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Case Report Open Access

Management of Tick Infestation in a hedgehog – Case Report

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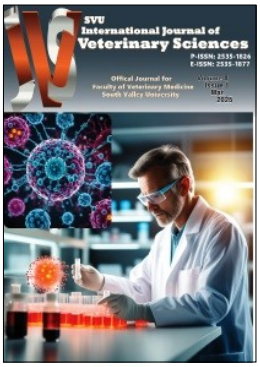

ABSTRACT

Hedgehogs are small insectivorous mammals susceptible to tick infestations, which can result in systemic complications and act as vectors for zoonotic diseases. The case report presents the management of a tick-infested hedgehog acquired from the wild and kept as a pet. The hedgehog exhibited lethargy, anorexia, and pale ocular mucous membranes. Examination revealed a body temperature of 35.4°C, respiratory rate 40 cycles/min and ticks across its body. Laboratory investigations identified the ticks as Amblyomma variegatum and Ixodes hexagonus which confirmed anemia, lymphopenia, neutrophilia, and granulocyte elevation. Treatment included subcutaneous ivermectin (0.2 mg/kg), intramuscular diminazene aceturate (2.5 mg/kg), topical fipronil spray, and supportive fluid therapy with 5% dextrose saline. These interventions effectively resolved the tick infestation and its associated complications. This case highlights the importance of timely diagnosis and comprehensive treatment of tick infestations in hedgehogs, demonstrating the effectiveness of combining antiparasitics with supportive care and the need for continued research into managing tick-borne diseases in vulnerable species.

Keywords: *Amblyomma variegatum; Anemia; Hedgehog; Ixodes hexagonus*

INTRODUCTION

Hedgehogs (Erinaceinae) are small insectivorous mammals increasingly recognized for their ecological roles and popularity as pets (Heatley, 2009). They are vulnerable to various parasitic infestations including ticks (Acarina). Hedgehogs are often exposed to tick infestations in both wild and captive environments (Thamm et al., 2009; Schütte et al., 2024). The most commonly reported tick species infesting hedgehogs include Ixodes hexagonus, Ixodes ricinus, and Rhipicephalus sanguineus (Walker, 2018; Schütte et al., 2024). These ticks may be acquired from their environment or other infested animals, particularly in areas with high tick prevalence (Rehman et al., 2017). In captivity, poor hygiene, improper enclosure maintenance, or exposure to other infected animals can predispose hedgehogs to tick infestations (Heatley, 2009; Prandi et al., 2022).

Tick infestations in hedgehogs are of concern due to their potential to cause direct harm and act as vectors for numerous zoonotic and wildlife diseases (Rocha et al., 2022). Ticks feeding on hedgehogs may carry Borrelia burgdorferi, the causative agent of Lyme disease, which poses a serious health risk to humans (Boulanger et al., 2019; Ruszkowsk et al., 2021). Chronic infestations of ticks on hedgehogs can lead to systemic effects such as weight loss, lethargy, impaired immune function, and death (Maguire et

al., 2021). Increased awareness of tick infestation in hedgehogs, coupled with advances in diagnostic and preventive strategies, can help mitigate the impact of tick infestations on hedgehog populations. This case report was aimed at treating a tick-infested hedgehog.

CASE PRESENTATION

Fig. 1: Picture of the hedgehog presented to the clinic

A hedgehog was presented to the Veterinary Teaching Hospital Ahmadu Bello University **Zaria, Nigeria** with a complaint of being off-feed and ticks all over the body. According to the owner, the hedgehog was gotten from the wild and domesticated as a pet at home.

Upon physical examination, the hedgehog appeared lethargic and reluctant to move (Fig 1). There were ticks all over the body parts and the ocular mucous membrane was pale. The hedgehog weighed 1.3kg, body temperature 35.4^{o}C and respiratory rate 40 cycles/min.

