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Generalized demodectic mange in a Pomeranian dog

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Abstract
A 4 year old Pomeranian dog, weighing around 10 kgs was presented with the complaint of hair loss, biting itself, itching and foul smell along with severe skin lesions all over the body. On clinical examination of the dog alopecia, crust formation and erythema of skin were observed all over the body. The appetite, pulse rate and respiratory rate of the dog were found to be within the normal range while the dog had mild fever of 102.8 °F. Skin scrapings were collected in 10% potassium hydroxide and submitted for microscopic examination which revealed *Demodex canis* under microscope. The systematic investigation did not show any significant abnormality in the hemato-biochemical parameters. The dog was treated with injection Ivermectin @ 0.2 mg/kg body weight subcutaneously once weekly for an interval of four weeks. Amitraz (Ridd®) 12.5% was diluted @ 4 ml/L of water and carefully worked onto the skin with a sponge after every week for twenty - one days. Before dipping, bathing with benzoyl peroxide shampoo (Petben®) was advised for soothing of skin and removal of crusts and debris. Oral antibiotic Cephalexin was given @30mg/Kg BW orally for fifteen days to check any secondary bacterial infections along with nutritional supplement (Syrup Nutricoat Advance, 2 tsf twice daily) and Liver tonic. Complete recovery occurred on 35th day after start of the treatment.

Keywords: Pomeranian dog, alopecia, itching, *Demodex canis*, ivermectin

Introduction
Canine demodicosis or demodectic mange or red mange or follicular mange is a common non-contagious inflammatory parasitic dermatosis characterized by excessive proliferation of Demodex mites within the hair follicles and sebaceous glands (Singh *et al.*, 2011) [1]. There are mainly three species of recognized Demodex mites in canine which are *Demodex canis*, *Demodex injai* and *Demodex cornei* while *Demodex canis* is the most common (Reddy *et al.*, 2014) [2]. *Demodex canis* is an ectoparasite and is the normal inhabitant of the canine hair follicles and sebaceous glands of skin. These mites assume pathogenic role mainly due to altered immune response or transmission from dam to pup leading to the development of clinical signs like alopecia, erythema and development of scales and lesions either localized on face and limbs or generalized all over the body. Localized demodicosis involves only small areas of skin having one or more discrete foci that regress spontaneously or may progress to widespread generalized cutaneous lesion. Generalized demodicosis may be severe; potentially life threatening disease and mostly associated with secondary bacterial pyoderma requiring prolonged treatment (Mueller, 2012) [3]. Receptivity of dogs to demodicosis is influenced by numerous intrinsic and extrinsic factors. Intrinsic factors like hereditary predisposition, alterations in skin structure and biochemistry, immunological disorders, breed, age and hormonal status (hypothyroidism, hyperadrenocorticism). Extrinsic factors include alimentation, fitness, presence of stress factors, presence of other diseases or pathogens (Singh and Dimri, 2014) [4]. The infection can only be seen in the immuno-deficient animals, old dogs and young puppies of about 3 months to a year old (Mueller, 2012) [3].

Materials and Methods
A 4 years old Pomeranian dog, weighing around 10 kgs was presented to the Veterinary Clinical Complex of the Abhilashi University with complaint of hair loss, biting itself, itching, and foul smell along with severe skin lesions all over the body (Fig. 1).

There was no evidence of fleas. The deworming and vaccination were properly updated and the dog had otherwise no other problem. On clinical examination of the dog foul smell from body, alopecia, crust formation and erythema of skin were observed all over the body. The appetite, pulse rate and respiratory rate of the dog were found to be within the normal range while the dog had mild fever of 102.8°F. Skin scrapings was collected in 10% potassium hydroxide and submitted for microscopic examination which revealed *Demodex canis* under microscope. Identification of mites was made by the method described by (Soulsby, 1982) [5]. Adult mites were cigar shaped with four pairs of stubby legs in the thorax part of their body (Fig. 2). The case was diagnosed as generalized demodicosis. The systematic investigation did not show any significant abnormality in the hemato-biochemical parameters. The skin lesions were persistent since last three months.

Results

The dog was initially treated with Antibiotic Ceftriaxone @ 20 mg per kg body weight and anti-allergic drug Cetrizine @ 1.0 mg.

