

ACUTE EQUINE PIROPLASMOSIS IN AN ARGENTINE HORSE IN KEFFI, NIGERIA: A CASE REPORT

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ABSTRACT

Equine piroplasmosis (EP) is a significant tick-borne disease affecting horses in Nigeria, caused by the protozoan parasites *Theileria equi* and *Babesia caballi*. It manifests in acute, subacute, or chronic forms, with symptoms such as fever, anemia, jaundice, weight loss, and reduced performance. A 7-year-old male Argentine horse was noticed to be manifesting a reduced activity few days after coming back from a polo tournament held in Katsina state, Nigeria. Diagnosis was confirmed by Giemsa-stained blood smear, revealing a mixed infection of *Babesia* spp and *Theileria* spp. Despite institution of treatment (Phenylbutazone, lactate ringers' solution, dextrose saline), the horse succumbed to the disease within 2 days. Post-mortem examination was carried out on the dead horse, and gross pathological lesions further confirmed the diagnosis. EP significantly impacts horse health and productivity, with infected animals often serving as long-term carriers. Control measures include vector management and improved diagnostic tools, as no vaccines are currently available. It is essential to mitigate EP's economic and health burden on Nigeria's equine population.

Keywords: Acute, Equine, Piroplasmosis, Nigeria

INTRODUCTION

In Nigeria, horses are susceptible to the dangerous disease known as equine piroplasmosis (EP). It can affect the horse's blood and is transmitted by microscopic parasites (*Babesia* sp & *Theileria* sp). Horses are important in many facets of Nigerian life, including farming, parades, ceremonies, and even as pets (Ehizibolo *et al.*, 2012). However, EP and other risk factors like inadequate care, malnutrition, and the ease with which horses can travel across borders pose a threat to these crucial roles (Onyiche *et al.*, 2020).

All of these problems aid in the spread of EP. To successfully reduce equine piroplasmosis (EP) in Nigeria, a comprehensive understanding of its regional epidemiology is important. Targeted control strategies can only be developed through detailed investigations into the distribution and transmission dynamics of these parasites across different

ecological zones. However, the existence and dispersion of the tick vectors for equine piroplasmosis (EP) parasites are closely related (Ueti *et al.*, 2008).

Transmission of the parasites is through natural bites of tick species, including *Rhipicephalus*, *Dermacentor*, *Amblyomma*, *Haemaphysalis*, and *Hyalomma* (Chabra *et al.*, 2011, Georges *et al.*, 2011).

Previous studies on EP prevalence in Nigeria often relied on less sensitive methods like microscopic examination of blood smears or single tests like PCR or competitive ELISA (cELISA).

These methods have limitations: PCR can detect the parasite before the horse's immune system produces detectable antibodies, and cELISA can lead to false-positive results after treatment, as antibodies may persist for months (Ueti *et al.*, 2012, Wise *et al.*, 2013). To improve the accuracy of EP

detection in Nigeria, there is a crucial need for more sophisticated approaches. These should combine highly sensitive molecular tests with serological tests to comprehensively identify horses exposed to the parasites that cause EP.

While molecular tools have only recently been used more frequently in Nigeria (Onyiche *et al.*, 2019, Mshelia *et al.*, 2020), this study utilizes World Organization for Animal Health (OIE)-approved cELISA tests (Mshelia *et al.*, 2016) alongside molecular detection for *T. equi*, *T. haneyi*, and *B. caballi*.

Furthermore, understanding the relationship between EP parasites and their tick vectors in specific regions is essential for assessing the risk of infection for other horses. While focusing solely on symptomatic horses does not provide a complete picture of disease prevalence, it can help identify areas with high tick activity and a greater likelihood of disease transmission.

This paper reports an unsuccessful treatment of equine piroplasmosis in a 7-year-old Argentine breed.

CASE PRESENTATION

A 7-year-old Argentine gelding on a farm in Keffi, Nasarawa state presented with fever (41.2°C), reduced appetite, malaise, lethargy, and icteric mucous membrane for 3 days. History revealed that the horse recently returned from a tournament in Katsina state where it was actively involved in polo playing. It was exposed to ticks while in the stable in Katsina state.

