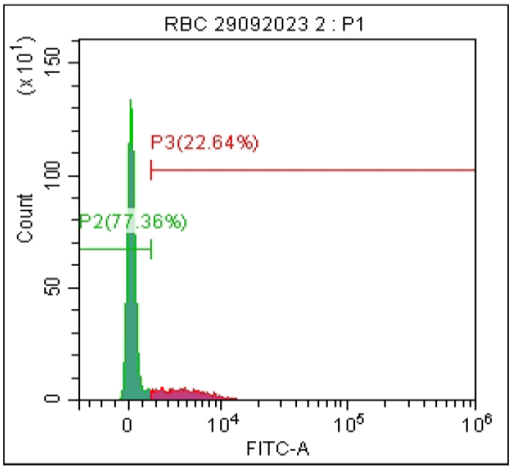

Fig 4. Flowcytometry for RBC

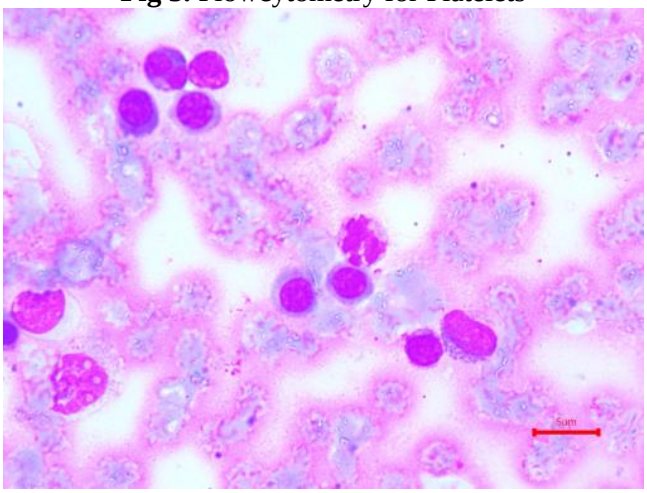

Fig 5 Bone marrow cytology- Erythroid hypoplasia

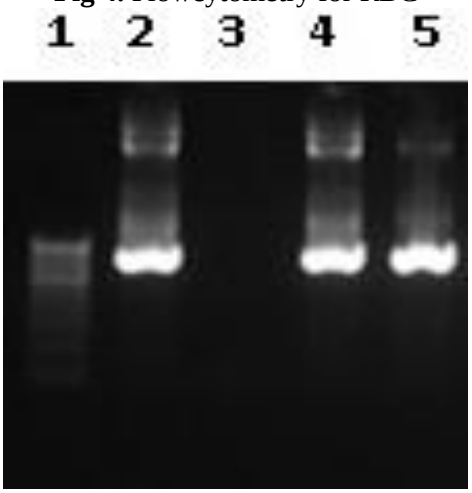

Fig 6 Amplified PCR Product size- 817 bp

Dogs with Evans' syndrome may succumb to ischemic brain infarction (Giannuzzi et al., 2014), which could be another contributing factor. The 16S rRNA nested PCR assay is a highly specific and sensitive test for confirming *E. canis* infection in dogs *(*Wen *et al.* 1997). It can even detect the presence of Ehrlichia after specific antibiotic therapy (Lakshmanan *et al.* 2007). Flow cytometry is considered a more rapid, cost-effective, and sensitive method for determining erythrocyte-bound immunoglobulins (Quigley *et al.* 2001) and platelet-bound immunoglobulins (Kaewmongkol *et al.* 2016). Evans syndrome in dogs has been documented in previous studies (Gogg *et al.* 2008; Giannuzzi *et al.* 2014). The presence of antiplatelet antibodies in *E. canis* infections (*Waner et al. 2000)* and anti-erythrocytic antibodies in parasitic infections has also been reported (De Tommasi *et al.* 2014). Shaw *et al.* (2001) reported that an increasing range of infectious agents like Babesia, *Ehrlichia canis* and other rickettsiales known to trigger secondary immune mediated anemia in the dog or induction of polysystemic immunemediated disease. The Evans' syndrome in our case might be due to secondary to *E. canis* infection. Many of these are arthropod-borne microparasites. Doxycycline is very effective for the elimination of *Ehrlichia canis* from the host (Ranjithkumar *et al.* 2023), and in the present case, Doxycycline at a dose of 10 mg/kg IV or PO showed better recovery. Prednisolone, a potent immunosuppressive drug, is known to reduce phagocytosis of RBCs, decrease the production of cytokines, and the production of immunoglobulin IgG. It is commonly used in autoimmune disorders like immune-mediated hemolytic anemia (IMHA) and immune-mediated thrombocytopenia (IMTP) in dogs (Swann *et al.* 2019). Meclizine, an antihistamine, inhibits the stimulation of the vestibular system of the brain (Garosi *et al.* 2012). In conclusion, the dog in this case, affected by Ehrlichiosis, exhibited vestibular signs along with Evan's syndrome, and the treatment with doxycycline, prednisolone, and meclizine proved to be effective in achieving recovery.

Contribution by Authors

Each co-author contributes equally.

Conflict of Interests

There is no conflict of interest.

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References

1. Baba, K., Itamoto, K. and Amimoto, A. (2012). *Ehrlichia canis* infection in two dogs that emigrated from endemic areas. *Journal of Veterinary Medical Science,* 74, 775–778
2. Bremer, W.G., Schaefer, J.J., Wagner, E.R., Ewing, S.A., Rikihisa, Y., Needham, G.R., Jittapalapong, S., Moore, D.L. and Stich, R.W. (2005). Transstadial and intrastadial experimental transmission of *Ehrlichia canis* by male Rhipicephalus sanguineus. *Veterinary Parasitology,* 131, 95–105.
3. De Tommasi, A.S., Otranto, D., Furlanello, T., Tasca, S., Cantacessi, C., Breitschwerdt, E.B., Stanneck, D., Dantas-Torres, F., Baneth, G., Capelli, G. and de Caprariis, D. (2014). Evaluation of blood and bone marrow in selected canine vector-borne diseases. *Parasites & Vectors,* 7, 534.
