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Case Report: Therapeutic Management of *Anaplasma* spp. Infection in A Dog from Fiji Island

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Abstract

Anaplasmosis is an emerging tick-borne zoonotic pathogen in dogs and humans that has recently gained attention in parasitology and microbiology study groups worldwide. This infection has been reported in regions worldwide. There are no reported cases of exposure to *Anaplasma* spp. canine or human patients in the Fiji Islands. This is the first reported case of canine *Anaplasma* spp. infectious canine cyclic thrombocytopenia in the Fiji Islands. Canine patients were presented to Pacific Animal Shelter and Hospital (PASH) in the Fiji Islands were screened for *Anaplasma* spp. antibodies using a commercial kit based on an enzyme-linked immune assay. *Anaplasma* spp. infection was diagnosed based on major clinical data, hematological findings and positive serology tests. The case was diagnosed as canine *Anaplasmosis* and was successfully treated with Doxycycline and other supportive treatments.

Keywords

Anaplasma spp., Canine Vector Borne Disease (CVBD), Fiji Islands

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Introduction

Anaplasmosis is a tick-borne disease in dogs and a potentially significant zoonotic pathogen in humans, as reported by several studies conducted by researchers around the world (Sainz *et al*., 2015; Carvalho *et al*., 2017; Khatat *et al*., 2017; Khatat *et al*., 2022). *Anaplasma* spp. are usually identified as obligate intracellular Gram-negative rickettsial-type bacteria that affect the host's neutrophils and/or platelets (Atif *et al.,* 2021; Facile *et al.,* 2024). The main vectors of this infection are ticks, including *Rhipicephalus sanguineus* and *Ixodes scapularis.* Their distribution worldwide is due to favorable climate conditions (Arun et al., 2017; Springer et al., 2019; Balmori-de la Puente *et al*., 2024; Fan, 2024). *Anaplasma platys* in dogs was first reported in the United States of America in 1978, it is now reported globally (Arun *et al.,* 2017). Commonly, two types of *Anaplasma* spp. are reported worldwide in humans and dogs. *Anaplasma phagocytophilum* is an infective agent of human and dog neutrophils, causing canine/ human granulocytic anaplasmosis, while *Anaplasma platys,* formally known as *Ehrlichia platys,* is a platelet-specific pathogen that leads to canine infectious cyclic thrombocytopenia (Atif *et al.,* 2021; López-Valencia *et al*., 2024; Das *et al*., 2024).

Anaplasma spp. infection in dogs and humans is challenging in a clinical setting due to its non-specific clinical manifestations, which range from subclinical to mild and severe pathological changes. Changes include anorexia, fever, depression, pale mucous membranes, generalized lymphadenopathy, nasal discharge, and some ocular and neurological symptoms (Ahmed *et al*., 2021; Atif *et al.,* 2021; Wijeratne and Perera, 2022; López-Valencia *et al.,* 2024). *Anaplasma* spp. can be diagnosed microscopically and serologically in a laboratory setting, and treated with tetracycline, which is more effective against *Anaplasma* spp. (Ahmed *et al.,* 2021; Das *et al*., 2024; Payandeh *et al*., 2025)

Despite the increasing interest in vector or tick-borne diseases worldwide, the understanding and reporting in Fiji are very limited. This is largely due to multiple contributing factors, including poor veterinary facilities that often lack the necessary equipment and trained personnel to accurately diagnose and manage such infections. Additionally, lack of resources further hampers research and awareness efforts, making it difficult to gather and distribute important information. The unavailability of veterinary pathology services means that comprehensive studies of this topic are often not conducted, limiting the ability to determine their prevalence and impact.

Furthermore, there is a significant lack of awareness among dog owners regarding these diseases, which prevents the timely reporting of cases and the implementation of effective preventive measures. Collectively, these challenges highlight the urgent need for improved veterinary infrastructure and public education to better address vector–and tick–borne diseases in Fiji. This study presents a case report of evidence of *Anaplasma* spp. infection in a local male dog from Nadi, Fiji.

