An Update on Therapeutic Management of Canine Demodicosis

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Abstract

Canine demodicosis is a common noncontagious parasitic dermatosis caused by different spp of Demodex mites including Demodex canis, Demodex injai and D. cornei. Generalized demodicosis can be one of the most frustrating skin diseases, one will ever treat. Conventional and newer miticidal therapies are available to veterinarian to treat this frustrating skin disease. All recognized Demodex mites in dogs appear to respond similarly to mite targeted therapy. Treatment for canine demodicosis includes amitraz, ivermectin, milbemicin oxime, moxidectin, and doramectin. The use of any glucocorticoid-containing products is contraindicated and could favour disease generalization. Conventional treatments will often appear to work however, but it relies heavily on a highly toxic method of treatment. Using natural remedies for mange, on the other hand, can enhance the dog's immune system, so that the body can fight off the mange mite infection by itself.

Keywords: Canine, Demodicosis, External Parasite, Mite, Immune system.

Introduction

Canine demodicosis is a common noncontagious parasitic dermatosis caused by overpopulation of the host-specific follicular mites of various Demodex species. Dogs have three recognized species of Demodex mite; clinically majority of cases of canine demodicosis are caused by Demodex canis. The Demodex canis mite is part of the normal cutaneous flora of dogs. This mite is limited to the hair follicle and, rarely, the sebaceous gland. Number of mites is kept low by a dog's immune system. The newly observed species of Demodex mites have led to the identification of additional patterns of clinical disease. Demodex injai, the large body Demodex species mite, is larger in all life stage than Demodex canis (Desch and Hillier, 2003). These mites tend to reside within the sebaceous glands. Cases of the D. injai infection are associated primarily with dorsal seborrhea dermatitis (Bensignor et al., 2006). A newly identified short bodied Demodex species mite has been tentatively named Demodex cornei. Unlike the other canine Demodex species mites, D. cornei can reside in the most superficial layer of the epidermis. It is 50 % shorter than the other form of D. canis (Tamura et al., 2001). The clinical signs and treatment of D. cornei so far appear to be similar to those of D. canis. Conventional and newer miticidal therapies are available to veterinarian to treat this frustrating skin disease.

Therapeutic approach

Treatment of localized canine demodicosis

Juvenile-onset localized demodicosis resolve spontaneously within one or two months in most dogs. Thus, miticidal therapy is not required unless the disease generalizes. By not treating localized cases with miticidal therapies, dogs developing generalized disease can be identified and eliminated from breeding programs given the genetic basis for this disease. Furthermore, mite-specific therapy has potential side effects and presents an unnecessary risk in patient with potentially self curing disease.

Localized demodectic lesions may benefit from topical antimicrobial agents such as mupirocin, benzoyl peroxide, chlorhexidine, or ethyl lactate when secondary pyoderma is present. The use of any glucocorticoid-containing products is contraindicated and could favour disease generalization. A clinical examination with skin scraping two to four weeks after initial diagnosis is indicated to monitor for disease resolution and progression.

Treatment of generalized canine demodicosis

Generalized demodicosis can be one of the most frustrating skin diseases, one will ever treat. Premature treatment cessation by owners is a central reason for treatment failure. Since clinical signs often improve before parasitological cure, owners should understand the need for regularly scheduled follow-up visit to ensure a successful outcome.

Antibiotic therapy for pyoderma

Superficial staphylococcal pyoderma is treated empirically by using a beta-lactamase-stable antibiotic for a minimum period of four weeks. Adjunctive topical therapy with an antibacterial shampoo may hasten clinical resolution. Common antibacterial shampoo ingredients include benzoyl peroxide, chlorhexidine, and ethyl lactate. Benzoyl peroxide-based shampoo are often recommended because of their keratolytic and supposed follicular flushing activity (Scott et al., 2001). Antibiotics should only be recommended on the basis of cultural and antibiotic sensitivity test.

Miticidal therapy

All recognized Demodex mites in dogs appear to respond similarly to mite targeted therapy. Treatment failure is rarely due to resistant mites. More frequent of treatment failure in canine demodicosis include poor pyoderma control, premature discontinuation of therapy, unsuccessful control of underling conditions, and the use of concomitant glucocorticoids. However, if a patient dose not responds to the initial miticide, one should switch to another treatment option (Mueller, 2004).

According to reports of earlier workers treatment for canine demodicosis includes, amitraz, ivermectin, milbemicin oxime, moxidectin, and doramectin (Mueller, 2004; Dimri et al., 2009). Earlier workers found evidence that ronnel, lufenuron, and levamisol should not be used to treated canine (Mueller, 2004). Because of the safer therapeutic options available, organophosphates should not be used to treat demodicosis.

