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Clinical Article

IMMUNE-MEDIATED HEMOLYTIC ANEMIA IN A CAT: DIAGNOSIS AND TREATMENT

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SUMMARY

An adult spayed female Domestic Short Hair cat, diagnosed to be suffering from immune-mediated hemolytic anemia (IMHA) with concurrent thrombocytopenia (IMTP), was successfully treated with conventional oral broad-spectrum antibiotic-corticosteroid combination regimen, supported by adequate home care by the well-informed client. The redeeming feature of the feline patient's blood biochemical profile, on presentation in the clinic, was uncompromised renal and hepatic function, with no obvious malignancy of the internal organs including the pancreas and spleen noted on radiographs. Feline Leukemia Virus (FeLV), Feline Immunodeficiency virus (FIV), heartworm infections were negative and thyroid function was normal. The patient responded well to the long-term antibiotic-immune suppression combination oral therapy, evidenced by the increased activity level, finishing the meals and drinking more water, and improved behavioral profile.

Keywords: Cat Immune-mediated, Hemolytic anemia, Thrombocytopenia

In the domestic cat, immune-mediated hemolytic anemia (IMHA) is a clinical condition where the circulating red blood cells- tagged with the immunoglobulins G and M, complements, or a combination of these, are mistaken as foreign and destroyed by the pet's own immune system. Primary or idiopathic IMHA is also named autoimmune hemolytic anemia. Secondary IMHA involves a triggering agent: drugs like propyl thiouracil, blood transfusion, neoplasia (lymphoma/ multiple myeloma), or microbial infection (*Mycoplasma spp*., *Babesia spp*., hemoplasmosis, feline infectious peritonitis and feline leukemia virus). In cats, the primary IMHA is rare and thrombosis is not a major issue (Carr, 2011).

The clinical signs in cats with IMHA are highly variable. The common signs include anorexia, lethargy, weight loss, respiratory distress (dyspnea), tachypnea, tachycardia, and pale visible mucous membranes suggestive of jaundice. Splenomegaly, icterus and pyrexia may be observed occasionally (Kohn *et al*., 2006).The primary diagnostic panel includes complete blood count (CBC) to establish anemia and evaluate the compensatory response *vis-à-vis* synthesis and release of new red cells (reticulocyte count), the blood biochemistry panel to monitor the renal, hepatic and pancreatic function, the circulatory electrolytes to evaluate generalized tissue dehydration/ electrolyte imbalance, and urinalysis to rule out urinary tract infection. The supplementary panel includes Coombs' test, PCR analysis, FeLV/ FIV testing to determine contagious viral disease (Cowell *et al*., 2006), and bone marrow aspirate/ core biopsy and imaging for neoplasia (Weiss, 2007).

Lilly Chilcutt, a 6-year old spayed Domestic Short Hair cat with body weight 4.5 kg, was presented to the Milford Veterinary Clinic, Milford, MI USA with a history of lethargy, respiratory distress, passing of discolored feces, and reduced activity level. The routine physical examination and laboratory diagnostic samplings were done. The oral mucosa was pale indicating jaundice. Urinalysis did not suggest any abnormality. In-house survey radiographs revealed no abnormal growths. A tentative diagnosis of primary immune-mediated hemolytic anemia with thrombocytopenia (IMHA/IMTP) was highly suspected based on the severe low red cell count and the platelet count. Life threatening anemia warranted immediate blood transfusion in the referral emergency care. However, the owner declined because of her financial constraints, necessitating 24 hours case management with the help of trained technicians in the home clinic on ethical norms. Uncompromised renal function is corroborated by the normal/ low serum creatinine (1.3 mg/dL; reference 0.8-2.4) and BUN values (1.3 mg/dL; reference16-36). Absence of electrolyte imbalance was established by the normal titers of sodium (Na^-), potassium (K^-) and Chloride (Cl^-). The T_4 serum titre (1.4 µg/ dL; reference interval 0.8-4.7 µg/ dL) indicated no thyroid-related issues (Table 1 & 2). Blood biochemical homeostasis suggested the absence of clinical microbial infection. Serological tests confirmed freedom from viral (FeLV/FIV) and heartworm infection.

The absence of neoplastic transformation/ tumors in the chest and abdominal internal organs was established by in-house survey right lateral and ventro-dorsal

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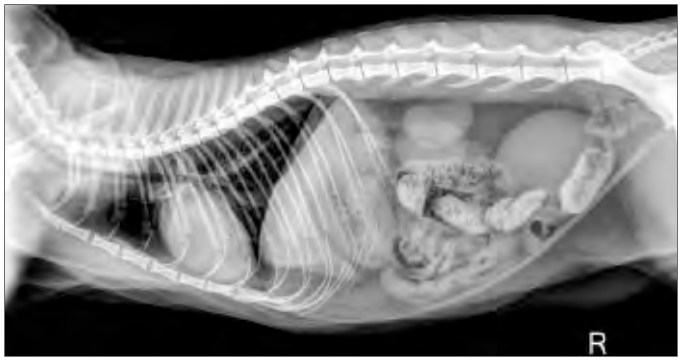

Fig. 1. Right Lateral radiograph: No obvious tumors noticed

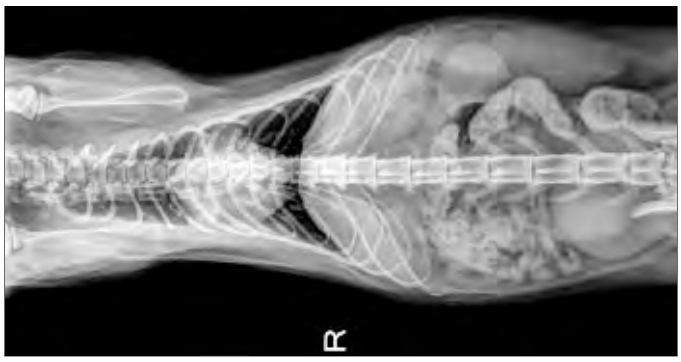

Fig. 2. Ventro-Dorsal view showing no visible tumors

radiography (Fig. 1 & 2).