Materials and Methods

Case Report

A 3-years old neutered male mixed breed dog was presented to PASH Nadi, Fiji Islands, with complaints of reduced appetite, depression, lethargy, mild pruritic skin lesions,

mild intermittent diarrhea with occasional blood stains in the feces, and dark- colored urine.

This is an outdoor dog without a history of preventive medications, including deworming, tick and flea treatments, and vaccinations. The owner stated that the dog had recently experienced a tick infestation, and attached ticks were found on its body and identified during the consultation. The clinical examination revealed that the above patient had a high rectal temperature of 40 °C, enlarged submandibular lymph nodes compared to other lymph nodes, mild abdominal organomegaa pale pink, dry mucous membrane with 6-7% dehydration, and mildly diarrheic feces on per rectal examination.

Materials and Methods

3.5 mL of blood sample was collected from the right cephalic vein using a 21-gauge needle with a 5 mL syringe, aseptically into an Ethylene-Di-Amine-Tetra-Acetic-Acid (EDTA) tube and a separate tube for blood count and biochemistry blood tests. Diff quick and Giemsa-stained blood smears were prepared for microscopic examination under 10x, 40x, and 100x magnification with oil immersion. The Serum sample was tested using an indirect immunofluorescence antibody test to detect *A. phagocytophilum /A. platys* antibodies with a commercial test kit (Anigen Rapid CaniV-4® test kit), which has a high sensitivity 96.1% and specificity 99.3%), following the manufacturer's instructions. The tick was observed under a microscope with different magnifications (10x, 40x).

Based on the clinical signs and serological laboratory test findings, this case was diagnosed as an *Anaplasma* infection, and treatments were initiated with Doxycycline at a dose of 10mg/kg BW for 28 days. Along with supportive treatments such as vitamin B complex, the anti-ulcer medication omeprazole, and paracetamol suppositories, as well as supportive intravenous treatment to address dehydration. Oral liver supportive and tick flea medication (Afoxolaner and Milbemycin oxime) were also dispensed. After 48 hours of initiating the treatment plan, improvement was noticed, and the dog was examined on days 7, 14, 21, and 28. On the 7th day, the dog showed improvement and had an uneventful recovery. With normal biochemical and hematological parameters confirming the successful management of *Anaplasma* spp. infection in this patient.

Results and Discussion

The following tables (Tables 1 and 2) present the results of the serum biochemical analysis, which includes liver and renal function tests. There is an increase in serum alkaline phosphatase (ALP) and aspartate transaminase (AST), along with a slight increase in creatinine and chloride levels. Additionally, there is a reduction in serum albumin level. The full blood count results from Table 3 revealed slight leucopenia, mild lymphopenia, and a low hemoglobin level, with moderate to severe thrombocytopenia. Microscopic images of the peripheral and buffy coat blood smears did not provide any evidence for the presence of intracellular basophilic inclusion bodies. The result of the serological examination for *Anaplasma* spp. antibodies were detected by commercial test kit. There was no evidence of co-infection with *E. canis*, Lyme disease and *Hepatozoon* spp, which can also cause similar clinical and

pathological changes in dogs. Based on the clinical-pathological findings and evidence, the dog was diagnosed with canine anaplasmosis infection. After 28 days of treatment, the dog had completely recovered from ongoing clinical signs and symptoms.

