Ehrlichiacanis Infection Induced Chronic Kidney Disease in a Labrador Retriever and its Management - A Case Report

ABSTRACT:

Introduction:

Chronic kidney disease is irreversible, progressive and most common form of kidney disease in dogs. Canine ehrlichiosis is caused by gram negative intracellular bacteria *Ehrlichiacanis*.

Case Presentation:

A 7-year old Labrador retriever male dog weighing around 35 kg was presented to the Madras Veterinary College Teaching Hospital with a history of inappetence, vomiting, polyuria and polydipsia from fifteen days. The dog was fully vaccinated and dewormed. On general clinical examination, all vital parameters were within normal range except elevated temperature (103.8°F). The hematological findings revealed mild thrombocytopenia and hypochromasia. The serum Biochemistry revealed increased creatinine level (3.68 mg/dl). The blood pressure was measured using Doppler device which revealed secondary hypertension. A blood smear examination was found to be negative.

Case Discussion:

The animal was treated for chronic kidney failure. Even then animal was going down and not taking feed. The blood sample was sent for Molecular PCR which confirmed presence of *Ehrlichiacanis*. Then animal was treated for Canine MonocyticEhrlichiosis to control *Ehrlichiacanis* induced renal failure. Then there was little progress in condition of the animal. The animal was maintained with a renal diet.

Keywords: Chronic Kidney Disease, Ehrlichiacanis, Labrador retriever, Molecular PCR.

1. INTRODUCTION

Ehrlichiacanis (*E.canis*) is most common Rickettsial disease in dogs. The relative risk of CKD for patients exposed to ticks carrying *E.canis* was found to be 2.12 [1]. Chronic kidney disease occurs due to loss of functional nephrons which leads to poor clearance of creatinine by kidneys thereby increasingcreatinine level in serum.The survival analysis showed the median survival time of chronic kidney disease is longer than acute kidney injury [10]. The membranoproliferative glomerulonephritis was the main glomerular lesion seen in this infection which causes hypoabluminemia [11].The clinical signs such as vomition, anorexia, polyuria, polydipsia,oral ulceration, weight loss are exhibited.The animal should be treatedsymptomatically and maintained with arenal diet.

2. PRESENTATION OF CASE

A 7-year old Labrador retriever male dog weighing 35 Kg was presented to Madras Veterinary College Teaching Hospital Critical Care Unit with a history of inappetence, vomiting, polyuria, andpolydipsia from 15 days. General Clinical examination revealed heart rate – 76 bpm, respiratory rate – 42/min, pulse rate – 72/min, rectal temperature - 103°F, and pale mucous membrane. The blood sample was collected and sent for hematological and biochemical profile evaluation. Blood gas analysis was done.

3. DIAGNOSIS

The hematological profile revealed mild anemia, thrombocytopenia, and hypochromasia. The serum biochemistry revealed anelevated creatinine level (3.68 mg/dl). Based onthelnternational Renal Interest Society (IRIS), it was graded as CKD stage 3 based on creatinine[2].Blood pressure was measured using Doppler device which revealed secondary hypertension (180 mm Hg). Arterial blood gas Analysis revealed metabolic acidosis.A blood smear was found negative for parasites. The hematology and biochemical profile analyzed and presented in Table 1. The findings of blood gas analysis are presented in Table 2.

Table 1: Hemato- biochemical analysis of*E.canis*infection-induced CKD before and after treatment.

Parameter	Reference range	Day 0	Day 10	Day 20	Day 30
Hemoglobin (g/dl)	12-18	7.1	6.4	8.4	9.2
PCV (%)	37-55	21.4	19.5	25.2	28.6
RBC	5.5-8.5	3.64	3.28	4.2	4.73
WBC (x$10^{3/}$µL)	6000-17000	12400	13000	6400	7600
Neutrophils (%)	58-85	74	74	70	71
Lymphocytes (%)	8-21	20	16	22	24
Platelet (x$10^{3/}$µL)	1,75,000 – 5,00,000	1,23,000	1,15,000	1,95,000	1,88,000
BUN (mg/dl)	10-28	50.73	30.32	106.8	107.26
Creatinine(mg/dl)	0.5-1.5	3.68	3.94	9.54	9.1
Calcium (mg/dl)	9-11.3	12.64	8.43	17.53	9.27
Phosphorus (mg/dl)	2.6-6.2	8.98	7.03	14.52	12.83
ALP (U/L)	20-156	61.0	108	385	173.6
ALT (U/L)	21-102	19	1417	-	284
GGT (U/L)		-	21	30	
Total protein (g/dl)	5.4-7.1	6.9	8.4	8.2	8.9
Albumin (g/dl)	2.3-3.8	2	1.8	2.4	2.6
Glucose (mg/dl)	-	71	56	92	81
Cholesterol (mg/dl)	135-270	-	166	107	129