4. Garosi, L.S., Lowrie, M.L. and Swinbourne, N.F. (2012). Neurological Manifestations of Ear Disease in Dogs and Cats. *Veterinary Clinics of North America: Small Animal Practice,* 42, 1143–1160
5. Giannuzzi, A.P., De Simone, A., Ricciardi, M. and Gernone, F. (2014). Presumptive Ischemic Brain Infarction in a Dog with Evans' Syndrome. *Case Report in Veterinary Medicine,* 2014, 1-8.
6. Goggs, R., Boag, A.K. and Chan, D.L. (2008). Concurrent immune-mediated haemolytic anaemia and severe thrombocytopenia in 21 dogs. Veterinary Record, 163(11), 323–327.
7. Harrus, S., Kass, P.H., Klement, E. and Waner, T. (1997). Canine monocytic ehrlichiosis: A retrospective study of 100 cases, and an epidemiological investigation of prognostic indicators for the disease. *Veterinary Record,* 141, 360–363
8. Harrus, S. and Waner, T, (2011). Diagnosis of canine monocytotropic ehrlichiosis (Ehrlichia canis): An overview. *The Veterinary Journal,* 187, 292–296
9. Kaewmongkol, G., Maneesaay, P., Suwanna, N., Tiraphut, B., Krajarngjang, T., Chouybumrung, A., Kaewmongkol, S., Sirinarumitr, T., Jittapalapong, S. and Fenwick, S.G. (2016). First detection of *Ehrlichia canis* in cerebrospinal fluid from a nonthrombocytopenic dog with meningoencephalitis by broad-range PCR. *Journal of Veterinary Internal Medicine,* 30(1), 255-227.
10. Kottadamane, M.R., Dhaliwal, P.S., Singla, L.D., Bansal, B.K. and Uppal, S.K. (2017). Clinical and hematobiochemical response in canine monocytic ehrlichiosis seropositive dogs of Punjab, *The Veterinary World,* 10(2), 255-261.
11. Lakshmanan, B., John, J., Gomathinayagam, S. and Dhinakarraj, G. (2007). Molecular detection of *Ehrlichia canis* from blood of naturally infected dogs in India. *Veterinary Arhiv,* 77 (4), 307-312
12. Quigley, K.A., Chelack, B.J., Haines, D.M. and Jackson, M.L. (2001). Application of a direct flow cytometric erythrocyte immunofluorescence assay in dogs with immune-mediated hemolytic anemia and comparison to the direct antiglobulin test. *Journal of Veterinary Diagnostic Investigation,* 13(4), 297–300.
13. Rani, P.A.M.A., Irwin, P.J., Coleman, G.T., Gatne, M. and Traub, R.J. (2011). A survey of canine tick-borne diseases in India. *Parasites & Vectors,* 4, 141-149.
14. Ranjithkumar, M., Elamurugan, A., Arvind, V., Vijayakumar, H., Pothiappan, P., Pazhanivel, N. and Kavitha, A. (2023). Efficacy of injectable doxycycline in natural cases of canine monocytic ehrlichiosis. *International Journal of Veterinary Science & Animal Husbandry,* 8(6), 14-20.
15. Saberi, M., Akhtardanesh, B. and Mohebbi, E. (2012). Treatment of Evan's syndrome by leflunomide and desmopressin in a mixed-breed dog. *Compendium of Clinical Pathology,* 21, 485–488
16. Sainz, A., Roura, X., Miro, G., Estrada-Pena, A., Kohn, B., Harrus, S. and Solano-Gallego, L. (2015). Guideline for veterinary practitioners on canine ehrlichiosis and anaplasmosis in Europe. *Parasites & Vectors,* 8, 75 -81.
17. Shaw, S.E., Day, M.J., Birtles, R.J. and Breitschwerdt, E.B. (2001). Tick-borne infectious diseases of dogs. *Trends in Parasitology,*17(2), 74-80.
18. Swann, J.W., Garden, O.A., Fellman, C.L., Glanemann, B., Goggs, R., LeVine, D.N., Mackin, A.J. and Whitley, N.T. (2019). ACVIM consensus statement on the treatment of immune-mediated hemolytic anemia in dogs. *Journal of Veterinary Internal Medicine*, 33, 1141–1172.