Table 1. Serum Biochemical Profile -Liver

Liver Function Test			
Test	**Result**	**Reference**	**Unit**
Albumin	28.6 (low)	32-41	g/L
ALP	452.0 (high)	7-115	U/L
ALT	88.9	17-95	U/L
AST	157.2 (high)	18-56	U/L
Total Bilirubin	3.0	0-3.42	µmol/L
GGT	6.0	0-8	U/L
Total Protein	64.8	55-72	g/L

Table 2. Serum Biochemical Profile- Kidney

Renal Function Tests			
Test	**Result**	**Reference**	**Unit**
Urea Nitrogen	7.02	3.21-9.28	mmol/L
Creatinine	139.3 (high)	53.05-123.79	µmol/L
Sodium Na+	137.5	143-150	mEq/L
Potassium K+	4.55	4.1-5.4	mEq /L
Chloride Cl-	115.6 (high)	106-114	mEq /L

Table 3. Complete Blood Count (CBC) Results

Full Blood Count			
Parameter	**Result**	**Reference range**	**Unit**
WBC	5.15 (low)	5.7-14.2	$10^3/\mu L$
Neut#	4.07	2.7-9.4	$10^3/\mu L$
Lymph#	0.71	0.9-4.7	$10^3/\mu L$
Mono#	0.35	0.1-1.3	$10^3/\mu L$
Eosinophil#	0.00	0.1-2.1	$10^3/\mu L$
Basophil#	0.02	0-0.1	$10^3/\mu L$
RBC	6.08	5.7-8.5	$10^6/\mu L$
HGB	13.8 (low)	14.1-20.1	g/dL
HCT	41.5	41-58	%

Full Blood Count			
Parameter	**Result**	**Reference range**	**Unit**
MCV	68.1	64-76	fL
MCH	22.7	21-26	pg
MCHC	33.3	33-36	g/dL
PLT	86 (low)	186-545	$10^3/\mu L$
MPV	14.1	8.4-14.1	fL

To my knowledge, this is the first report of a clinical case of canine Anaplasmosis in dogs in Fiji. *Anaplasma* is one of the tick-borne diseases that are very common in tropical countries, as reported in several studies. Previously, the *Rhipicephalus sanguineus* species of tick was identified in the Fiji Islands (Fan, 2024). This suggests that dogs are commonly exposed to tick bites and concurrent tick-borne diseases, a situation observed worldwide (Sainz *et al*., 2015; Springer *et al*., 2019; Balmori-de la Puente *et al.,* 2024).

With the availability of various diagnostic methods, including serology and antibody detection, as well as identification of *Anaplasma* spp. morula, PCR (polymerase chain reaction) Anaplasmosis can be detected in laboratory setups, as described in previous studies from various countries (Arun *et al*., 2017; Atif *et al*., 2021; Thounaojam and Rajesh, 2023; Widyasanti *et al*., 2025).

The identification of *Anaplasma* spp. morula from the buffy coat or peripheral blood smear is the first diagnostic approach for *Anaplasma* spp. infection (Situmorang *et al.,* 2024). However, this is only possible during the acute phase of the infection, as experienced by several researchers in basic hospital settings (Hamidinejat *et al.,* 2019; López-Valencia *et al.,* 2024, Das *et al*., 2024).

It is impossible to differentiate specific *Anaplasma* spp. by using a serological commercial test kit due to their cross-reactivity to other *Anaplasma* spp. (Wijeratne and Perera, 2022). Therefore, in this study, specific *Anaplasma* spp. was not identified due to a lack of resources in Fiji.

The hemogram showed evidence of thrombocytopenia, and a positive result from the serological test kit indicated the presence of *Anaplasma* spp., which was diagnosed in this case as described by Atif *et al*. (2021).

Figure 1. The positive result of the *Anaplasma* spp. commercial antibody test kit shows C (control), sign shows T (Sample).

Figure 2. Ectoparasite Examination Under Microscope with 100x Magnification *Rhipicephalus* spp. Ticks.

