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Conventional blood smear diagnosis and clinico-pathological findings of canine monocytic *Ehrlichia canis* in a rottweiler dog

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Abstract

A four year old, male, Rottweiler dog was brought to small animal medicine outpatient ward unit at Veterinary Clinical Complex, Tirunelveli, Tamil Nadu, India with the history of anorexia, panting and nasal discharge. On physical examination, the prescapular lymph node was swollen and mucous membrane congested. Pinpoint petechial hemorrhages were present on ventral abdomen. For hematological and biochemical analysis, the blood was collected and examined under automated hematology and biochemical analyzers. Blood smears were prepared from peripheral site and stained with leishman's - Giemsa stain. Hematological examination revealed anemia, leukocytosis along with monocytosis and thrombocytopenia. Blood pictures revealed presence of hypochromasia and anisocytosis. The blood smears showed presence of morulae of *Ehrlichia canis*. It was present in both monocytes and lymphocytes. Biochemical examination showed elevation of blood urea nitrogen (BUN), alkaline phosphatase (ALP) and reduced albumin level. The case was diagnosed as an *Ehrlichia canis* based on presence of initial bodies and morulae within lymphocytes and monocytes. The case was treated successfully with Doxycycline @ 10 mg/kg/B/Wt for 14 days.

Keywords: *Ehrlichia canis*, monocytosis, morulae, thrombocytopenia

Introduction

Canine monocytic ehrlichiosis (CME) is a disease of dogs and caused by obligatory intracellular pleomorphic rickettsia *Ehrlichia canis* (Huxsoll *et al.*, 1970) [7]. The brown dog tick, *Rhipicephalus sanguineus*, spreads through its bite, which causes serious clinical signs in affected dogs (Aziz *et al.*, 2022) [3]. The infection is more prevalent in tropical and subtropical regions where *R. sanguineus* serves as a primary vector. Subsequent incubation period, three typical stages of the disease may develop like acute, chronic, and subclinical (Davis *et al.*, 2013) [5]. Intracytoplasmic inclusion bodies (morulae) in circulating monocytes and lymphocytes are suggestive of *E. canis* infection. The clinical symptoms of canine ehrlichiosis *viz.*, fever, weakness, loss of appetite, epistaxis, enlarged lymph nodes, tick infestation and changes in the eyes colour (Huxsoll *et al.*, 1970) [7]. A few reports of *E. canis* infection are recorded with typical clinical sign like epistaxis (Venkatesakumar *et al.*, 2018) [11]. The definitive diagnosis of ehrlichiosis based on clinical signs, haemato biochemical changes and solely presence of organism within the cytoplasm of circulating monocytes. But current challenges, as natural infections may manifest with diverse clinical signs that vary across geographical regions and stray presence of the organism in advance stages of infection. Presence of morulae on blood smear examination is snap shot approach for diagnosis of ehrlichiosis (Sheikh *et al.*, 2017) [10]. The present study reported the cytological diagnosis, clinico pathological alterations and therapeutic management of canine monocytic Ehrlichiosis in a Rottweiler Dog.

Materials and Methods

A four year old, male, Rottweiler dog (Fig. 1) was presented at Veterinary Clinical Complex, Veterinary College and Research Institute, Tirunelveli with history of not taking food for past

one week, difficulty in breathing, panting along and nasal discharge. For further investigation blood was collected from cephalic vein in the forelimb. With the use of 5 ml syringe and the blood was pour into EDTA tube and clot activator tube. Collected blood was analyzed in complete automated blood cell count machine. Biochemical examination was carried in fully automated biochemical analyzer. Blood smears were prepared from peripheral vein of ear. Smears were fixed with methanol and stained with Leishman – Giemsa as per standard procedure. Stained blood smears were washed with distilled water after 20 minutes for cytological examination.

Results and Discussion

The physical examination was conducted. It revealed general appearance of dog was normal. The dog had history of anorexia it correlated with finding of (Asmita *et al.*, 2016) [2] and pyrexia (Temperature: 102.5°C), congested conjunctival mucous membrane along with swollen prescapular lymph node as same clinical findings reported by (Senthil *et al.*, 2020) [10]. Presence of multifocal petechial hemorrhage in the ventral aspect of abdomen with it mentioned in (Azize *et al.*, 2016) [3] could be due to thrombocytopenia. The results were obtained from hematology and biochemical examinations are presented in Table 1 and 2. Hematology indicated that dog had anemia, thrombocytopenia, monocytosis as same as (Bulla *et al.*, 2004) [4]. In present study, epistaxis does not happened though thrombocytopenia exists. Biochemical analysis of our study showed elevation of blood urea nitrogen, alkaline phosphatase and reduction of albumin. These