In perspective, the severe anemic state could be attributed to immune-mediated bioepisode. Coombs' test is not definitive: a variety of disorders may produce positive test (Grace, 2011). The reliability of serology tests for antibodies is not well-established (Mac Neill *et al*., 2019.

In the emergency anemic state (PCV% <15), the top-most priority was restoration of the circulatory blood volume through i/v infusion of the typed whole blood from a healthy donor cat/ Hb-based blood substitute, e.g. Oxyglobin®.

In the instant case, despite the 70-80% chance of mortality, this best option could not be implemented. Antibiotic-corticosteroid oral supportive regimen was recommended to pre-empt any incidental microbial infection (enzootic *Mycoplasma spp*., *Cytauxzoon felis*, and *Babesia spp*.). Doxycycline was given @ 5mg/kg every 12 hr PO for 3 weeks. Anti-inflammatory corticosteroid, Prednisolone was given at the higher initial dose @ 4 mg/

Table 1

Patient's haemogram (Automated CBC*) at the specified pre-treatment and post-treatment intervals

Parameter (units)	Pre-treatment Day 0	Status	Post-treatment			IDEXX Lab Reference interval	Status
			Day 18	Day 32	Day 34		
TEC ($1x10^6$/µL)	1.1	Low	1.56	2.74	2.62	6.54-12.20	Low
Haematocrit (%)	7.1	Low	11.50	18.40	17.00	30.30-52.3	Low
Hb (g/dL)	2.7	Low	3.41	4.80	5.00	9.6-16.2	Low
MCV (fL)	64.0	High	-	67.20	65.00	35.5-53.1	High
MCH (pg)	-		-	17.50	19.1	-	High
MCHC (g/dL)	38.0	High	-	-	29.40	28.1-35.8	Low
RDW (%)	30.3		-	28.80	1.70	15.0-27.0	High
Reticulocyte (%)	2.1		-	2.60	1.70	-	
Reticulocyte ($1x10^3$ /µL)	23.1	Low	62.4	75.40	45.00	30.0-50.0	Normal
TLC ($1x10^3$ /µL)	*		*	6.12	5.00	-	
Neutrophil (%)	*		*	42.30	44.00	-	
Lymphocyte (%)	*		*	51.00	39.80	-	
Monocyte (%)	*		*	3.90	12.50	-	
Eosinophil (%)	*		*	2.00	3.10	-	
Basophil (%)	*		*	0,80	0.20	-	
Neutrophil ($1x10^3$ /µL)	*		*	2.59	2.66	2.30 - 10.29	Normal
Lymphocyte ($1x10^3$ /µL)	*		*	3.12	2.39	0.92 - 6.88	Normal
Monocyte ($1x10^3$ /µL)	*		*	0.24	0.75	0.05 - 0.80	Normal
Eosinophil ($1x10^3$ /µL)	*		*	0.12	0.19	0.17 - 1.57	Normal
Basophil ($1x10^3$ /µL)	*		*	0.05	0.01	0.01 - 0.26	Normal
Thrombocyte ($1x10^3$ /µL)	21.0	Low	-	97.00	204	151-600	Normal

*Leucogram was not recorded by the Auto Cell Counter

Table 2

Patient's pre-treatment urine examination (IDEXX)

I. Physical		II. Pathochemical		III. Sediments (Centrifuged)	
Characteristics	Result	Characteristics	Result	Characteristics	Result
Colour	Pale yellow	pH	7.0	WBCs, RBCs	<1/HPF
Consistency	Clear	Proteins	Negative	Bacteria: Rods, Cocci	None to rare
Specific gravity	1.025	Glucose	Negative	Exfoliated epithelial cells: Squamous & Non-squamous	None to rare
		Ketone bodies	Negative	Casts: Hyaline/ Non-hyaline	None to rare
		Urobilinogen	Normal	Crystals: Struvite/ Calcium oxalate	None to rare
		Bilirubin	Negative		
		Bilirubin-direct	Negative		

kg every 12 hr PO with gradual tapering off under clinical supervision. The combination of oral regimen in the well-informed client's home brought prompt relief to the feline patient, evidenced by the improved clinical condition, patient being Bright, Alert and Responsive (BAR), eating, drinking adequately and displaying total relaxed body posture. Prednisolone oral suspension [10 mg/ ml] @ 0.75 ml PO bid and Doxycycline oral syrup [25 mg/ ml] @ 0.5 ml PO bid for 14 days was prescribed on day 32 post-treatment with advisory on periodic reassessment for suitable modifications/ extension. The absolute count ($1x10^3/\mu L$) of the circulatory reticulocytes is a dependable index of regenerative hemopoiesis (50-75 mild, 75-175 moderate, >175 marked, IDEXX) in the individual patient. Nearly three-fold increase (23.1 → 62.5, Table 1) in just 3½ weeks' time attests to the facilitated recovery process, reflected in the continuing parallel increases in the TEC, hematocrit and hemoglobin values in the patient's erythrogram. Lilly recovered fully and visits regularly for periodic health check in the clinic. It is a unique case of survival under adverse circumstances, supported with judicious remedial therapy. Positive psychosomatic factors may promote the recovery process.

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