Anaplasma spp. Infection is very difficult to detect, as in most cases, the clinical-pathological symptoms are not clearly defined in the context of *Anaplasma* spp. infection. Clinical laboratory findings often reveal non-specific abnormalities such as anemia and thrombocytopenia, which can overlap with other diseases. The use of commercial test kits can enhance diagnostic accuracy; however, their sensitivity and specificity may vary, potentially leading to false negatives or positives. Additionally, clinical experience plays a crucial role in identifying suspected cases of *Anaplasma* spp. infection, especially in light of the recent presence of ticks, which are known to carry this infectious agent. Therefore, veterinarians must remain vigilant and consider a combination of clinical signs, laboratory findings, and epidemiological factors when diagnosing *Anaplasma* spp. infections. (Soni and Shrivastava, 2022; López-Valencia *et al.,* 2024; Oliveira *et al.,* 2024; Das *et al*., 2024). There have also been reports of co-infections with *Anaplasma* spp. and *E.canis* worldwide, presenting similar clinical signs (Wijeratne and Perera, 2022).

A decreased albumin level indicates generalized involvement of *Anaplasma* spp. infection. Similar clinical signs and findings have been recorded in dogs infected with *Anaplasma* spp. (Atif *et al.,* 2021; Das *et al*., 2024). Detection of *Anaplasma* spp. Inclusion body is a possible and economical method in a clinic setup, but it's only feasible in the early stages of *Anaplasma* spp. infection.

The following steps will help enhance the early detection of *Anaplasma* spp. infections. Improved diagnostic techniques, such as PCR tests, can detect *Anaplasma* spp. DNA, along with serological assays for antibodies. Educating and raising awareness among pet owners about the importance of early detection and treatment is crucial. Additionally, research and development of new diagnostic tools, along with a better understanding of *Anaplasma* spp. will be beneficial. Employing multi-testing approaches that utilize different diagnostic methods will help increase the

accuracy of identifying infection stages. Prognostic factors and clinical signs depend on concomitant infections with other vector-borne diseases, such as *E. canis*, *Hepatozoon* spp., and *Babesia* spp. (Sainz *et al*., 2015; Facile *et al*., 2024; Das *et al*., 2024).

The initial phase of infection is characterized by thrombocytopenia, resulting from the destruction of *Anaplasma*-infected platelets, which triggers an immunological response. Doxycycline Treatment has been successfully implemented in several studies in dogs with naturally infected *Anaplasma* spp. infection in Europe and USA due to its efficacy against intracellular organisms, good tissue penetration, rapid response and good tolerance in canine patients (Kohn *et al*., 2008; Matei *et al*., 2019; El Hamiani Khatat *et al*., 2021; Martinescu *et al*., 2024).

Both species of *Anaplasma* have been identified in *Rhipicephalus* tick species worldwide, particularly in regions where this tick species is active throughout the year. Warmer climates contribute significantly to the tick burden, and these ticks have been reported in Fiji (Fan, 2024). Infestation affects various species, including humans, making it a significant public health issue, as reported by El Hamiani Khatat *et al*. (2022).

Conclusion

To my knowledge, this is the first reported case of *Anaplasma* spp. infection in a dog in Fiji. Based on the client's information, clinical manifestations, and hematological results, which included thrombocytopenia, along with a serological positive result for *Anaplasma* spp. This case was diagnosed with Anaplasma infection and successfully treated with oral Doxycycline. Simultaneously treating the *Anaplasma* spp. patients with supportive care and specific treatment for *Anaplasma* spp. will be the key to controlling the infection, alleviating clinical signs, and providing a more promising prognosis. Further studies need to determine the species of *Anaplasma* spp. in FIJI islands; Whether it is endemic *Anaplasma* spp. to the FIJI islands; Further epidemiological implications of *Anaplasma* spp.; Identify the presence of different types of ticks.

Approval of Ethical Commission

No ethical approval was required as this is a case report that required no ongoing research data.

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Author's Contribution

PY: Attended to, diagnosed, managed the case, and primarily authored this manuscript, including preparing the manuscript and interpreting the cytological evidence.

Conflict of Interest

I, as an author, declare that I have no conflicts of interest.

Data Availability Statement

The data used for this case report were obtained from the hospital management system (Ezyvet.com/Pacific Animal Shelter and Hospital Fiji). Access to this data is limited

to the public due to hospital privacy protocols. But the data can be shared upon request.

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