Amitraz

Topical amitraz is FDA-approved for treating generalized demodicosis in dogs older than 4 months of age. Amitraz, a miticide and insecticide, is a monoamine oxidase inhibitor (MAOI), prostaglandin synthesis inhibitor, and an alpha2-adrenergic agonist (Mueller, 2004). Amitraz liquid concentrate is to be used as a 0.025% (250ppm) dips every two weeks for three to six topical treatments until no live mites are found. All dogs cannot be cured with amitraz administered as per the label protocol. Consequently, investigators have found greater cure rates by using various regimens of increased dip concentrations or frequencies. Overall, topical amitraz at 0.025% to 0.05% every seven to 14 days is recommended.

Pododemodicosis and demodectic otitis can be treated with an extra label mixture of amitraz and mineral oil (1:9), although this mixture may irritate the otic epithelium in some individuals. If label protocol proves to be ineffective, it may be more acceptable to use macrocyclic lactones instead of extralabel amitraz. Amitraz collars are not recommended for treating demodicosis (Mueller, 2004).

Amitraz dips are not without risk to dogs and their handlers. Many patients experience mild toxicosis seen as excessive lethargy for one or two days after dipping (Gortel, 2006). More overt signs of toxicosis are similar to those of seen with use of alpha2-adrenergic agonists, including sedation, hypothermia, bradycardia, and hyperglycemia (Hugnet et al., 2001). Hyperglycemia is a potential concern in diabetic dogs as well as in clients. The use of alpha2-adrenergic antagonists can reverse signs of toxicosis and can be used before dipping in patients with a history of adverse effects. Atipamesole (50µg/kg intramuscularly) can reverse the signs of toxicosis within 10 minutes (Hugnet et al., 2001). Avoid antidepressants and MAO inhibitors, such as selegiline, in dogs receiving amitraz. Animal handlers administering amitraz should wear protective clothing and apply in a well ventilated area. Personnel should be aware of potential risk for drug interactions. Those with respiratory problems or diabetes should not use amitraz (Avsarogullari et al., 2006). A new spot-on formulation containing metaflumizone and amitraz can be used as a topical treatment for generalized demodicosis in dogs older than 1 year of age (Fourie et al., 2007).

Macrocyclic lactones

Macrocyclic lactones include the avermectins (ivermectin and doramectin) and milbemycins (milbemicin oxime and moxidectin). This class of drugs selectively binds to glutamate-gated and gamma-aminobutyric acid (GABA)-gated chloride cannels in the mite's nervous system, resulting in cell hyper polarization, mite paralysis, finally death. Macrocyclic lactones do not readily cross mammalian blood-brain barrier (Macdonald and Gledhill, 2007). Safety in mammals is due to the lack of glutamate gated chloride channels in the peripheral nervous system and restriction of GABA to a central nervous system.

Ivermectin

For generalized demodicosis, the injectable form of ivermectin should be given orally at a dose of 300 to 600µg/kg/day (Mueller, 2004). The aqueous formulation may be more palatable than are propylene glycol-based products. Adverse events are sporadic and include lethargy, edematous wheels, mydriasis, muscle tremors, and ataxia. The main concern is development of signs attributed to sever neuro-toxicosis including depression, stupor, coma, ataxia,

mydriasis, tremors, emesis, drooling and seizures; death can also result. Blindness has also been reported in dogs (Kenny et al., 2008).

The better identify ivermectin-sensitive dogs, one report recommended initially dosing ivermectin at 50 µg/kg/day and then incrementally increasing the dose by 50µg/kg during the first days of treatment until the target dose is achieved (Mueller and Bettenay, 1999). Another way to gradually increase the dose of ivermectin is to calculate the target dose and corresponding volume, and then give 25% (day 0-2), 50% (day 3-5), 75% (day 6-8) and 100% (day 9+). The pour-on formulation of ivermectin is not effective in treating generalized demodicosis (Mueller, 2004).

Signs of ivermectin toxicosis can occur inspective to any breed but are most common in ivermectin sensitive breeds such as collies and other herding breeds (Hopper et al., 2002). There is no safe specific antidote for ivermectin toxicosis. Initially following an oral exposure the focus should be on ivermectin removal; activated charcoal and saline cathartic can be used. Symptomatic and Supportive care can help the majority of intoxicated animals. Treatment could be prolonged (days to weeks), intravenous fluids, pads, turning affected animals to prevent pressure sores and treat possible bradycardia. Picrotoxin has been proposed as a specific antidote. There are some reports of using picrotoxin to treat ivermectin toxicosis. It is generally titrated to effect. Picrotoxin is a potent GABA antagonist that causes an increase in the excitability of neurons in the CNS which leads to convulsions. Seizures caused by picrotoxin administration may be treated with barbituates. Picrotoxin has a narrow margin of safety and is not the best treatment for ivermectin toxicosis. Physostigmine has been shown to have some effect in the comatose animals. This may be due to an increased concentration of acetylcholine in affected neurons. The comatose animal may exhibit a transient increase in metal alertness. This may be beneficial to the veterinarian by: confirming the diagnosis of ivermectin toxicosis, possibly treating the more severe cases and giving the owners hope for their comatose dog.

