



## Research Article

# Advances in Therapeutic Management of Complicated Demodicosis in Canines

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### ABSTRACT

Mixed infection by ectoparasites and bacteria are common among dogs. Such cases need efficiently devised therapeutic approach as mere treatment of one of the pathogens will not be much beneficial. In one such case of German Shepherd presented with signs of alopecia, erythema and hyperpigmentation, comedones, crust formation, itching, oozing of serum and pus formation at certain points, proper diagnostic and therapeutic approach lead to improvement. Skin scraping for parasitic examination and swab for bacterial culture was taken. After skin scraping and bacterial culture it was diagnosed as a mixed infection of demodicosis and pyoderma. As the case was complicated, both antiparasitic and antibacterial medication was started in a proper way along with antiinflammatory and antiallergic agents. Animal showed improvement and treatment was continued with some modifications. Finally the animal recovered. Advancement in therapeutic management of complicated demodicosis in canines is becoming a need of the hour as such cases are on rise among pets.

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### INTRODUCTION

Nowadays concurrent occurrence of mixed infection by mites and bacteria are becoming common among pet dogs (Mueller, 2004; Mueller *et al.*, 2012). This may be due to the unhygienic management and complications post demodicosis. Due to itching and scratching by mite infestation, skin is predisposed to bacterial invasion and hence development of pyoderma. Such cases are usually diagnosed based on history, clinical examination along with skin scraping test and bacterial culture (Muller *et al.*, 2012). Treatment involves medication against both mites and bacteria besides preventing inflammation and allergy (Taylor, 2001; Ettinger and Feldman, 2010).

*Demodex canis* is common cause of demodicosis or red mange in dogs. It is a tiny parasitic mite living in or near hair follicles and invades deep in dermis. Infection is acquired either from infected animal or objects or following immunosuppressive conditions or treatments, or may be related to a genetic immune deficiency (Greve and Gaafar, 1966). Dalmatian, the American Bulldog and the American Pit Bull Terrier appear to be more susceptible (Urquhart, 1996). Most common sites lesions are the face, muzzle, forelimbs and periorbital regions. Usually two types of manifestations are there. These include squamous and pustular forms. Squamous form causes dry alopecia and thickening of the skin and pustular form which is the more severe form, causing secondary bacterial infection resulting in the characteristic red, numerous pustules and wrinkling of the skin (Mueller, 2004; Mueller *et al.*, 2012).

Usually demodicosis is complicated by Staphylococcal infection (especially *Staphylococcus epidermidis*) (Mueller, 2004) but other bacteria like streptococcus can also occur. This results in pustule formation and systemic reactions like fever and septicemia.

### MATERIAL AND METHODS

A one and half year German Shepherd dog was presented with signs of alopecia, erythema and hyperpigmentation, comedones, crust formation, itching, oozing of serum and pus formation at certain points on body. Clinical examination was done and clinical parameters like temperature, respiration rate and pulse rate, were taken. Skin scrapings were taken for detection of mites and pus soaked swab for bacterial culture. Scrapings were taken from edge of lesion by a sharp blade smeared with glycerol in a petri dish until bleeding occurred. Skin scrapings were digested in warm 10% KOH and smear was prepared. Swab was cultured in nutrient broth and slides were stained with Gram's stain for bacterial examination.

### RESULTS

On clinical examination alopecia, crusting of skin and pustules were noticed around ventral abdomen, face, neck and back. Animal had itching and scratching lead to oozing of serum like fluid. Pus formation was noticed around lesions. Temperature was slightly elevated (103.8°F), respiration rate (28/minute) and heart rate (72/minute).

Table: Showing therapeutic management of complicated demodicosis in canines.

