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Management of Acute-on-Chronic Kidney Injury in a Golden Retriever

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Abstract

A four-year-old Golden Retriever bitch weighing 26 Kg was presented with the history of inappetence for one week. Clinical examination revealed emaciated, pyrexia, pale mucus membrane, hypertension (170 mmHg). splenomegaly and generalized lymphadenopathy. Laboratory evaluation showed hypochromic anemia with thrombocytopenia, hyposthenuria with proteinuria with elevated blood urea nitrogen and creatinine levels. Nephrosonogram revealed normal parenchyma with good corticomedullary differentiation, with irregular border and increased cortical echogenicity. Polymerase chain reaction (PCR) confirmed *Babesia gibsoni* infection.. Targeted antiprotozoal therapy comprised a 28-day course of triple antibiotic protocol with doxycycline, clindamycin, and metronidazole along with hematinic and thrombopoietic support. Therapeutic management included fluid therapy, antiemetics, proton pump inhibitors, antihypertensives, phosphate binders, renal-specific diet, and supportive care Marked clinical improvement was observed during follow-up, with progressive normalization of renal parameters, restoration of appetite, and improvement in body condition score. .

Keywords: *Babesia gibsoni,* Dog, Kidney injury, Triple therapy

Babesia gibsoni is an intraerythrocytic protozoan parasite widely recognized as a causative agent of canine babesiosis, particularly in Asia, including India, where its endemic presence has been increasingly reported (Kumar *et al*., 2023; Sivajothi and Reddy, 2018). Acute kidney injury (AKI) or progression to acute-on-chronic kidney injury (ACKI) has been observed in severe cases, necessitating timely diagnostic and therapeutic interventions (Preethi *et al*., 2024). This case report presents a successful management of *Babesia gibsoni*-associated acute-on-chronic kidney injury in a Golden Retriever.

A four year old Golden Retriever bitch weighing 26 kg with a Body Condition Score of 3/9 was presented with inappetence for one week. Increased body temperature (103.5°F) with pale roseatte mucus membrane, hypertension (170 mmHg), generalized lymphadenopathy and splenomegaly were observed. Hypochromic anemia, thrombocytopenia, azotemia, isosthenuria, proteinuria, urine protein creatinine ratio (UPC) of 4.8, elevated BUN and creatinine values were also noticed (Table- 1). Screening for haemoparasites revealed *Babesia gibsoni* genome organism on nested PCR. Normal cortico-medullary differentiation, slightly increased cortical echogenicity irregular renal borders, with the interlobar artery revealing Resistive Index (RI) of 0.60 and Pulsality index (PI) of 1.33 were observed under ultrasonography (Fig 2). Based on the clinical, laboratory and ultrasonographic findings the case was diagnosed as *Babesia gibsoni* induced acute on chronic renal failure.

Treatment was initiated with triple therapy with doxycycline (@ 10mg/Kg bwt IV), clindamycin (@ 11mg/Kg bwt IV) and metronidazole (@ 15 mg/Kg bwt IV). Ringers Lactate (@ 20 ml/Kg bwt twice daily IV), pantroprazole (@ 1mg/Kg bwt IV), ondansetron (@ 0.5mg/Kg IV), N- Acetyl Cysteine (@ 40 mg/Kg), darbepoietin (@ 0.8 mg/Kg subcutaneously) were administered. Benazapril (@ 0.5 mg/Kg bwt twice daily), renal diet, phosphate binder (@ 20 mg/Kg PO BID), syrups containing omega 3, 6 fatty acids, haematinic and thrombopoietic support were given to the dog. The hematology and serum biochemistry values were monitored periodically (Table 1). The dog had an uneventful recovery with reduction of proteinuria and blood pressure to normal limit and dog is now under management with renal diet and antihypertensive.