Milbemycin oxime

Oral milbemycin oxime is recommended at a dose rate of 1.5 to 2mg/kg/ day, although the dose ranges of 0.5 to 3.1 mg/kg/day have been used (Holm, 2003). Cure rate vary are better with higher dose. Ivermectin-sensitive breeds generally tolerate milbemycin oxime at the dose outlined above (Tranquilli et al., 1991). Side effects of daily milbemycin oxime administration are similar to those of ivermectin and include depression, stupor, coma, ataxia, and seizures. The major limitation of this drug is expense.

Moxidectin and Doramectin

Moxidectin given orally at 400µg/kg/day may be effective in treating generalized demodicosis. Moxidectin can be used at a lower dose and then gradually increased to 400µg/kg/day similar to ivermectin (Wagner and Wendlberger, 2000). Doramectin is another avermectin, can be used at 600µg/kg/week subcutaneous injection (Dimri et al., 2009; Johnston, 2003). This drug should not be used in ivermectin sensitive breeds of dogs.

Alternative and supportive therapies

Conventional treatments will often appear to work however, but it relies heavily on a highly toxic method of treatment. Using natural remedies for mange, on the other hand, can enhance the dog's immune system, so that the body can fight off the mange mite infection by itself. Natural remedies such as nutritious foods, herbs and other supplements can be used to treat the skin problem topically. Lots of raw dark leafy vegetables like broccoli, watercress should be added to diet which help in quick recovery from demodectic mange. Raw foods increase the antioxidents as these are crucial at this time for the immune system. Because antioxidants minimize damage to cells, they are useful whenever disease is present and immune support is needed. Adding dietary supplements is also important to help relieve the dog's itch and improve his skin conditions. Fish oil provides omega-3 fatty acids and can be very effective in easing an itch. Other sources of omega-3 fatty acids include flaxseed oil and pumpkin seed.

We have demonstrated the efficacy of Jatropha curcas oil against canine demodicosis. Jatropha curcas oil along with Withania somnifera root extract revealed higher efficacy against demodectic mange (Singh and Dimri, 2010). Powdered garlic, and goldenseal, mixed in olive oil, can be applied to areas of skin infested with Demodex mange. Garlic contains sulphur compounds which mites dislike. Diluted garlic oil can therefore be used topically to the affected areas. Since garlic is antibacterial as well, applying garlic oil to the affected areas will have the added benefit of minimizing bacterial infection. If dog is sensitive to garlic, licorice can be used instead. High quality natural food, processed food or those high in sugars should be avoided. Mites feed on the yeast living in the body, and systemic yeast feed on nutritional yeast and sugars (carbohydrates). By

eliminating these things, the mites will starve to death. This means eliminating all grains, potatoes, yeast & starch/sugar and feeding only quality raw meat & bone will help in recovery of dogs from demodicosis. The best therapy would be supplementing with Colostrom, next best thing which is not anywhere near as potent though would be probiotic for the immune system.

Rubbing of copious quantities of vegetable oil into the skin are said to starve Demodex mites of oxygen. Neem oil, together with lavender oil, can make an effective skin rinse against mange. To make the skin rinse, 1 part Lavender oil, 1 part Neem oil, and 10 parts Almond oil should be mixed and applied to affected areas once or twice daily. Yarrow is excellent in wound healing, stops the bleeding from oozing wounds. Yarrow oil, salve, or ointment can be applied to the affected areas. Other herbs that are effective against mange include yellow dock, Echinacea, Calendula, and Aloe vera.

Homeopathic treatment

It is also effective in treating canine mange. Commonly used homeopathic remedies are Sulphur, Psorinum and Silicea. A treatment protocol for mange consists of the combined usage of neem oil (externally) and homeopathic (orally). The neem oil kills the mange mites on contact, while the homeopathic deals with the animal's constitutional predisposition to getting mange (this helps to reduce the likelihood of the mange recurring). The homeopathic preparation contains arsenicum album, graphites, hepar sulph, kali arsenicum, psorinum, and sulphur.

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