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A case report on the effective management of canine demodicosis

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Abstract

Canine demodicosis is a non contagious skin disorder caused by *Demodex canis*, a mite that resides in the hair follicles and sebaceous glands of dogs. While typically harmless in healthy dogs, overgrowth of the mite can lead to clinical manifestations such as alopecia, pustular lesions, and pruritus. A 10 month old female Doberman dog, weighing 12 kg, was presented to the Veterinary Clinical Complex, Veterinary College and Research Institute, Salem, with a history of inappetence, dullness, itching, and hair shedding. The bitch had a previous history of ectoparasite infestation and followed regular vaccination and deworming schedules. Physical examination revealed alopecia, pustular lesions, dry scales, crusts, and scabs, especially around the ears, head, and shoulders. Examination of skin scraping confirmed a generalized demodicosis. The dog was initially treated with Ivermectin (400 µg/kg), Hydroxyzine hydrochloride (2 mg/kg), and Enrofloxacin (10 mg/kg) for 20 days. Bravecto (Fluralaner) at 25 mg/kg was administered every 30-60 days, along with topical therapies using benzoyl peroxide (1-3%) and cypermethrin (1.0%) shampoos. The treatment successfully controlled the mite infestation and secondary bacterial infection. After three weeks, the dog showed a complete recovery, with two consecutive negative skin scrapings, confirming the resolution of the condition. The combination of systemic treatment with Ivermectin, Hydroxyzine, Enrofloxacin, and Fluralaner, alongside topical treatments, was effective in managing generalized demodicosis in this dog. This case highlights the effectiveness of combined systemic and topical therapies, including the use of isoxazoline derivatives like Fluralaner in treating generalized canine demodicosis.

Keywords: Canine demodicosis, *Demodex canis*, Fluralaner, Ivermectin, generalized demodicosis

Introduction

Canine demodicosis, commonly referred to as "mange," is a dermatologic condition caused by the overgrowth of *Demodex canis* mite, which normally resides in the hair follicles and sebaceous glands of dogs. While the presence of *Demodex* mites is typically asymptomatic in healthy dogs, an imbalance in the immune system, often due to genetics, stress, or other underlying conditions, can lead to the development of generalized or localized demodicosis (Olivry *et al.*, 2009) ^[16]. This condition is characterized by symptoms such as hair loss, erythema, pustules, and secondary bacterial infections (Marsella *et al.*, 2015) ^[11]. Demodicosis is more common in young puppies, particularly in those with an inherited predisposition to immune system dysfunction, but it can also affect older dogs, often due to immunosuppressive conditions or treatments (Patterson *et al.*, 2008) ^[17]. The disease can range from localized lesions, which are confined to specific areas, to generalized forms that involve extensive areas of the body and may require more intensive treatment (Kwochka *et al.*, 1999) ^[9]. There are three documented species of canine *Demodex* mites: *Demodex canis*, *D. injai* and *D. cornei*. *Demodex canis* was the first species to be identified, while the other two species may be either mutations of *Demodex canis* or distinct species (Sivajothi *et al.*, 2015) ^[20]. *Demodex injai* is a long bodied mite, with males more than twice as long as male *D. canis* mites (Hillier and Desch, 1997) ^[7]. Scarff (1988) reported a short and stubby form of *Demodex*, approximately half the length of the female *D. canis* (Scarff, 1988; Chesney, 1999) ^[18, 1].

Demodex canis is transmitted from mother to puppy during the early days of life, and while it is typically asymptomatic in healthy animals, its overgrowth can occur under conditions of

immunosuppression or genetic predisposition (Fadok, 2000) [3]. The pathogenesis of the condition involves an impaired immune response, which allows the mites to proliferate uncontrollably (Olivry *et al.*, 2009) [16]. Treatment often involves a combination of systemic and topical therapies, including acaricides like ivermectin or newer isoxazoline derivatives like fluralaner, which have shown efficacy in managing generalized demodicosis (Marsella *et al.*, 2015) [11]. This article presents a case report of demodicosis along with advisable treatment, prevention and control measures in dogs.

Case history

A 10 month old female Doberman dog, weighing 12 kg, was presented to Veterinary Clinical Complex at the Veterinary College and Research Institute in Salem. The bitch had a history of inappetence, dullness, itching, and hair shedding, along with a prior history of ectoparasite infestation. The animal was regularly vaccinated, and dewormed. On physical examination, the dog exhibited alopecia, pustular lesions, dry scales, crusts, and scab formation around the ears, over the head, and on both the right and left shoulder regions (Fig. 1). The body temperature was 39.8 °C, and the conjunctival mucous membranes were congested. Other parameters, such as heart rate, respiratory rate, urination, and defecation, were normal. There was mild neutrophilic leukocytosis, along with decreased total protein and albumin levels.



Fig 1: Lesions of Demodicosis (*Demodex canis*) in a 10-month-old female Doberman dog-a & d: Head and ears, b & c: Shoulder, neck and abdomen region

Method/Diagnosis

Based on the clinical signs observed in the animal, the infection was tentatively diagnosed as a skin infection of parasitic origin. For confirmatory diagnosis, deep skin scrapings were collected using scalpel blades. Multiple scrapings were taken from affected skin areas of approximately 1 cm² in the direction of hair growth. The skin was squeezed to maximize the number of mites in the area to be scraped. The skin was scraped until capillary bleeding occurred, indicating sufficient depth. The debris was then transferred onto a slide, mixed with mineral or paraffin oil, and examined under a microscope with a coverslip at low magnification (10x).

