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Case Report

Alternative Therapeutic Approach to Treat Canine Demodicosis

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Abstract

Canine demodicosis is becoming prevalent parasitic skin disease caused by Demodex mange. Eleven-month-old German shepherd dog was presented at Veterinary Teaching Hospital, University of Agriculture, Faisalabad, Pakistan having lesions on face and fore limbs with alopecia. Skin scrapping of affected area revealed cigar shaped demodectic mange, while history, physical examination aided with complete blood report confirmed *Demodex canis*. Treatment protocol adopted for this case consisted of Ivermectin 0.6 mg/kg subcutaneously (Ivomec®, Merial-Boehringer Ingelheim, Germany) and Ceftriaxone Sodium, 500 mg intravenous (Kintrex®, Sami pharmaceuticals Pvt. Ltd., Pakistan), Trichlorfon 980 mg/gm (Neguvon, Symans Pharmaceuticals Pvt., Ltd., Pakistan) mixed with 1 mL of 25% Cypermethrin (Cyprin, Nawan pharmaceuticals, Pakistan) in 4 litres of water to be sprinkled on the body of dog for seven days. Fipronil 25% spray (FRONTLINE®, Merial-Boehringer Ingelheim, Germany) was also applied on affected parts. Fourteenth day of post treatment, clinical signs were disappeared. Skin scrapping slide was also found negative in addition to normalize hematology.

Keywords: *Demodicosis; Dog; Ivermectin; Ceftriaxone; Cypermethrin; Fipronil*

Introduction

The skin is all the time exposed to infectious agents that are dominated by parasites. Most of these parasites are ectoparasite infestations that cause irritation as well as sensitization of skin. Reactions with these ectoparasitic or extra-epidermal parasites lead to inflammation, toxins production. Canine demodicosis (demodectic mange/ follicular scabies/red scabies) is an emerging common skin disease of veterinary medicine that may occur due to excessive growth of hair follicles [1]. The disease is identified by the formation of papules, nodules, pustules and cysts of different sizes, seems mostly on neck, shoulder and forequarter region. As the disease progresses, the lesion spreads from the initial position to other parts of the body [2]. The disease may be caused by *Demodex canis* (long bodied mites) alone or in combination with short bodied mites i.e. *Demodex injai* [3]. The symptoms are not evident in case the mites are fewer in number and remain vital microfauna of skin that may proliferate in immune compromised and genetically disordered dogs [4]. Severity of disease thus relies on the type of mite involvement, extent of disease, and presence of any illness. No involvement of humoral response, makes recovery more challenging [5].

The disease presents itself in localized and generalized manifestation. Ninety percent effected dogs may spontaneously recovered from clinical manifestation while latter requires immediate treatment because disease progresses in short span of time. The disease must im-

mediately be diagnosed and treated to avoid adversity. Diagnosis involves a proper history of disease, clinical signs, skin scrappings and complete blood count. Effective treatment includes miticidal along with antiparasitic, antifungal, and antibiotics as an adjunct therapy. Current case report was aimed to treat generalized canine demodicosis in order to get quick recovery and to get thriftiness of patient to reinstate.

Case Presentation

Eleven-month-old German Shepherd dog weighing 22 - 25 kg was presented to the Veterinary Teaching Hospital, University of Agriculture, Faisalabad, Pakistan with a complaint of depression, rubbing his face and paws, lesions on its body especially around the mouth and fore-limbs (Figure 1). History revealed that the patient was suffering from this condition since last 10 days. Upon physical examination of the dog, temperature, pulse, and respiration were found normal. Signs included lesions on eyes, lips, front legs, scaly and itchy skin having reddish-brown colour and thinning of hairs at affected areas. Two diagnostic approaches including complete blood count and skin scrapings were used. From the affected area, shallow and deep skin scapings were performed for laboratory tests by using surgical blade until blood started oozing. The material was suspended on slide coated in a drop of potassium oxide. The slide visualized at 10X magnification under stereomicroscope (Figure 2). These scrapings were found positive for parasites which were identified as cigar shaped 8 headed *Demodex canis*. For haematological abnormalities (Figure 3-6), 10 mL blood was collected in 10% EDTA coated vacutainer from saphenous vein. Blood was processed for complete blood count i.e. PLT (platelet count), WBC (white blood cells), LYM (lymphocytes), GRAN (granulocytes), RBCs (red blood cells). Blood samples were also centrifuged at 3000 rpm for 10 minutes to collect plasma. Remaining red blood cells were used to evaluate oxidative stress. Haematological abnormalities showed reduced total erythrocyte, lecucytie, neutophil, and eosinophil count. All the clues like history, physical examination, skin scrapping slide, and haematological parameters proved *Demodex canis* infection.

