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Research Article

Tick Paralysis in an African Duiker (*Cephalophus* spp.) Rescued in Southern Nigeria: A Case Report

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ABSTRACT
Tick paralysis is a neurotropic and potentially fatal condition induced by neurotoxins secreted in the saliva of engorged female Ixodid ticks. These toxins disrupt acetylcholine release at the neuromuscular junction, causing progressive paralysis and respiratory failure if not promptly managed. Although the condition is well documented in domestic animals and humans, reports from African wildlife remain rare despite the region's high tick prevalence. This report describes a case involving an adult *Cephalophus* (duiker) antelope rescued near Benin City, Nigeria. The animal exhibited weakness, ataxia, loss of reflexes, and respiratory distress. Numerous engorged ticks were found on the neck and ventral abdomen. Laboratory findings revealed mild leukocytosis, and parasitological examination confirmed *Ixodes* species infestation. Management included meticulous tick removal, supportive therapy, intravenous fluids, dexamethasone, loratadine, vitamin B-complex, oxytetracycline, and acaricide application. Although antibiotics are not standard for treating tick paralysis, their use was justified due to possible secondary bacterial or tick-borne co-infections (e.g., anaplasmosis, ehrlichiosis) and potential skin infections from immobility. The animal showed marked improvement by day three and full recovery by day five, confirming tick paralysis. This case emphasizes the critical role of early detection and supportive care in reversing a potentially fatal outcome. It also highlights the importance of routine wildlife health surveillance, ranger training, and integrated vector management to protect susceptible species in fragmented habitats.

Keywords: *Cephalophus*; Ixodidae; Nigeria; Tick paralysis; Wildlife health

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INTRODUCTION

Tick Paralysis is a condition caused by the neurotoxin of an engorged, gravid female ticks of Ixodid species during a prolonged attachment (Crawford *et al.,* 2021). It is a life-threatening, non-infectious tick-borne disease, secreted in the saliva of ixodid ticks (Crawford *et al.,* 2021). The toxins impair acetylcholine release at the neuromuscular junction, resulting in ascending flaccid paralysis, respiratory failure, and death if not recognized and managed promptly. *Ixodes holocyclus* has been reported in most cases in Australia (Rodriguez-Valle *et al.,* 2018, Borawski *et al.,* 2018). Although tick paralysis is well-documented in domestic animals such as dogs and livestock (Morsy *et al.,* 2021, Onyiche and MacLeod, 2023) reports in African wildlife are rare, despite the continent's rich biodiversity and heavy tick burden (Onyiche and MacLeod, 2023).

The *Cephalophus* (duikers) are small to medium-sized forest antelopes of sub-Saharan Africa

(awf.org/news/defassa), playing vital ecological roles in seed dispersal and food web dynamics. Their lack of regular veterinary care and inconspicuous behavior make them vulnerable to undetected parasitic invasion. Benin City lies in Nigeria's humid rainforest belt, characterized by fragmented forest habitats and peri-urban expansion that heighten interactions between wildlife and vector populations (Arktar, 2016). This case contributes to the scarce literature on tick paralysis in African antelopes and underscores the role of veterinary interventions in wildlife conservation.

CASE PRESENTATION

Clinical History and Examination

An adult *Cephalophus* antelope was rescued from the outskirts of Benin City after being observed with weakness and impaired mobility. On Physical examination, there was hindlimb weakness which was progressing to paralysis, no reflexes upon pricking of tendon, marked ataxia, recumbency, weak with extremities cold to touch and difficulty in breathing. The rectal temperature was 38.6°C, with a pulse rate of 33.8 beats/min. On closer examination, several active, engorged ticks attached to the ventral abdomen and cervical region were seen. No prior history of trauma, systemic illness, or toxin exposure was available.