INVESTIGATION

Blood sample was collected via venipuncture through jugular vein to clinical pathology and protozoology laboratories for analysis. Ticks from the body were picked with forceps into sterile container and taken to Protozoology laboratory for identification. Laboratory result from Protozoology identified the ticks found on the body of the hedgehog to be *Amblyomma variegatum* and *Ixodes hexagonus* (Fig. 2). Blood sample sent to the clinical Pathology Laboratory was analyzed as described by Okorie-Kanu et al. (2015), it revealed anaemia, lymphopenia, neutrophilia and increased granulocyte (Table 1).

DIAGNOSIS

Tick infestation

TREATMENT

- Inj. 1% Ivermectin Kepro © 0.2mg/kg SC
- 5 % dextrose saline 50mls/kg.
- Fipronil spray was applied at the back
- Inj. Diamenazene aceturate Berenil© 2.5mg/kg I.M.

FOLLOW UP

After treatment, the hedgehog was active, with light pink mucous membranes, a temperature of 36.5°C, and a respiratory rate of 35 cycles/minute.

DISCUSSION

The present study demonstrates the potential severity of tick-borne diseases in wildlife, particularly in small mammals such as hedgehogs. The presence of *Amblyomma variegatum* and *Ixodes hexagonus* on the hedgehog emphasizes the role of ticks as both

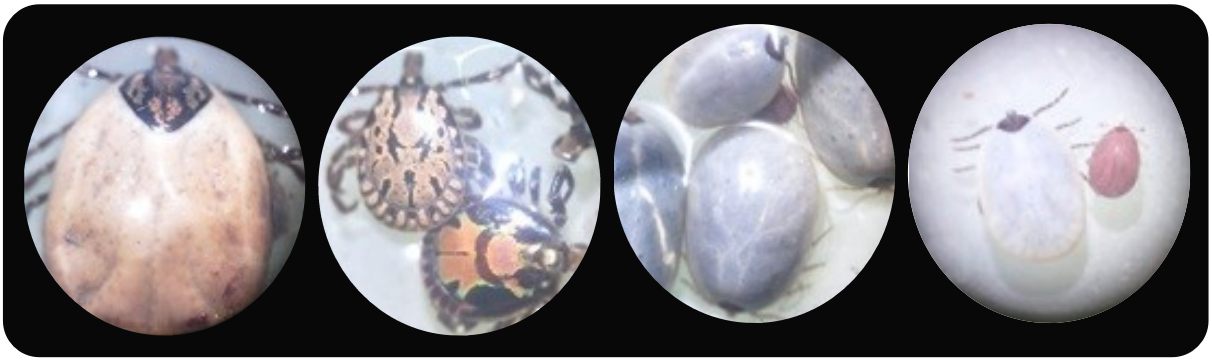

Fig. 2: Picture of Amblyomma variegatum and Ixodes hexagonus ticks viewed under the microscope.

Table 1: Haematological Parameters of the Hedgehog

Hematological parameters	Hedgehog	Reference values
RBC (×10⁶/L)	3.80	4.29–5.96
Hb (g/dL)	9.00	10.71–14.86
PCV (%)	30.10	33.50–47.00
WBC (×10³/L)	10.13	11.50–21.65
Neutrophil (×10³/L)	9.70	6.13–14.63
Lymphocyte (×10³/L)	2.90	3.28–8.88
Monocyte (×103/L)	0.80	0.00–0.78
Eosinophils (×10³/L)	0.40	0.00–0.30
Basophils	0.01	0.00–0.20
MCV (fl)	78.95	76.34–99.78
MCH (pg)	23.68	22.47–31.44
MCHC (g/dL)	30.00	27.69–35.19

Reference values: Okorie-Kanu et al. 2015; RBC, red blood cell; Hb haemoglobin; PCV, packed cell volume; WBC, white blood cell; MCV, mean corpuscular volume; MCH, mean corpuscular hemoglobin; MCHC, mean corpuscular hemoglobin concentration

ectoparasites and vectors of various pathogenic organisms. *Amblyomma variegatum* is commonly associated with ruminants but can infest a wide range of hosts, while *Ixodes hexagonus* is frequently found on hedgehogs, indicating its ecological adaptability (Rehman et al., 2017; Schütte et al., 2024). These tick species are known to cause blood loss, irritation, and anemia in their hosts, which were evident in the present study. Ixodes species, in particular, are known vectors of ***Borrelia burgdorferi***, a pathogen responsible for Lyme disease, posing potential risks to both hedgehogs and humans in close contact (Boulanger et al., 2019; Ruszkowsk et al., 2021).