Treatment

The dog was treated for *Demodex canis* with a comprehensive approach combining systemic and topical

therapies. Initially, it received Ivermectin (400 µg/kg) for mite infestation, Hydroxyzine hydrochloride (2 mg/kg) for itching, and Enrofloxacin (10 mg/kg) for secondary bacterial pyoderma. Additionally, Bravecto (Fluralaner) was administered at 25 mg/kg every 30-60 days for mite control, while topical benzoyl peroxide shampoo (1-3%) was used every 3-7 days for its keratolytic effect. Cypermethrin shampoo (1.0%) was applied every 15 days to enhance the miticidal effect. After three weeks of treatment and two consecutive negative skin scrapings, the dog showed full recovery. The use of isoxazoline derivatives like Fluralaner demonstrated effective results in treating generalized demodicosis, leading to successful resolution of the infestation.

Results

The present case was considered as generalized demodicosis due to the presence of a large number of lesions throughout the body. The skin scraping examination revealed the presence of elongated, cylindrical and cigar shaped mite, which was identified as *Demodex canis* (Fig. 2) with body divisible into the head, thorax and the abdomen and each microscopic field contained eight to ten mites. The mite is characterized by thorax with four pairs of three jointed short and stumpy legs and long, transversely striated abdomen (Soulsby, 1982) [21].



Fig 2: *Demodex* mites (cigar shaped) in skin scrapings under 10X magnification

Discussion

The present case was classified as generalized demodicosis due to the lesions observed throughout body region. Several drugs are used in the multimodal treatment of canine generalized demodicosis (Mueller *et al.*, 2012) [14]. The lesions of demodicosis and clinical indications may be caused by a variety of predisposing factors viz., malnourishment, malnutrition, aberrant environment that encourages mite proliferation and the development of other skin diseases (Mueller *et al.*, 2012; Shrestha *et al.*, 2015) [14-19].

The treatment approach for *Demodex canis* in this case is a combined systemic and topical therapies, which is essential for managing generalized demodicosis in dogs. *Demodex canis* mites typically reside in the hair follicles and sebaceous glands, and their overgrowth can result in

conditions like pyoderma, hair loss, and itching (Olivry *et al.*, 2009) ^[16]. The initial treatment involved Ivermectin (400µg/kg), an effective acaricide for mite infestations, particularly in generalized demodicosis (Cohen *et al.*, 2003) ^[2]. While ivermectin is commonly used, caution is required for certain breeds, such as Collies, due to potential toxicity (Patterson *et al.*, 2008) ^[17]. To manage pruritus, Hydroxyzine hydrochloride (2 mg/kg) was administered, as it effectively reduces itching related to allergic reactions and secondary infections (Hann *et al.*, 2012) ^[6]. Enrofloxacin (10 mg/kg) was used for secondary bacterial pyoderma, a common complication in demodicosis, offering broad-spectrum antibiotic coverage (Giorgio *et al.*, 2011) ^[4].

Bravecto (Fluralaner) was a key component of the treatment, administered at 25 mg/kg every 30-60 days. Fluralaner, an isoxazoline derivative, is highly effective against *Demodex* mites, inhibiting their GABA receptors and causing paralysis and death of the parasites (Marsella *et al.*, 2015; Kopp *et al.*, 2013) ^[11-8]. According to Grellet *et al.* (2021) ^[5], fluralaner significantly reduces the mite burden in dogs with generalized demodicosis, leading to quicker recovery times and improved clinical outcomes compared to traditional therapies such as ivermectin. These findings support the use of fluralaner as a first-line treatment for demodicosis, especially in cases that are resistant to other treatments. Topical therapy with benzoyl peroxide shampoo (1-3%) was used every 3-7 days for its keratolytic and follicular flushing effects, helping to reduce scaling and open blocked hair follicles (Marrack *et al.*, 2009) ^[10]. Moreover, topical treatments, like benzoyl peroxide and cypermethrin shampoos, are commonly used adjunctively to enhance the therapeutic effects and promote skin healing (Mylonakis *et al.*, 2022) ^[15]. Additionally, Cypermethrin shampoo was applied every 15 days to enhance the miticidal effect, as it targets surface mites (Morris *et al.*, 2013) ^[13]. After three weeks of treatment, the dog showed complete recovery, with two consecutive negative skin scrapings. This outcome supports the efficacy of combining systemic and topical therapies, especially with newer treatments like Fluralaner, which offer long-lasting results with fewer applications compared to older options like ivermectin (Marsella *et al.*, 2015; Mishra *et al.*, 2024) ^[11-12]. The case underscores the importance of a multi-faceted treatment strategy for managing generalized demodicosis in dogs.

Conclusion

This case highlights the importance of a comprehensive treatment approach for generalized demodicosis, which includes systemic acaricides, topical shampoos, antibiotics for secondary infections, and pruritus management. Supportive therapy helps in the improvement of secondary bacterial complications. The combination of fluralaner, ivermectin, benzoyl peroxide, and cypermethrin shampoos was effective in resolving the infestation, while careful follow-up ensured that the dog made a full recovery. The use of isoxazoline derivatives like fluralaner represents a promising and effective alternative for the treatment of generalized demodicosis in canines.

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Conflict of Interest

There is no conflict of interest among authors for this case study.

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