Table 2: Blood gas parameters and UP:UC of *E.canis* induced CKD

Parameter	Reference range	Day 10
pH	7.31-7.42	7.25
pCO_2 (mmHg)	35.0-48.0	17.9
HCO_3 (mmol/L)	21.0-28.0	12.0
pO_2(mmHg)	85-95	106.9

SO_2 (%)	94.0-98.0	98.5
BUN/Crea (mg/mg)	12-20	5.7
Urea/Crea (mmol/mmol)	48.5-80.8	23.2

4. TREATMENT AND MANAGEMENT

Theanimal was initially treated for chronic kidney disease symptomatically. Inj. Ringer's Lactate (@ 10ml/kg body weight intravenously), Inj. Pantaprazole(@ 1mg/kg body weight I/V),Inj. Ondansetron(@ 0.2mg/kg, I/V), Inj. Darbopoietin(0.8µg/kg, S/C) were given. Tab.Renodyl (1-0-1),Tab.Enalapril(@ dose rate of 0.25 mg/kg, BID),Powder. Phosclear(Aluminiumhydroxide) @ 45 mg/kg, PO were prescribed for 10 days. Even then animal condition was not improved. The blood sample was collected again and sent for molecular PCR which revealed presence of *E.canis*[3]. Then animal was treated with triple therapy – Doxycycline (10mg/kg, I/V), Clindamycin (12mg/Kg, I/V), Metronidazole(15mg/Kg, I/V). A single shot of Imidicarb at the dose rate of 6.6mg/Kg was given. The owner was advised to maintain the animal with renal diet.

5. CASE DISCUSSION

Arterial blood gas (ABG) is an essential part of diagnosing and managing the oxygenation status and acid–base balance of the high-risk patients, as well as in the care of critically ill patients in the Intensive Care Unit [4]. Animal was treated with fluid therapy to correct the metabolic acidosis. CKD leads to hyperphosphatemia and hypocalcemia. Hence phosphate binderlike aluminium hydroxide was given to reduce to level of phosphate in blood [5,8]. After the initiation of triple therapy, there was improvement in the condition of the animal. Increase in hemoglobin level (Fig. 1) and platelet count (Fig. 2) was observed.The creatinine level was increased after the treatment as a result of permanent damage of kidney caused by *E.canis*(Fig. 3). Once the animal's appetite became normal, it was maintained with renal diet to maintain the quality of life.

