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Acute Respiratory Distress Syndrome Due to Babesiosis in a Dog: Case Report

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Abstract: A case of acute respiratory distress syndrome due to babesiosis is reported in a 5 years old male Japanese sptiz. The patient was noticed to have developed sudden dyspnoea. The main presenting clinical signs included laboured breathing, broad-base stance but preferred recumbency, pallour and seizures. Blood smears from the ear tips revealed presence of multiple Babesia parasites in the erythrocytes. Hematology results showed slight leucocytosis, severe anemia and thrombocytopenia. Additionally, urinalysis revealed renal pathology and presence of leucocytes in urine. Despite aggressive measures to stabilize the patient, it died within an hour. Autopsy results also confirmed Babesiosis with generalized icterus.

Key words: Canine babesiosis, clinical signs, complications, ear tips, patient, Kenya

INTRODUCTION

Canine babesiosis is a tick-borne disease caused by intra-erythrocytic protozoan parasites of the genus *Babesia*. *Babesia gibsoni*, *Babesia canis canis*, *Babesia canis vogeli* and *Babesia canis rossi* are the main species isolated from dogs. The disease has a worldwide distribution and is transmitted by the following ticks *Rhipicephalus sanguineous* (Brown dog tick), *Haemaphysalis leachi*, *Haemaphysalis bispinosa* and *Dermacentor reticulatus* (Mathe *et al*., 2006). There is also non-vector transmission by blood exchange during fighting, biting and blood transfusion (Jefferies *et al*., 2007).

The infection by these hemoparasites results in a wide range of clinical presentations from sub-clinical disease to severe illness. The common presenting clinical signs include pallor, fever, lymphadenomegally, spleenomegally, anorexia, icterus, hemoglobinuria and dullness. The clinical signs are associated with intravascular and extravascular hemolysis, hypoxic injury and systemic inflammation (Jacobsen, 2006).

Complicated canine babesiosis has been reported with the following manifestations; hepatopathy, pancreatitis, Acute Renal Failure (ARF), Disseminated Intravascular Coagulopathy (DIC), Immune-Mediated Hemolytic Anemia (IMHA), Acute Respiratory Distress Syndrome (ARDS), Cerebral Babesiosis (CB), Systemic Inflammatory Response Syndrome (SIRS) and Multiple Organ Dysfunction Syndrome (MODS) (Mathe *et al*., 2006). This study reports a case of canine babesiosis complicated with ARDS, ARF and CB in a 5 years old male Japanese spitz.

CASE HISTORY, FINDINGS AND MANAGEMENT

A 5 years old entire male Japanese spitz was presented to the Small Animal Clinic, University of Nairobi with a history of sudden onset of dyspnea, inappetance and dullness. On examination, the dog was in good body condition with a dull demeanour, severe respiratory distress preferred recumbency but on standing had a broad-base stance. The mucus membranes were pale, temperature of 39.6°C, tachycardia and harsh lung sounds.

The patient presented with violent episodes of seizures during the examination period. Giemsa-stained blood slides revealed presence of multiple Babesia parasites in the erythrocytes. Hematology and urine samples were analyzed and shown in Table 1 and 2, respectively. The hematology results indicated slight leucocytosis, severe anemia and thrombocytopenia. Urinalysis suggested renal pathology due to high protein and glucose levels. Additionally, leucocytes were also present in the urine.

