SECONDARY IMMUNE-MEDIATED HAEMOLYTIC ANAEMIA (IMHA) IN GOLDEN RETRIEVER DOG

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A male Golden retriever dog of age 2.5 years presented to the Veterinary Clinical Complex, Nagpur with a history of inappetence, hematemesis, melena and exercise intolerance. Physical examination revealed icteric mucous membranes, tachypnoea, splenomegaly, hepatomegaly, fever, and lymphadenopathy. On complete blood count thrombocytopenia, lymphocytosis, and neutrophilia were observed and blood biochemical examination revealed hypoalbuminaemia, elevated total bilirubin and direct bilirubin. On PCR the dog was diagnosed positive for ehrlichiosis.

Keywords: Agglutination, Ehrlichiosis, IMHA, Jaundice, Thrombocytopenia.

Immune-mediated haemolytic anaemia is one of the most common manifestations of canine immune-mediated disease. Immune-mediated hemolytic anemia (IMHA) is the most common autoimmune disease in dogs (Chopel *et al.*, 2020). Haemolysis can be extravascular (antibody-coated RBCs are recognized and phagocytised by macrophages in organs such as the spleen) or intravascular (antibody and complement on the RBC surface lead to direct cell lysis within the circulation). Immune mediated haemolytic anaemia as we know is a life-threatening condition in dog, in which the dog's own immune system attacks its own erythrocytes and cause anaemia (Elone *et al.,* 2022). It is characterised by the generation of IgM and/or IgG against RBC antigens, which results in the death of RBCs intravascularly by complement activation or extravascularly via phagocytosis of the erythrocytes from the monocyte-macrophage system; in IMHA, RBCs are still being manufactured in the bone marrow but once released into the circulation, they have a shorter-than-normal life span (Swann and Skelly, 2016). Serious anaemia and the ensuing inflammatory response are linked to the typical clinical symptoms. Though there is no pathognomonic test for the condition. Idiopathic (primary) IMHA can happen on its own or as a side effect of several infectious or malignant conditions, Immune-mediated hemolytic anemia (IMHA) is an important cause of morbidity and mortality in dogs. IMHA also occurs in cats, although less commonly. IMHA is considered secondary when it can be attributed to an underlying disease, and as primary (idiopathic) if no cause is found. (Garden *et.al.,* 2019).

IMHA is one of the most common autoimmune diseases diagnosed in dogs (Klotsman *et al.,* 2019).Primary (idiopathic) IMHA is a classic example of an autoimmune disorder with no identifiable underlying cause and is the predominant form of IMHA. Secondary IMHA is caused by an immunologic response to non-self antigens that have modified or are associated with normal RBC membranes. Secondary IMHA can be caused by several underlying processes. Among the pathogens associated with secondary IMHA, ehrlichiosis is the most common infectious agent. Affected RBCs may become infected by pathogens or coated with foreign antigens. Clinical

symptoms may manifest as pale mucous membranes, fatigue, and inability to exert, and collapse in cases of mild to severe anaemia. Tachycardia, tachypnoea, and forceful (bounding) pulses, which are linked to sympathetic activation brought on by local tissue hypoxia, are frequently observed on physical examination. Hemic murmurs, or systolic left-sided murmurs, range from degree 1 to grade 2 in patients with severe anaemia. Presence of hemoglobinemia (red-pink serum) and haemoglobinuria (dark "port wine" urine) are symptoms of intravascular haemolysis, although some individuals with extravascular haemolysis will have mild to severe jaundice.

Case history and Observations

A male golden retriever dog of age 2.5 years was presented to the Veterinary Clinical Complex, Nagpur, with a history of fever, inappetence, vomition, hematemesis (Fig no.1), haematuria, melena, jaundice, exercise intolerance and tick infestation. On clinical examination, it was observed that the dog had high body temperature (104.5°F), icteric mucous membrane (Fig no.2 and Fig no.3), splenomegaly and lymphadenopathy. On complete blood count thrombocytopenia, leucocytosis, and neutrophilia were observed and blood biochemical examination revealed hypoalbuminemia, elevated total bilirubin and direct bilirubin. Ultra-sonography was also performed that revealed an enlarged spleen and distended gall bladder with a thickened wall and multiple cholecystic gravels. Initially, blood smear examinations were performed thrice and was negative on all three occassions. After 5 days of treatment a PCR was performed positive for ehrlichiosis.