Figure 1: *Appearance of animal before and after treatment (before treatment, a=arrow indicates lesions; b=alopecia on back of dog; after treatment, c and d= arrow indicates recovered lesions).*

Figure 2: *Demodex canis in skin scraping slide (visualized at 10X, Stereomicroscope, arrow indicate cigar like mange).*

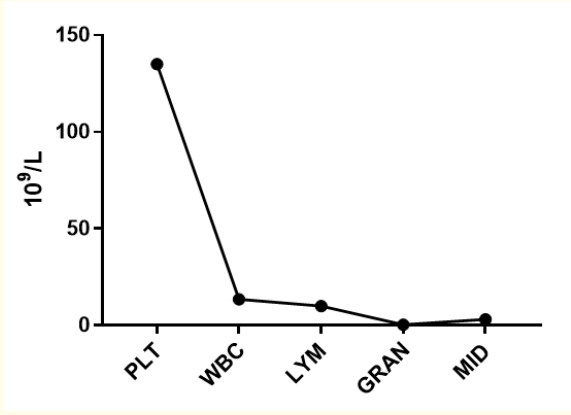

Figure 3: *Haematological values (109/L) in dog suspected with canine demodicosis.*

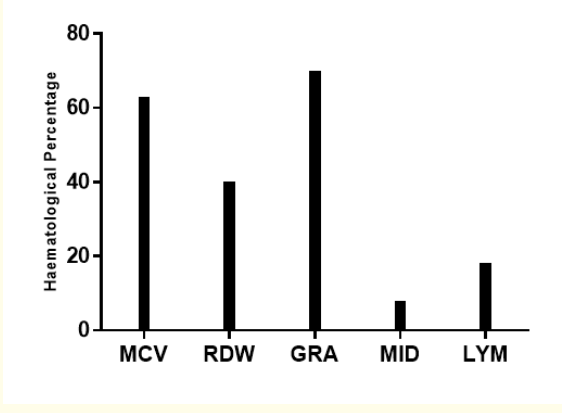

Figure 4: *Haematological percentage in dog suspected with canine demodicosis.*

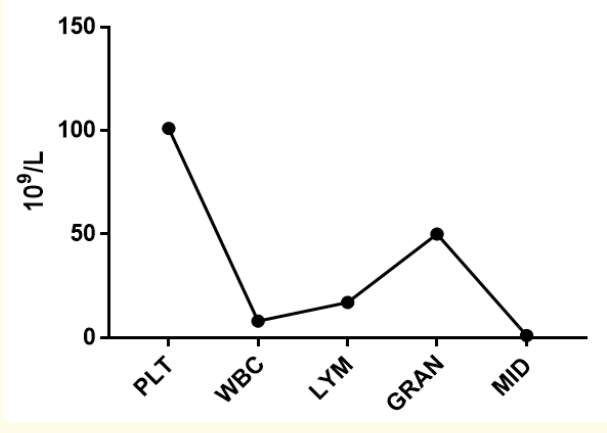

Figure 5: *Haematological values (109/L) in dog after treatment protocol.*

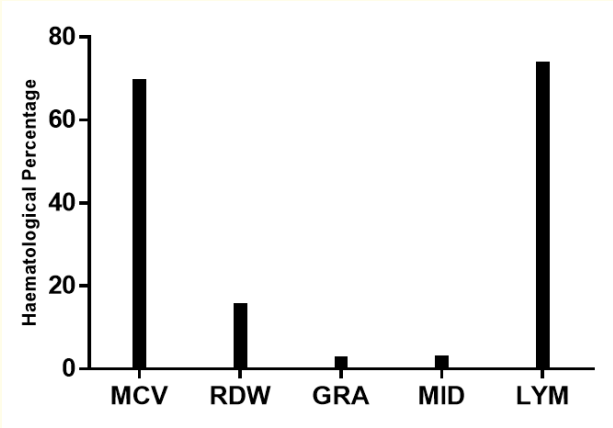

Figure 6: *Haematological percentage in dog after treatment protocol.*

Treatment

Ivermectin (Ivomec®, Merial, France) 0.6 mg/kg subcutaneously single dose and Ceftriaxone Sodium, 500 mg intravenously (Kintrex®, Sami pharmaceuticals Pvt. Ltd., Pakistan) were injected (SID for three days). Trichlorfon 980 mg/gm (Neguvon, Symans Pharmaceuticals Pvt., Ltd., Pakistan) mixed with 1 mL of 25% Cypermethrin (Cyprin, Nawan pharmaceuticals, Pakistan) in 4 litres of water was also sprinkled on the body of dog for seven days. Fipronil 25% spray (FRONTLINE®, Merial-Boehringer Ingelheim, Germany) was also applied on affected parts. Total of 3920 mg of Trichlorfon was mixed in 4 litres of water. The dog was kept under observation for one hour for avoiding licking.

Results

After the treatment protocol, patient was monitored continuously on weekly basis. Physical examination and skin scrapping were performed until four weeks of post treatment. Two weeks later, patient showed negative results and complete recovery against demodicosis (Figure 1c).

Discussion

Dog Demodex is the main cause of demodicosis characterized by the presence of numerous *Demodex* species. The three admitted canine *Demodex* mites are *Demodex cornei*, *Demodex canis* and *Demodex injai* [6]. Anaemia may also occur in this condition due to loss of skin proteins and leucocytosis. This may be due to allergic reactions of mites or their products of inflammatory reactions [7] as indicated in figures 3-6, where a significant difference can be seen in PLT, GRAN, LYM, MCV before and after treatment. There