19. Sykes, J.E. (2014). Ehrlichiosis, Canine and Feline Infectious Diseases. First edn., Elsevier Saunders, St. Louis, Missouri, USA, PP. 278–289.
20. Taboada, J. and Lobetti, R. (2006). Babesiosis, In: Greene C. ed. Infectious Diseases of the Dog and Cat, 3rd edn. St Louis: WB Saunders Co. PP. 722–735.
21. Thirumalapura, N.R., Crossley, E.C. and Walker, D.H. (2009). Persistent infection contributes to heterologous protective immunity against fatal ehrlichiosis. *Infection & Immumology,* 77, 5682–568
22. Waner, T., Leykin, I., Shinitsky, M., Sharabani, E., Buch, H., Keysary, A., Bark, H. and Harrus, S. (2000). Detection of platelet-bound antibodies in beagle dogs after artificial infection with Ehrlichia canis. *Veterinary Immunology & Immunopathology,* 77(1-2), 145-50.
23. Wen, B., Rikihisa, Y., Mott, J.M,, Greene, R., Kim, H.Y., Zhi, N., Couto, G.C., Unver, A. and Bartsch, R. (1997). Comparison of nested PCR with immunofluorescent-antibody assay for detection of *Ehrlichia canis* infection in dogs treated with doxycycline. *Journal of Clinical Microbiology,* 35, 1852–1855

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