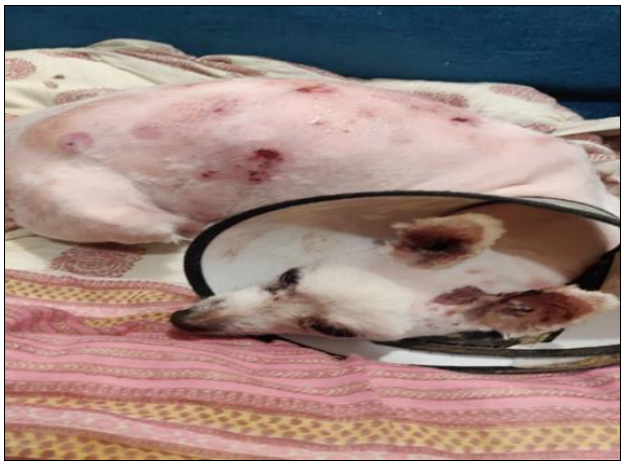

Fig 1: Dog with generalized demodicosis

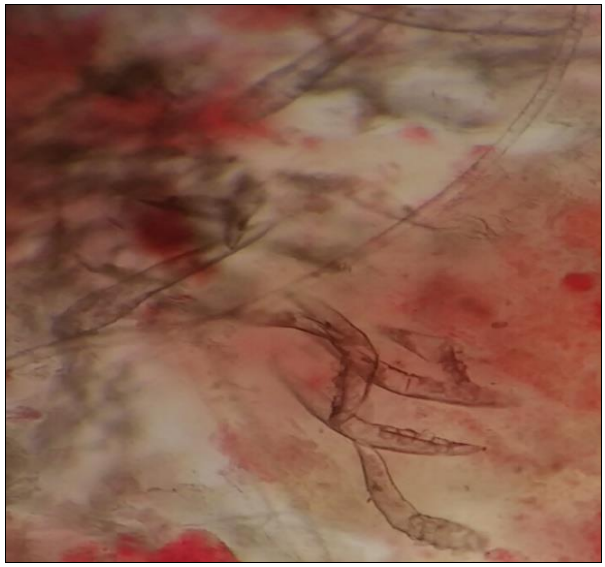

Fig 2: Scraping containing *Demodex canis* mites (40 X)

Per kg body weight for a period of seven days. The animal was also administered corticosteroids orally daily for a period of five days. A shampoo with Chlorhexidine was applied weekly once with supportive therapy, liver extract and multivitamins. The animal recovered upto some extent however, after few days the dog again developed similar lesions. The dog was then treated with injection Ivermectin @ 0.2 mg/kg body weight subcutaneously once weekly for an interval of four weeks. Amitraz (Ridd®) 12.5% was diluted @ 4 ml/L of water and carefully worked into the skin with a sponge after every week for twenty-one days. Before dipping, bathing with benzoyl peroxide shampoo (Petben®) was advised for soothing of skin and removal of crusts and debris. Cephalexin @ 30 mg/Kg BW orally for fifteen days to check any secondary bacterial infections along with nutritional supplement (Syrup Nutricoat Advance, 2 tsf twice daily) and Liver tonic. The owner reported marked improvement in condition after 14 days of treatment; hence the treatment was continued and complete recovery occurred on 35th day after start of the treatment as was evident from disappearance of skin lesions and skin scrapings were negative for mange mites.

Discussion

The failure of the treatment given before was due to the administration of corticosteroids which further suppressed the immune system of the animal. Ivermectin given orally for generalised demodicosis selectively binds to glutamate-gated and gamma-aminobutyric acid (GABA) gated chloride channels in mite's nervous system, resulting in hyperpolarization of cell, paralysis and finally death of mites (Venkataramanan *et al*., 2013) [6].

Amitraz associated with the antibiotic therapy is highly effective for treating generalized demodectic mange (Tarallo *et al*., 2009) [7]. Application of Amitraz should be preceded by a shampoo such as benzoyl peroxide applying some hours before in order to remove crust, debris, and bacteria and the dipping should be continued for at least two treatments after negative scrappings have been obtained (Verde, 2005) [8]. Amitraz acts by inhibiting monoamine oxidase and prostaglandin synthesis and by stimulating α2-adrenergic receptors of arthropod nervous system (Tarallo *et al*., 2009) [7]. Moreover, Antibacterial shampoos like benzoyl peroxide and chlorhexidine are beneficial when treating demodicosis (Panigrahi *et al*., 2013) [9]. Benzoyl peroxide shampoo possesses keratolytic and follicular flushing activity and hence it is recommended for the treatment of demodicosis (Scott *et al*., 2001) [10]. Omega fatty acids solution along with vitamins for the supplement also helped in improving immune system and strengthening skin health by maintaining integrity of the epithelial barrier.

Conclusion

The present study confirmed that treatment of demodicosis via a combination therapy with ivermectin administered sub-cutaneously at weekly intervals, topical application of Amitraz and benzoyl peroxide shampoo, along with cephalexein orally and supportive therapy is an effective and well-tolerated treatment for generalized canine demodectic mange.

Acknowledgement

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