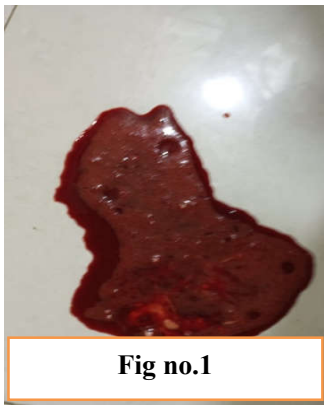

Fig no.1

Fig no.2

Fig no.3

Table. 1 HAEMATO-BIOCHEMICAL PARAMETERS OF THE DOG SUFFERING FROM SECONDARY IMHA

Parameters	Unit	Day 0	Day 14	Day 21
Haemoglobin	**(gm/dl)**	16	14.5	12.9
WBC	**($x10^3$)**	24.9	10.4	6.1
RBC	**($x10^6$)**	5.37	4.94	4.42
PCV	**(%)**	46.8	42.9	38.9
Neutrophils	**(%)**	91.7	72.3	69.2
Lymphocytes	**(%)**	6.6	23.3	23.3
Monocytes	**(%)**	4.2	4.4	7.5
Eosinophils	**(%)**	1.7	2.0	1.7
Platelets	**($x10^3/mm^3$)**	116	218	320
BUN	**(mg/dl)**	17.2	7.5	11.5
Serum creatinine	**(mg/dl)**	0.9	0.7	0.76
SGOT(IU/dl)	**(IU/dl)**	30.9	31.2	44
SGPT(IU/dl)	**(IU/dl)**	39.6	31.0	30
Total bilirubin (mg/dl)	**(mg/dl)**	6.5	2.6	1.2
Direct bilirubin(mg/dl)	**(mg/dl)**	4.0	1.75	0.6

Treatment

Initially the dog was stabilized with Inj Intacef-tazo 562mg (20mg/kg) I/V bid, Inj Ondansetron 1.5ml (0.25mg/kg) I/V bid, Inj Pantoprazole 30mg (1mg/kg) I/V od, Inj,Vetalgin 1.5ml I/M , Inj Dextrose 5% 200ml I/V bid, then Inj Prednisolone acetate @0.25mg/kg IM and Inj Ethamsylate 1ml IM bid for 5 days and for oral medication syrup Sucralfate 5ml tid, Liq. Crotalus horridus 5ml tid and Tab.Ursodil 300mg (10mg/kg) bid. After five days, a treatment regimen including doxycycline 300mg (10mg/kg) for 21 days od was given.

Results and Discussion

The diagnosis is based on the clinical manifestations, and laboratory findings (severe anaemia). The haematological and biochemical values were estimated on day 0, day 14, and day 21. The findings of haematological changes have been presented in Table1.Significant alteration was observed in the haematological and biochemical profile during and after the recovery period.

Signs were acute anorexia, lethargy, weakness, fever, icterus, abdominal discomfort, or change in urine colour. A rise in the total plasma bilirubin concentration greater than 2mg/dl imparts an yellow discoloration to tissues. A severe leucocytosis and left shift with toxic changes in the neutrophils. After the PCR which was positive for ehrlichiosis, doxycycline was started which is the drug of choice for ehrlichiosis as also recommended by Chethan *et al*., 2016a and Chethan *et al*., 2016b. After 1 week of treatment appetite improved slightly and an improvement in platelets, a decline in total and direct bilirubin was observed (add) along with, decline in neutrophils. All the parameters were normal after 21 days of treatment with doxycycline.

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