Drug	Dosage	Effect
Ivermectin injection	@ 200µg/kg body weight subcutaneously once in week	to treat mite infestation
Benzoyl peroxide shampoo	Used topically for bathing	was used for its follicular flushing activity
Whole-body amitraz dips (0.025%)	applied every 2 wk	to treat generalized demodicosis
Cephalexin	@ 25 mg/kg was given orally daily	to treat pyoderma and to prevent bacterial infection.
Meloxicam	@ at a dose rate of 0.15 mg/kg IM	to treat fever and inflammation
Antihistamine cetirizine	was used @ 1mg/kg body weight once daily	To prevent allergy/itching,
Omega fatty acids were supplied (Nutriccoat advanced <sup>®</sup> ).	1 tsf daily orally	To minimize oxidative stress and to support healthy skin growth

were within normal range. Mucous membranes were congested. Animal was dull, depressed and anorectic. Pinna-pedal reflex showed jerking of foot on pinching pinna.

Skin scraping revealed presence of small mites under microscopic examination. These were categorized as *Demodex canis* by parasitological examination. Bacterial culture showed presence of Gram positive cocco-bacillary bacteria mostly *Staphylococci*.

Treatment was started with ivermectin injection @ 200µg/kg body weight subcutaneously once in week to treat mite infestation. Topically benzoyl peroxide shampoo was used for its follicular flushing activity. Whole-body amitraz dips (0.025%) were applied every 2 wk to treat generalized demodicosis. Higher concentrations (0.05%) and shorter treatment intervals (1 wk) may be more efficient. At times hair clipping and body cleansing, especially with benzoyl peroxide shampoo was used. Cephalexin @ 25 mg/kg was given orally daily to treat pyoderma and to prevent bacterial infection. Meloxicam @ at a dose rate of 0.15 mg/kg was given to treat fever and inflammation. To prevent allergy/itching, antihistamine cetirizine was used @ 1mg/kg body weight once daily. To minimize oxidative stress and to support healthy skin growth omega fatty acids were supplied (Nutriccoat advanced<sup>®</sup>). Animal responded well to treatment and same treatment was continued for one week. After this ivermectin was stopped, topical preparations were continued along with omega fatty acids. Besides hepatoprotectants like vitamin B complex and antioxidants like selenium and vitamin E was also provided in follow up treatments.

## DISCUSSION

Treatment of canine generalized demodicosis is multimodal (Mueller *et al.*, 2012). Taylor *et al.* (2001) has reviewed recent developments in ectoparasitocides. Mueller (2008) has used different topical agents for demodicosis. Benzoyl peroxide (2–3%) and chlorhexidine-based shampoos (3–4%) are commonly recommended for dogs with demodicosis. They also have antimicrobial action. Amitraz is widely used in canine demodicosis. The recommended concentration varies from 0.025 to 0.06%, with a frequency of once weekly to every 2 weeks (Mueller, 2004). It has many advantages as summarized by Scott *et al.* (2001) and Mueller *et al.* (2012). Recently efficacy of metaflumizone plus amitraz for the treatment of juvenile and adult onset demodicosis in dogs was studied by Rosenkrantz (2009).

Use of macrocyclic lactones in demodicosis is well established. Milbemycin oxime (Holm, 2003; Mueller,

2004), ivermectin (Delayte *et al.* 2006; Mueller, 2004) and doramectin (Murayama *et al.*, 2010) are the common ones used. Recent ones include selamectin (Schnabl *et al.*, 2010). Also use of amitraz collars, closantel, deltamethrin, vitamin and Se, PUFAs (Behera *et al.*, 2011; Singh *et al.*, 2011), herbal and homeopathic preparations (Dimri *et al.*, 2008), muramyl dipeptide and phoxime has been recommended in skin affections (Mueller, 2004; Gorte, 2006).

Demodicosis complicated by bacterial infection presents a challenge for veterinary practitioners. Therapeutic regime requires a strategic approach that overcomes both effects of mite and bacteria and the damage they cause in the animal in general and in the skin in particular. Besides proper timing, frequency and duration of treatment will determine the outcome of therapy.

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## CONFLICT OF INTEREST

Author's declare that they do not have any conflict of interest.

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