The clinical presentation of lethargy, reluctance to move, and pale ocular mucous membranes in the hedgehog were indicative of systemic involvement, likely related to the tick infestation and potential blood loss. The body temperature of 35.4°C (below the normal range for hedgehogs), suggests that the parasitic burden was overwhelming its ability to maintain homeostasis. Hypothermia in hedgehogs can result from multiple stressors, including parasitic infestations and concurrent infections (Burgess & Campbell, 1999; Bexton, 2016).

The laboratory findings were consistent with the expected effects of tick-borne diseases in mammals. Anemia, a reduction in red blood cells or hemoglobin, is often observed in tick infestations due to direct blood loss from the ticks, as well as potential secondary infections such as Babesiosis or Anaplasmosis (Hsu & Smith, 2009). In the present study, the anemia was likely a combination of blood loss from the tick infestation and possible hemolysis associated with protozoan parasites transmitted by the ticks. Additionally, lymphopenia suggested immune system suppression, which is frequently seen in wildlife under stress or burdened by heavy ectoparasitic loads (Oliver & Blouin, 2001). The neutrophilia and increased granulocytes were likely indicative of an inflammatory or infectious response, possibly as a result of tick-borne bacterial or protozoan infections (Torina et al. 2020). This aligns with findings in other studies showing that the presence of ticks such as Amblyomma americanum can stimulate a significant inflammatory response in the host (McNally & Slater, 2014).

The treatment regimen used in this case, comprising ivermectin, dextrose saline, fipronil spray, and diminazene aceturate, reflects a comprehensive approach to both treat the tick infestation and address the potential secondary infections. Ivermectin is widely used in veterinary medicine as an antiparasitic agent for the treatment of ectoparasites such as ticks, lice, and mites (Lifschitz et al. 2024). It works by disrupting the nervous system of parasites, leading to their paralysis and death (Hsu & Smith, 2009). The dose used in this case (0.2 mg/kg) is within the

recommended range for treatment of ectoparasites in small mammals (Jull & Mader, 2006). Fipronil, a topical insecticide, is commonly used to treat tick infestations. It is particularly effective against ticks and fleas by inhibiting the neurotransmitter gamma-aminobutyric acid (GABA) in the nervous system, leading to paralysis and death of the tick (McNally & Slater, 2014). Fipronil spray application on the back is a targeted approach to remove any remaining ticks on the body of the hedgehog after systemic treatment with ivermectin.

Diminazene aceturate, an antiprotozoal agent, was included in the treatment regimen as a precautionary measure to address possible protozoan infections such as Babesia or Theileria, which are transmitted by ticks of the Amblyomma genus (Oliver & Blouin, 2001). While this drug is commonly used in cattle and sheep, it is increasingly being utilized for treating tick-borne diseases in wildlife (Burgess & Campbell, 1999).

Fluid therapy, particularly with dextrose saline, was critical in managing the hedgehog's hypoglycemia and potential dehydration. Hedgehogs, especially those under stress due to parasitic infestations, are highly susceptible to dehydration and metabolic imbalance. The administration of fluids ensures that the animal has the necessary resources to support its recovery, particularly in cases of anemia where blood volume may be compromised (Jull & Mader, 2006).

CONCLUSION

This case highlights the need for prompt and effective veterinary care in wildlife species suffering from ectoparasitic infestations. The use of ivermectin, fipronil, and diminazene aceturate, along with supportive therapy such as dextrose saline, proved to be an effective treatment protocol for managing tick infestations and associated health complications in a hedgehog. Continued research and veterinary management strategies will be essential for protecting wildlife from the increasing threats posed by tick-borne diseases.

CONFLICT OF INTEREST

Authors declare no conflict of interest

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