Differential Diagnosis

Tick paralysis in antelope may mimic several neurological deficiencies or systemic conditions. In an attempt to rule out the lineup of differentials, a thorough exclusion and a timely response to ticks' removal are useful tips. These are, tick paralysis, botulism, acute inflammatory neuropathy, spinal cord injury, toxic ingestion, polioencephalomalacia (PEM), listeriosis and rabies.

Tick paralysis mostly occurs as an acute, progressive, symmetrical, ascending motor paralysis occasioned by neurotoxins release.

Botulism whose aetiology clostridium botulinum toxin, leads to flaccid paralysis which often time proceeds with cranial nerves deficits and gastro-intestinal complications. In the case of PEM, thiamine deficiency or high sulphur ingestion may manifest in blindness and several cortical signs. Listeriosis is ruled out due to typical absence of circling syndrome, facial paralysis and other asymetrical signs. In rabies, which may be rare, it was ruled out because there were no visible aggression, excessive salivation, and fulminating progression to death. While poisoning may cause muscle tremors, salivation and respiratory compromise. In spinal cord trauma, onset of paralysis is mostly sudden, asymmetrical or may even appear localized. However, observed marked improvement within 24- 48 hours post removal of ticks strongly supports the final diagnosis. Tick paralysis is mostly a diagnosis of exclusion, confirmed by rapid recovery after tick removal and following supportive care.

Diagnostic Workup

A complete blood count indicated mild leukocytosis (14.6*10/L) which may have been caused by capture experience, transportation, environmental conditions, minor wounds, localized infections, excitement or epinephrine response which also elevates WBCs count. No systemic illness or fever was detected.

Ticks were carefully collected for parasitological identification. Laboratory evaluation confirmed Ixodid tick species (Fig 1).

TREATMENT AND MANAGEMENT

Manual removal of all visible ticks was done using forceps. For supportive therapy, 5% dextrose 5-10 ml/kg/h, IV, 3/7, dexamethasone (anti-inflammatory), 2mg/ml, IM, 3/7, oxytetracycline 20% 1ml per 10kg, IM, repeated after 48hrs, loratadine 5 mg/day IM, 3/7, Vitamin B-Complex, 1ml, IM, 5/7, pour-on for tick control and close monitoring of vital parameters, hydration status, and neurological function were done.

Fig 1. Ixodid Species detached from the Duicker

Outcome

On the third day, the antelope showed gradual clinical improvement after intervention. Day 5, the animal regained mobility, normal reflexes, and stable

respiration as seen in Fig 2. The rapid and complete recovery confirmed the diagnosis of tick paralysis.

Fig 2. Duicker on Day 7 Post-treatment

DISCUSSION

An undiagnosed cause of morbidity and mortality in African Wildlife can be attributed to Tick paralysiss. It carries serious implications for wildlife health, conservation, and ecosystem stability. Tick paralysis can lead to sudden death in affected animals if ticks are not promptly removed, Recumbent antelopes are vulnerable to predation, dehydration and further exposure. In disease surveillance, the transient nature of tick paralysis and rapid decomposition of carcasses will make detection difficult, cases of misdiagnosis will also make most mortality attributed to other causes and lack of routine monitoring in many reserves further makes case unnoticed. In the areas of tick ecology and climate change, ticks' population are exploding due to warming and favourable temperature and changing rainfall patterns, further increasing the risk of outbreaks, constantly evolving habitat overlap between antelope and tick vectors also intensifying during seasonal migration or droughts. Also recall that treatment in the wild is more challenging, restraint and tick removal requires skills and resources, preventive measures like use of acaricides are difficult in free range. Also, the dire need for conservationists to balance interventions with less disruption to natural behaviour. For the purposes of research and policy gaps, it is noted that few published cases exist, which limits awareness and preparedness. Available wildlife heath policies mostly prioritize diseases that are infectious, overlooking neurotoxic and traumatic conditions. While ticks' paralysis is well documented in domestic animals and humans, its occurrence in African antelopes is usually under reported. More research is needed on species susceptibility, tick- host dynamics and future effects.