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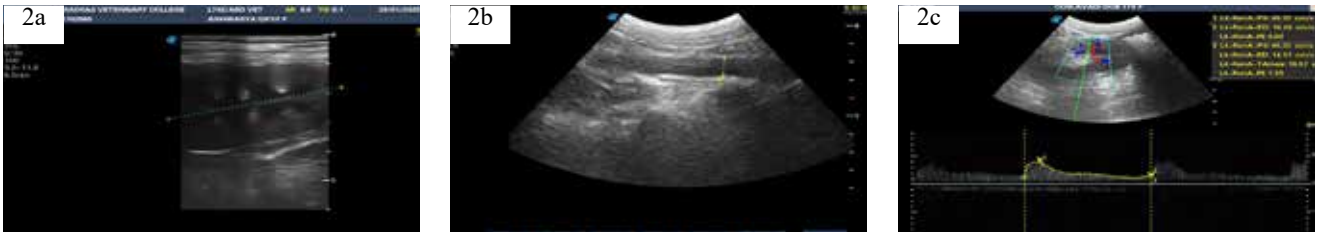

Fig.2a. Kidney with irregular border with normal cortico-medullary differentiation, Fig 2b Diameter of aorta at renal artery Fig 2c Doppler studies of the interlobar artery of left kidney measuring Resistive Index (RI) -0.60 and Pulsatality Index (PI) 1.33.

Table 1: Haematobiochemical parameters

Parameter	Day 1	Day 3	Day 10	Day 17	Day 24	Reference Range
Haemoglobin (g/dL)	9.3	7.3	9.1	9.4	9.9	11.9- 18.9
PCV (%)	27.9	22.6	24	27.6	29.4	35 - 57
RBC (m/cmm)	5.06	3.9	4.54	4.97	5.2	4.95 – 7.87
WBC (/cmm)	8400	8400	10,300	11,400	12,800	5 – 10.1
Platelets (/cmm)	81,000	1,40,000	3,68,000	4,29,000	4,69,000	2,11,000 -6,21,000
Glucose (md/dL)	75	53.0	87	93	69	76 - 119
Total Protein (g/dL)	7.2	7.4	7.5	7.90	5.70	5.4 – 7.5
Albumin (g/dL)	1.8	1.3	1.5	2.40	1.90	2.3 – 3.1
Urea (mg/dL)	103.17	94.88	101.16	17.38	19.07	8 - 28
Creatinine (mg/dL)	9.03	8.27	4.68	1.44	0.80	0.5 – 1.6
ALT (U/L)	41	44.0	73	37	34	10-109
ALP (U/L)	615	892.0	782.0	110	193	1- 114
Sodium (mmol/L)	152	154.0	151	149	140.2	142 -152
Chloride (mmol/L)	111	115.4	113	111	109.7	110 -124
Potassium (mmol/L)	5.45	5.39	4.89	4.7	3.63	3.9 -5.1
Calcium (mg/dL)	9.22	9.59	13.38	8.96	10.68	9.1– 11.7
Phosphorous (mg/dL)	14.00	7.75	9.51	4.32	6.15	2.9 – 5.3

In the present case, the Golden Retriever exhibited hallmark clinical signs of babesiosis including inappetence, fever, pallor, lymphadenopathy, and splenomegaly, consistent with earlier reports (Barta *et al*., 2021; Sivajothi and Reddy, 2018). In the present case, azotemia, proteinuria, and ultrasonographic alterations in renal architecture (increased cortical echogenicity and irregular renal margins) were suggestive of acute-on-chronic kidney injury (ACKI). This aligns with findings by Yamasaki et al. (2020), who reported similar nephrosonographic changes in experimental *B. gibsoni* infections. Triple therapy with doxycycline, clindamycin, and metronidazole was employed as an alternative to the Atovaquone-azithromycin protocol. Although the latter is considered superior in efficacy, financial and availability constraints limit its routine use in India (Ravindran *et al*., 2023; Shakya *et al*., 2021). Fluid therapy, antiemetics, phosphate binders, antihypertensives, renal-specific diets, omega-3 fatty acid supplementation, and hematopoietic support facilitated

renal recovery and overall clinical improvement. Serial monitoring of hematological and biochemical parameters indicated progressive normalization of renal indices. This outcome reaffirms that even cases with significant azotemia and systemic involvement can demonstrate reversible renal dysfunction if managed promptly and comprehensively (Baneth *et al*., 2020)

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