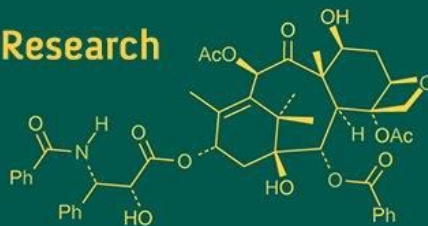


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Non-oliguric acute kidney injury with haemorrhagic signs in a dog with canine distemper and concurrent anaplasmosis

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Abstract

Canine distemper is a highly contagious viral disease of dogs that causes multisystemic infection and severe immunosuppression, often predisposing affected animals to secondary opportunistic infections. The present case report describes a non-oliguric acute kidney injury associated with haemorrhagic manifestations in a two-year-old unvaccinated male non-descript dog diagnosed with concurrent canine distemper and anaplasmosis. The animal was presented with clinical signs including tick infestation, pyrexia, vomiting, diarrhoea, serous ocular and nasal discharge, melena, hyperkeratosis of nasal planum and foot pads, and ecchymotic haemorrhages over various body regions. Serological testing using an immunochromatographic assay confirmed infection with *Anaplasma* spp., while clinical findings were suggestive of systemic canine distemper. Haemato-biochemical analysis revealed leukopenia, lymphopenia, thrombocytopenia, hypocalcaemia and elevated phosphorus levels initially, followed by marked increases in blood urea nitrogen, creatinine and liver enzymes indicating acute renal involvement. The dog was treated with doxycycline, supportive fluid therapy, antihistamines, diuretics and immunosuppressive therapy, along with oral supplements. Progressive clinical improvement was observed, and the animal recovered completely by day 18 post-treatment. This case highlights the importance of early screening for vector-borne infections in dogs with immunosuppressive viral diseases such as canine distemper, as coinfections may worsen clinical outcomes and complicate diagnosis and management.

Keywords: Canine distemper, anaplasmosis, acute kidney injury, coinfection, thrombocytopenia, haemorrhagic manifestations, dog

Introduction

Canine distemper is a globally distributed, highly contagious viral disease caused by canine distemper virus (CDV), belonging to the genus Morbillivirus. The infection produces multisystemic illness affecting the respiratory, gastrointestinal and nervous systems. CDV-induced immunosuppression, mediated through lymphoid depletion and impairment of cell-mediated immunity, predisposes affected dogs to secondary opportunistic infections (Beineke *et al.*, 2019; Rendon-Marin *et al.*, 2021) [2, 11].

Anaplasmosis in dogs is primarily caused by *Anaplasma platys* transmitted by ixodid ticks. The *A. platys* specifically infects platelets and is associated with infectious cyclic thrombocytopenia, which may manifest clinically as petechiae, ecchymoses and bleeding tendencies (Dumler *et al.*, 2021; Kohn *et al.*, 2023) [4, 6]. Currently, tick-borne coinfections are increasingly recognized in tropical regions due to high vector burden.

Viral immunosuppression may enhance susceptibility to other bacterial and parasitic infections, leading to a fatal outcome. However, reports describing hemorrhagic manifestations due to *Anaplasma* infection and co-infection with CDV remain limited in the literature. The present report describes a case of acute kidney injury with bleeding signs in a non-descript dog with canine distemper and co-infection with anaplasmosis. This case underscores the importance of early screening for subclinical vector-borne infections in immunosuppressive distemper-cases and need for specific treatment.

Case History and Observations

An unvaccinated male non-descript dog of two year old was presented to the Teaching Veterinary Hospital, Veterinary College and Research Institute, Namakkal, with signs of tick infestation, hyporexia, pyrexia, congested conjunctival mucosae, enlarged popliteal lymphnode, vomiting, diarrhoea, serous ocular and nasal discharge, sunken eyeball, melena and hyperkeratosis of nasal planum and foot pads. The clinical signs were suggestive of systemic form of canine distemper. Ecchymoses were observed on ventral abdomen, inguinal region, inner thigh, periorbital region and scrotal sac (Figure 1a, 1b and 1c). The serum sample was subjected to sandwich lateral flow assay based immunochromatography test (Pet X®, J & B Biotech Ltd, UK) to detect antibodies to *Anaplasma* spp. and the test proved positive (Figure 2). Faecal examination revealed no helminthic egg or ova and peripheral blood smear examination performed to rule out the blood parasites that may cause bleeding signs such as Ehrlichia, Babesia or Anaplasma, proved negative.

Whole blood and serum samples were collected for haemato-biochemical analysis (Table 1). On day-1 before treatment, a reduction in WBC, platelets, lymphocyte count and calcium level with an increase in phosphorus level was observed. On day-4 post treatment, hematological analysis revealed an increase in packed cell volume (PCV) and lymphocyte count. Whereas, serum biochemical analysis revealed an increase in alanine aminotransferase (ALT), blood urea nitrogen (BUN), creatinine, bilirubin (direct and indirect) and phosphorus levels, with a reduction in calcium level. On day-11 post treatment, a reduction platelet count and an increase in BUN, creatinine and phosphorus levels was observed.