findings were contradicted with previous report of (Asmita *et al.*, 2016) [2] and concurred with (Azize *et al.*, 2016) [3]. Blood smear examination revealed presences of both morulae (Fig. 2) and initial bodies (Fig. 3) of *E. canis* in monocytes and also within lymphocytes (Fig. 4). These results of presence of morula of *Ehrlichia canis* in lymphocytes and monocytes it is correlated with (Elias *et al.*, 1991) [6]. Animal was treated with doxycycline 10mg/kg/Bwt as a drug of choice in many clinical studies (Amyx *et al.*, 1971) [11]; (Asmita *et al.*, 2016) [2]; (Komal *et al.*, 2020) [8]. On the first day, the dog was treated with Inj. doxycycline @10 mg/kg/Bwt and to correct the electrolyte deficit infused ringer's lactate with dose rate based on dehydration, dexamethasone was given at dose rate of 2 mg/kg body weight. Then owner was advised to have Tab - Doxycycline -10 mg/kg body weight for 14 days. The dog feeding habits and other activities improved clinically one week after treatment. The haematobiochemical values were within the normal range after 14 days of therapy.

Table 1: Hematological examination

Parameters	Units	Value	Normal range	Result
Hemoglobin	g/dL	5.7	12-28	Anemia
RBC	10 ⁵ /uL	2.36	5.7-8.5	Anemia
WBC	10 ³ /uL	11,300	5000-10000	Leukocytosis
Platelets	/ul	55,000	150000-350000	Thrombocytopenia
Neutrophil	%	70	60-70	Normal
Eosinophils	%	-	5-10	Normal
Basophils	%	-	0-5	Normal
Monocyte	%	18	3-10	Monocytosis
Lymphocyte	%	12	12-28	Normal

Table 2: Biochemical examination

Parameter	Units	Value	Normal range	Inference
Blood urea nitrogen	(mg/dl)	351.45	5-30	Elevated
Creatinine	(mg/dl)	1.9	0.7-1.8	Normal
Total protein	(g/dl)	6.6	5-8	Normal
Albumin	(g/dl)	1.9	2.5-3.7	Reduce
Alanine aminotransferase (ALT)	(IU/dl)	65	15-110	Normal
Alkaline phosphatase (ALP)	(IU/dl)	1217	20-200	Elevated
Glucose	(mg/dl)	15.8	80-120	Normal

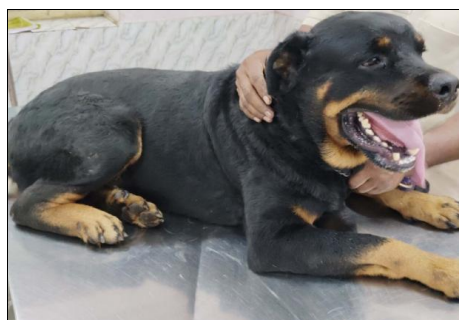


Fig 1: Rottweiler – 4 year – Male

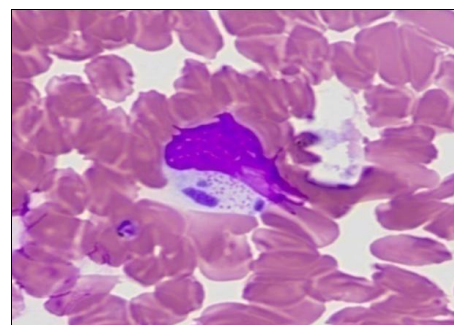


Fig 3: Presence of initial bodies of *E. canis* within the cytoplasm of monocyte - LG x1000

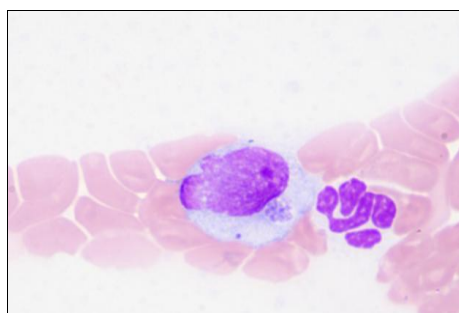


Fig 2: Presence of morulae of *E. canis* within the cytoplasm of monocyte - LG x1000

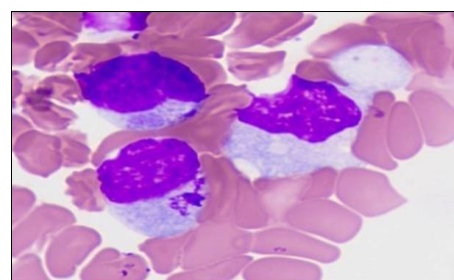


Fig 3: Presence of Morulae of *E. canis* within the cytoplasm of lymphocyte - LG x1000

Conclusion

Based on conventional blood smear examination the case was diagnosed, recorded the clinical pathological parameters and treated with doxycycline and supportive therapy for 14 days. Morulae and initial bodies presence within the circulating monocytes and lymphocytes of the dog blood smear confirm the Canine Ehrlichiosis. The dog recovered completely within 14 days of post treatment.

Conflict of Interest

Not available

Financial Support

Not available

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