CLINICAL FINDINGS

Clinical examination revealed an icteric conjunctiva with pale nasal and oral mucous membranes, tachycardia (Heart Rate = 80bpm,) tachypnea (Respiratory Rate = 40 breaths per minute). Physical examination showed production of dark reddish urine, severe emaciation, flared nostrils, anxiety, exhaustion and severe dehydration. Systemic phenylbutazone (4.4mg/kg OD) was administered to reduce fever.

Supportive therapy (lactate ringers' solution and 50% dextrose saline 10ml/kg each OD) were given intravenously for rehydration. Differential diagnosis included Equine infectious anemia (EIA), African horse sickness (AHS), and dourine.

LABORATORY INVESTIGATIONS

Blood sample was collected from the jugular vein of the animal, then thin and thick smears were carried out. Full blood count (FBC) and the biochemistry profile were carried out. The FBC was performed using an automated hematology analyzer that utilizes a combination of electrical impedance for cell counting and sizing, and flow cytometry

for detailed cell analysis and white blood cell differentiation. The biochemistry profile was determined using an automated chemistry analyzer. This analyzer utilizes spectrophotometry for colorimetric and turbidimetric measurements of various analytes, and ion-selective electrodes for electrolyte analysis. Blood analysis revealed anemia, thrombocytopenia, and elevated liver enzymes.

A blood smear stained with Giemsa revealed the presence of intraerythrocytic piroplasm consistent with *Babesia* spp and *Theileria equi* (Figure I and Figure II).



Figure I: Thin blood smear showing red blood cells infected with *Babesia* spp.

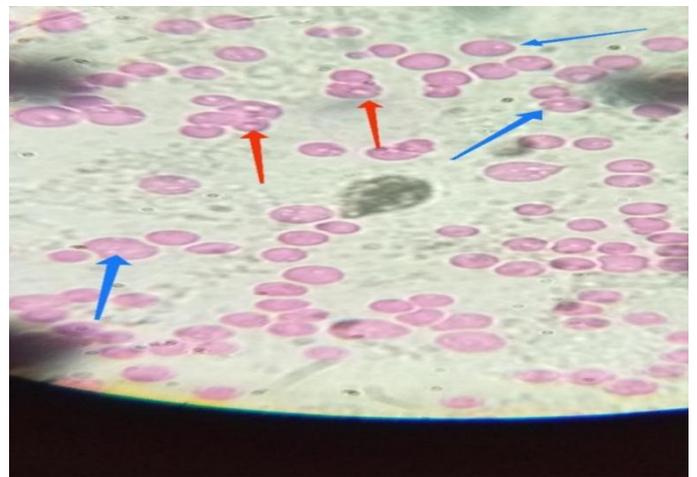


Figure II: Thin blood smear showing a mixed infection of *Babesia* (red arrow) and *Theileria* (blue arrow) species

TREATMENT PLAN AND OUTCOME

After laboratory confirmation, proper treatment regimen was instituted. These included Imidocarb dipropionate at 2.5 mg/kg IM Stat, Vit C 10mg/kg P.O, OD, Dexamethasone 0.04mg/kg, OD, Phenylbutazone 4.4mg/kg IV, OD. However, the horse's condition deteriorated rapidly, and it succumbed to the disease within 2 days.

Table I: Result of full blood count in an Argentine horse

Sample type	Result	Unit	Range	
Whole Blood	WBC	1.37	10 ⁹ /L	4.00 - 10.00
	Lyme	1.29	10 ⁹ /L	0.80 - 4.00
	Mid	0.20	10 ⁹ /L	0.10 - 1.80
	Gran	0.06	10 ⁹ /L	2.00 - 7.80
	Lyme	94.2	%	20.0 - 40.0
	Mid	1.6	%	1.0 - 15.0
	Gran	4.2	%	50.0 - 70.0
	RBC	6.91	10 ¹² /L	3.50 - 5.50
	HGB	11.4	g/L	11.0 - 16.0
	MCV	51.0	fl	80.0 - 100.0
	MCH	16.5	pg	27.0 - 34.0
	MCHC	32.4	g/dL	32.0 - 36.0
	PLT	25.0	10 ⁹ /L	100 - 300
	MPV		fl	7.0 - 11.0
	PCT		ml/L	1.08 - 2.82