Treatment and Discussion

The case was administered with doxycycline @ 10 mg/kg b.wt., IV, once daily to treat anaplasmosis, dextrose normal saline @ 10 mL/kg b.wt., IV, chlorpheniramine maleate @ 0.5 g/kg bwt and furosemide as diuretic @ 2 mg/kg bwt, IV for 7 days. Prednisolone @ 1.0 mg/kg was administered as an immunosuppressant for 3 days to treat the thrombocytopenia. The case was then treated with oral doxycycline @ 10.0 mg/kg, once daily for 21 days. Oral supplements such as hepatic stimulant (Tefrolipet®), neurine stimulant (Neurobind®) and renal probiotics (Renodis®) were recommended until the hepatic and renal parameters return to normal range. On day- 5 post treatment, the bleeding signs start to subside (Figure 3a and 3b).

The clinical signs observed on day-1 were similar to the findings stated by Greene (2012) [5]. Although, myoclonus is one of the most common clinical manifestations, 50% of the infected dogs were not known to show this clinical sign (Menezes *et al.*, 2023) [9]. The antibody based test detected the infection by *Anaplasma* spp. though microscopic examination of Giemsa stained blood smears mostly fails to detect the inclusion bodies inside the platelets, owing to the low level of parasitaemia (Lima *et al.*, 2010) [8].

Lymphopenia and the resultant leukopenia observed on day-1 before treatment could be associated with the infection of lymphoid tissues caused by the CDV (Palomino, *et al.*, 2022) [10]. The thrombocytopenia could be due to direct destruction of platelets and also the immune mediated thrombopathy caused by the intracellular bacterium, *Anaplasma platys* (Dyachenko *et al.*, 2012) [3]. The changes in calcium and phosphorus levels, without any changes in renal markers, may be indicative of an early stage of

azotemia. The normal platelet count observed on day-4 post treatment could be due to the specific treatment initiated or associated with the cyclic pattern of the *A. platys*, with alternating periods of thrombocytopenia corresponding to waves of parasitaemia. The haemorrhagic signs such as melena and ecchymotic haemorrhages observed in this study were similar to the findings observed by Venugopal *et al.* (2025) [13]. Recurrence of thrombocytopenia observed on day-11 might be due to the recrudescence of the *A. platys* owing to its cyclical pattern (Atif *et al.*, 2021) [11].

Renal azotemia could be due to the interstitial nephritis and acute tubular necrosis caused by deposition of IgM complex in CDV infections (Silva *et al.*, 2022) [12]. The elevated liver enzymes and total bilirubin levels were similar to the findings of Kumar and Sirisha (2025) [7] in CDV infections. However, on day-18 post treatment, the case recovered completely with the absence of bleeding signs and all the haemato-biochemical values were within normal range.

In conclusion, dogs affected with the immunosuppressive canine distemper could become vulnerable to the inapparent or subclinical vector borne infections such as anaplasmosis and such a complication might lead to a fatal outcome with poor prognosis. Hence an early detection of anaplasmosis by an antibody based test owing to the poor sensitivity of microscopy and specific treatment would help preventing fatal complications.

Table 1: Haemato-biochemical changes in a non-descript dog affected with canine distemper and anaplasmosis

Haemato-biochemical parameters	Values			Reference values
	Day-1	Day-4	Day-11	
Hb (g/dL)	15.1	13.9	17.9	11.9-18.9
PCV (%)	54.2	59.7	53.1	35-57
RBC ($\times 10^6/\mu\text{L}$)	7.81	8.1	7.98	4.9-7.8
WBC ($\times 10^3/\mu\text{L}$)	5.63	11.95	12.83	5.0-14.1
Platelet ($\times 10^3/\mu\text{L}$)	200	250	178	211-621
Neutrophils (%)	86.0	54.0	75	58-85
Lymphocytes (%)	11.0	40.0	17	8-21
Monocytes (%)	3.0	6.0	08	2-10
Eosinophils (%)	0.0	0.0	0.0	0-9
Total protein (g/dL)	6.6	6.6	7.4	5.4-7.5
Albumin (g/dL)	3.6	3.4	3.8	2.3-3.1
Globulin (g/dL)	3.0	3.2	3.6	2.7-4.4
ALT (U/L)	81	122	72	10-109
BUN (mg/dL)	12	110.0	121	8-28
Creatinine (mg/dL)	0.9	9.0	6.2	0.5-1.7
Calcium (mg/dL)	8.4	9.0	9.8	9.1-11.7
Phosphorous (mg/dL)	5.6	20.9	11.2	2.9-5.3
Glucose (mg/dL)	119	116.0	97	76-119
Bilirubin (mg/dL)	0.8	0.9	0.8	0.1-0.6
Direct (mg/dL)	0.3	0.3	0.3	0.0-0.2
Indirect (mg/dL)	0.5	0.6	0.5	0.0-0.4



Fig 1: Nasal hyperkeratosis and ecchymotic haemorrhages observed before treatment on (a) ventral abdomen, (b) Periorbital region and (c) scrotal sac in a non-descript dog



Fig 2: Lateral flow assay based immunochromatography test showing positivity for anaplasmosis in a non-descript dog



Fig 3: Absence of ecchymotic haemorrhages post treatment in the affected non-descript dog

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Conflict of Interests: None

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