are several recommended treatments for complex demodectic mange in dogs. Although various protocols have been proposed, one of them is the administration of a high dose of ivermectin, which may be used orally or subcutaneously [6]. Ivermectin is structurally similar to macrolide antibiotics, but it does not possess antibacterial activity. It selectively binds to glutamate-dependent chloride channels in invertebrates and muscle cells, leading to cell death [8]. Trichlorfon is an organophosphate, which is also used systemically in dogs for its anthelmintic and pesticidal properties [9]. It is an acetylcholinesterase inhibitor [10]. Besides, there have been reports about the use of cypermethrin and fipronil for the control of ticks and mites [11,12]. Fipronil binds to the agonist-related form of the **γ**-aminobutyric acid (GABA) receptor in the cell membrane and mediates its action through three classes of receptors. These classes are known as **α**-adrenergic, **β**-adrenergic and octopaminergic/tyramine receptors [13].

There are following studies and case reports evaluating the treatments of canine demodicosis.

Effected Dogs	Treatment Protocol	Recovery %	References
6	Deltamethrin rinse every 12h for 7 days	100%	[14]
10	Ivermectin at 350 µg kg^{-1} every 24h	50%	[15]
20	Ivermectin at 600 µg kg^{-1} every 24h	70%	[16]
16	Cypermethrin at 15 mg/kg	87.5%	[17]
16	0.1% solution of 97% trichlorfon	100%	[9]
1	Amoxycillin and clavulanic acid 20 mg/kg q12h, Ivermectin 100 µg/kg up to 600 µg/kg q 24h, Cephalexin 300 mg q12h	100%	[3]

Table 1: *Different treatment protocols of canine demodicosis.*

Conclusion

Many negligence factors are responsible to cause canine mange e.g. a misdiagnosed parasitic disease which should be diagnosed as early as possible to shorten the disease course. The diagnosis may be coupled with multiple approaches like history, clinical examination, skin scrapping slide examination, and haematology. The treatment must encompass all aspects inclusive of antifungal, antiparasitic, and antibacterial for one week observing time through parenteral and topical routes. Regular monitoring along with improved environment and provision of a balanced diet supplemented with fatty acids may get quick recovery.

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