The condition is closely tied to the ecology of Ixodes species and seasonal movement patterns of antelopes.

Epidemiological and Ecological considerations

Tick paralysis in African wildlife is mostly under diagnosed due to a number of factors such as Limited surveillance and weak response and Missattribution to predation or trauma has also been attributed in related studies.

It is observed that Antelope species such as impalas, kudus, and bushbucks are vulnerable due to their habitats overlapping with tick-infested zones, especially more pronounced during the wet season following upsurge in ticks' populations. The condition can mimic other acute neuromuscular disorders such as botulism or neuropathies, highlighting the need for careful tick inspection in cases of unexplained paralysis (Jeyaraja *et al.,* 2021).

Detachment of all ticks attached was the most critical step. This stops neurotoxin delivery, and recovery typically begins within hours to days if intervention occurs early (Lother and Haley, 2017).

Supportive fluid therapy was used to maintain circulation and hydration, an important measure since systemic weaknesss, anorexia, neurotoxins in saliva can lead to progressive motor paralysis. In many severe cases, it can also impair swallowing and mobility contribute to dehydration and shock. Dehydration can result from prolong reduction of water intake due to paralysis or weakness, stress from immobilization or capture procedure. It was clinically assessed using skin elasticity (Tenting test), Capillary refill time, Eyes appearance (sunken eyes) and percentage estimation was scored at 11% due to weak pulse and observed cold extremities. Intravenous fluids have been shown to shorten recovery time in tick paralysis (Atwell *et al.,* 2019).

Dexamethasone was administered to reduce possible inflammation and minimize potential hypersensitivity reactions, particularly relevant in situations where antiserum might otherwise be required (Porrett *et al.,* 2021).

Oxytetracycline was included as a prophylactic measure to prevent secondary bacterial infections, especially aspiration pneumonia, which is a recognized complication of severe paralysis involving respiratory or swallowing muscles (Sanivarapu *et al.,* 2024).

Loratadine, an antihistamine, was given to reduce the risk of allergic reactions associated with massive tick removal and to stabilize the animal during recovery (Islam *et al.,* 2023).

Finally, acaricide treatment and environmental management strategies were recommended to reduce

the risk of reinfestation (Obaid *et al.,* 2022). Ranger training and ecological monitoring are essential components of sustainable control measures, particularly in fragmented habitats where wildlife-vector contact is increasing (Stephenson *et al.,* 2022).
This management approach resulted in rapid recovery, consistent with the expected prognosis when tick paralysis is promptly recognized and managed.

CONCLUSION

This case highlights tick paralysis as a rare but significant health threat in African antelopes. Early recognition, prompt tick removal, and supportive management can achieve favorable outcomes. Ticks' paralysis in African Antelopes underscores the intersection of parasitology, neurology and wildlife conservation efforts. Case reports will among others help improve clinical understanding, inform deeper ecological management and overall disease surveillance strategies.
Routine surveillance- should implement regular health checks in the wild especially during peak ticks' seasons.
Capacity building for field veterinarians and rangers as well to identify high- risk ticks' species.
Stakeholders should always consider tick paralysis in cases of sudden onset of ataxia, recumbency alongside other conditions.
Prompt tics removal should be encouraged.
Commencement of supportive therapy such as hydration, provision of shades, and protection from predators for recovering animals.
Encourage judicious uses of acaricide.
Advocate Habitat management such as managing grass height, controlling host species rodents or birds that supports proliferation of ticks.
Sentinel monitoring can be of help: Domestic animals, or GPS- collared antelope as sentinel to detect early signs of infestation or tick paralysis.
For research purposes, encourage case documentation in form of publication of confirmed cases as this will in no small measure help build data base and raise awareness.
Encourage cross- sector collaborations such as One Health (OH)'. Policy formulation tailored towards national wild life disease surveillance framework is highly recommended.
Wildlife health monitoring and vector control strategies must be strengthened to safeguard vulnerable species in Nigeria's rapidly changing ecosystems.

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