Fig 1. This graph shows increase in Hemoglobin as the treatment progress

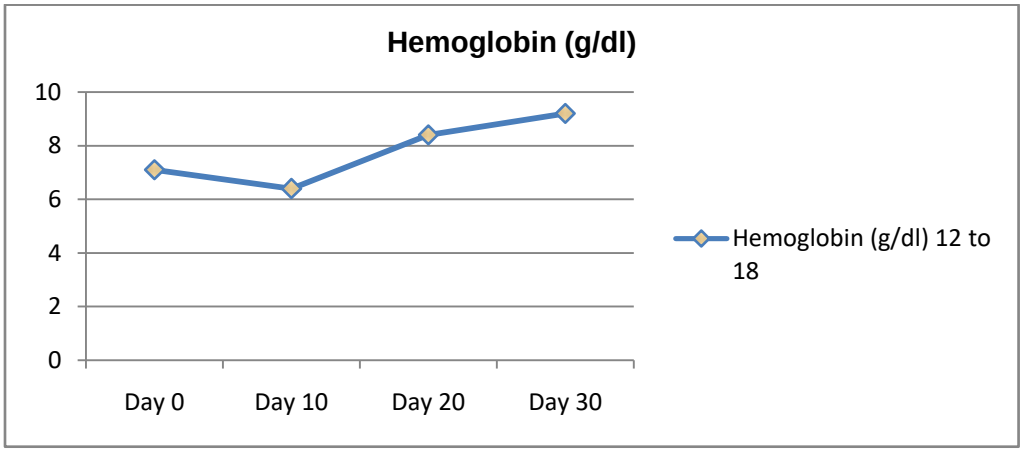


Fig 2. This graph shows increase in platelet count in response to treatment

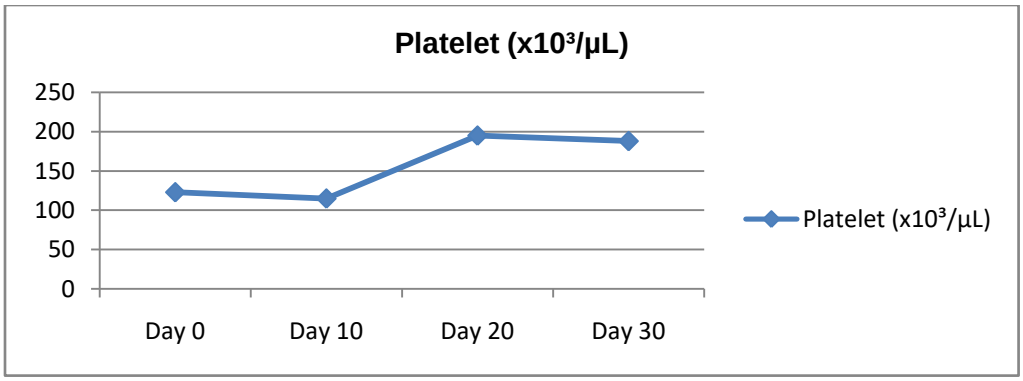
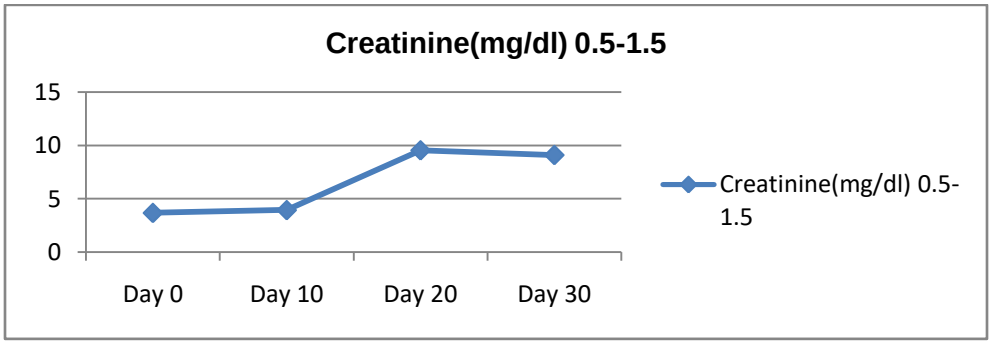


Fig 3. This graph shows increase in Creatinine level as a result of permanent damage of Kidney caused *E.canis*



6. CONCLUSION

Chronic kidney disease (CKD) is most common form of kidney disease in dogs which causes permanent reduction in number of functional nephrons. It has varied etiology. It is suggested that glomerular disease accounts for 50% of the CKD in dogs. The coincidence effect of ehrlichiosis on chronic kidney disease is unclear. Ehrlichiosis leads to protein-losing nephropathy as a result of immune-complex glomerulonephritis thereby leading to renal failure [6].Ehrlichiacanis can affect different organs at different stage of infection and kidney involvement is believed to be one of the leading causes of the death associated with the disease [7].Darbepoetin is used to stimulate erythropoiesis in dogs affected with CKD [9].Conservative medical management is the only realistic option for most dogs with CKD. It consists of supportive and symptomatic therapy designed to ameliorate clinical signs, correct fluid deficits or excess as well as electrolyte, acid-base, endocrine and nutritional balance.

COMPETING INTERESTS DISCLAIMER:

Authors have declared that no competing interests exist.

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AUTHORS' CONTRIBUTIONS

This work was carried out in collaboration with all authors. Author MC identified the patient and went in for assessment and complete therapy. Author MC also checked and corrected the first draft. Author SS wrote the first draft in the manuscript, managed the literature searches and critically reviewed the manuscript. Author VP aided in the patient intensive care and management and prepared the final manuscript. All authors read and approved the final manuscript.

CONSENT

It is not applicable.

ETHICAL APPROVAL

It is not applicable.

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