Figure III: Enlarged kidney with hemorrhages of a case of equine Piroplasmosis in an Argentine horse



Figure IV: Enlarged spleen of a case of equine Piroplasmosis in an Argentine horse



Figure V: Enlarged liver showing A. Icterus, and B. Congestion of a case of equine piroplasmosis in an Argentine horse

POSTMORTEM FINDINGS

A post-mortem examination was performed, and gross lesions consistent with EP were observed (Hermas *et al.*, 2024), including pale and watery blood, enlarged spleen, petechial haemorrhages on the lungs and kidneys, enlarged lymph node, spleen and congested liver.

DISCUSSION

Equine piroplasmosis (EP) is a tick-borne disease caused by *Theileria equi* and *Babesia caballi*, which poses significant health and economic challenges to the horse industry in Nigeria. Upon examination, the horse manifested an icteric conjunctiva with paleness of the nasal and oral mucous membranes, tachycardia, tachypnoea, voiding of dark reddish urine, severe emaciation, and unthriftiness.

The result of full blood count in Table I below showed low RBC count, haemoglobin, and haematocrit and are consistent with the haemolytic anaemia caused by *Babesia* and *Theileria* parasites. The low platelet count (thrombocytopenia) can be attributed to the lysing of platelets during the parasite’s lifecycle. Leukopaenia, particularly the decrease in granulocytes and monocytes, may be due to the bone marrow suppression or lysing of these cells by the parasites. However, lymphocytosis indicates a response to the parasitic infection. These findings corroborate with the work of Mshelia *et al.*, (2016) and Onyiche *et al.* (2019) that reported similar clinical symptoms presented by the horse. Laboratory findings revealed *Babesia* and *Theileria* parasites in the blood smear. Thus causing haemolysis, leading to anaemia that causes release of haemoglobin into the blood stream. This occurs because the parasites *Theileria equi* and *Babesia caballi* are intraerythrocytic, meaning they invade and replicate within red blood cells.

This intracellular replication leads to the rupture and destruction of infected RBCs, resulting in hemolysis. This hemolysis occurs through a combination of direct parasite-induced lysis and immune-mediated destruction of infected cells. The resulting decrease in circulating RBCs leads to anemia. Furthermore, the destruction of RBCs releases hemoglobin into the bloodstream, causing hemoglobinemia. In severe cases, this can overwhelm the kidneys' ability to reabsorb the free hemoglobin, leading to hemoglobinuria (Akel & Mobarakai, 2017; Zygner *et al.*, 2023).

The parasitic infection can cause inflammation, which may contribute to the leukopenia and thrombocytopenia observed (Akel & Mobarakai, 2017). The parasite may suppress bone marrow function, leading to decreased production of RBCs, WBCs, and platelets as seen in our case. Interestingly, the postmortem lesions seen in this case are diagnostic of acute EP in horses. The postmortem lesions observed as depicted in Figures III-V, including pale and watery blood,

splenomegaly, petechial haemorrhages on the lungs and kidneys, lymphadenopathy, and hepatic congestion. These lesions result from the haemolysis, anaemia, and circulatory disturbances caused by the intraerythrocytic parasites *Theileria equi* and *Babesia caballi*. Specifically, the pale and watery blood is a direct result of severe anaemia. Splenomegaly reflects the increased activity of the spleen in removing damaged RBCs and mounting an immune response (Chapman *et al.*, 2023). Petechial haemorrhages indicate damage to small blood vessels, likely due to endothelial damage and thrombocytopenia (Nachman & Rafii, 2008). Lymphadenopathy signifies an active immune response, and hepatic congestion is associated with increased blood flow and the clearance of cellular debris (Norouzian & Abdi, 2023).

CONCLUSION

Equine piroplasmosis is a significant disease in Nigerian horses, with severe and rapid progression. Control measures include vector management and improved diagnostic tools, as no vaccines are currently available. Prompt and effective treatment, combined with improved control measures against ticks and EP, are essential to prevent mortality and reduce the economic impact of the disease.

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