A decision was taken to stabilize the patient prior to any anti-babesial therapy. This constituted of oxygen therapy at 2% using a gas mask, 250 mg of aminophylline

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Table 1: Hematology results of the dog that presented with acute respiratory distress syndrome due to babesiosis observed at Small Clinic, University of Nairobi, Kenya

Parameters	Recorded value		Normal range
White blood cells	20.47 m mm^{-3}	↑	6.0-17.0 m mm^{-3}
Lymphocytes	30.8%		10.0-40.0%
Monocytes	5.2%		2.0-10.0%
Granulocytes	64.0%		50.0-80.0%
Erythrocytes	1.41 m mm^{-3}	↓	5.5-8.5 m mm^{-3}
Mean corpuscular volume	68.4 fl		58.0-73.0 fl
Hematocrit	9.6%	↓	35.0-55.0%
Mean corpuscular hemoglobin	24.8 pg	↑	19.5-24.5 pg
Mean corpuscular hemoglobin concentration	36.4 g dL^{-1}		28.0 n-40.0 g dL^{-1}
Hemoglobin concentration	3.5 g dL^{-1}	↓	10.0-18.0 g dL^{-1}
Thrombocyte concentration	76 m mm^{-3}	↓	120-600 m mm^{-3}

Table 2: Urinalysis results of the dog that presented with acute respiratory distress syndrome due to babesiosis observed at Small Clinic, University of Nairobi, Kenya

Parameters	Results
Appearance	Clear
Colour	Yellowish
pH	6.0
Specific gravity	1.030
Protein	30 mg/100 mL
Glucose	1000 mg/100 mL
Ketone bodies	-
Blood	-
Bilirubin	-
Urobilinogen	1 mg/100 mL
Creatinine	-
Sediments	-
Epithelial cells	-
Erythrocytes	-
Leucocytes	25 μL^{-1}
Casts	-
Bacterial cells	-
Crystals	-
Sperm	-

by slow intravenous injection and 20 mg of Dexamethasone intravenously. The patient's condition deteriorated markedly, despite the aggressive measures of stabilization and died within an hour. Further examination at necropsy confirmed babesiosis from spleenic smears and generalized icterus.

DISCUSSION

To the researchers knowledge, this is the first case of complicated canine babesiosis manifesting with acute respiratory distress syndrome, seizures and with acute renal failure in the Small Animal Clinic, University of Nairobi. Over the past years cases of uncomplicated canine babesiosis have been observed and treated successfully in the clinic similarly to canine ehrlichiosis (Kitaa *et al*., 2005).

The common presenting clinical signs of the uncomplicated form were as reported previously (Jacobsen, 2006; Mathe *et al*., 2006). Upon infection by these intra-erythrocytic parasites there is hemolysis of infected cells leading to a hemolytic crisis (Holm *et al*., 2006). Tissue hypoxia sets in and triggers tissue injury due to the release of immunological factors (cytokines, oxygen free radicals, nitric oxide and other inflammatory mediators) causing a Systemic Inflammatory Response Syndrome (SIRS) (Schetters and Klerskens, 2009).

Body temperature raise is a sequel to the release of these inflammatory substances (Schetters and Klerskens, 2009). In rare instances where the body system is overwhelmed, long standing SIRS triggers Disseminated Intravascular Coagulopathy (DIC) leading to Multiple Organ Dysfunction Syndrome (MODS) that manifest as different complications depending on the system involved (Mathe *et al*., 2006).

The researchers strongly believed that the severe respiratory distress in the patient was due to damage at the lung capillaries compromising gaseous exchange which may have led to reduced perfusion of the brain and kidneys hence the cerebral form and acute renal failure, respectively.

The prognosis of complicated babesiosis depends on the extent of organ damage, age and the number of organs involved (Mathe *et al*., 2006). Success of treatment largely depends on the organ involved and early intervention. The reported case is observed not to have responded to stabilization due to extensive organ damage and involvement of more than one organ. Studies elsewhere have shown that *Babesia canis* is associated with high incidence of complicated cases (Mathe *et al*., 2006).

CONCLUSION

The use Giemsa stained blood smears is a quick and relatively easy technique used to scan suspect cases. However, its reliability depends on the skills of the clinician, stage of disease and has very low sensitivity. The use of molecular techniques has been employed due to high sensitivity and determination of actual species. This strengthens the need for use of modern diagnostic techniques to determine the specific etiology, clinical presentations and treatment options for better control of the different forms of babesiosis.

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