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CANINE AND FELINE DEMODICOSIS

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Canine demodicosis is a noncontagious parasitic skin disease caused by an overpopulation of the host-specific follicular mites of the genus Demodex. Most cases of canine demodicosis are caused by Demodex canis, although two other species of demodicid mites are reported. Localized demodicosis is a common mild and benign self-limiting disease. In contrast, generalized demodicosis is a serious and potentially life-threatening disease. Most cases of generalized demodicosis are juvenile in onset and develop in dogs less than 1 year of age.

A genetically preprogrammed immunologic defect probably is responsible for the juvenile-onset, generalized demodicosis. Immunosuppressive diseases (hyperglucocorticoidism, iatrogenic hyperglucocorticoidism, lymphoid neoplasia, leishmaniasis, and hypothyroidism) can induce adult-onset demodicosis. Marked breed predilections and clustering in litters support a hereditary basis for juvenile-onset generalized demodicosis. Data suggests an autosomal recessive mode of inheritance. The American Academy of Veterinary Dermatology (AAVD) adopted a resolution in 1981 sponsored by Dr. Robert Kirk recommending 'neutering all dogs who have had generalized demodicosis so that the incidence of the disease is decreased and not perpetuated'.

Generalized canine demodicosis is characterized by the progression of multifocal, erythematous, partially alopecic, crusted macules that eventuate in plaques. Boggy, crusted plaques, alopecia, and exfoliation are signs of more severe disease. Hyperpigmentation, lichenification, and scarring develop with chronic infection. Secondary bacterial infection with generalized deep folliculitis and furunculosis, occasional cellulitis, and tissue devitalization may contribute greatly to disease severity, morbidity, and mortality. Hairloss may be surprisingly minimal in long-coated breeds with long anagen hair cycles such as the Maltese, Shih Tzu, Lhasa Apso, and Miniature Poodle; this may lead to a decreased suspicion for demodicosis.

Diagnosis is not difficult in most dogs with demodicosis. Skin scrapings or hair plucking readily demonstrate mites. Skin biopsy may be required to rule out demodicosis if the disease is chronic, severely affects the feet, or in the Chinese Shar Pei.

Feline demodicosis is a rare or regional skin disease caused by at least three different species of demodicid mites. Feline superficial demodicosis is a contagious, transmissible frequently pruritic generalized skin disease caused by the surface dwelling Demodex gatoi. Feline follicular demodicosis caused by the feline follicular mite, Demodex cati resembles Demodex canis infection in dogs.

Feline superficial demodicosis does not have a canine counterpart. It is believed to be rare in most of North America, but is found more commonly in localized enzootic regions of the southern and southeastern U.S.A. Feline superficial demodicosis may be increasing in frequency where modern insect-specific parasiticides that do not kill acarids are used for flea control. Clinical features vary from asymptomatic alopecia to alopecia with variable pruritus and self-trauma. If pruritus is absent, cats can present with diffuse, bilaterally symmetric alopecia, plus or minus scaling, affecting the ventral and lateral trunk and caudal legs. Pruritus, if present, usually is intense leading to erythema, crusting and excoriation. Skin scrapings may not yield mites or eggs in pruritic cats since excessive grooming can remove surface-living mites. Skin scrapings of non-pruritic cats may yield large numbers of mites.

Feline follicular demodicosis due to D. cati is rare may present as either localized or generalized follicular demodicosis. Similar to canine localized demodicosis, feline localized demodicosis is a mild and self-limiting disease. Similar to canine generalized demodicosis, feline generalized follicular demodicosis due to D. cati seems to require diminished immune response. Immunosuppressive diseases such as feline immunodeficiency virus infection (FIV), feline leukemia virus (FeLV), diabetes mellitus, hyper-glucocorticoidism, and neoplasia may initiate feline generalized follicular demodicosis.

Feline generalized follicular demodicosis is a less severe disease than canine generalized demodicosis. Predominantly asymptomatic and subtle erythema with variable alopecia, scaling, and crusting may be seen. Lesions most commonly affect the face, neck, trunk, or extremities. Systemic signs referable to underlying immunosuppressive systemic diseases may be noted.

Treatment of canine generalized demodicosis remains challenging. There is no treatment for generalized demodicosis that is 100% effective, even though multiple options currently are available. However, most dogs can be successfully managed long-term. Corticosteroid usage must be avoided.

Secondary deep pyoderma usually coexists with canine generalized demodicosis and must be treated aggressively. Antibiotics such as cephalaxin, enrofloxacin, marbofloxacin, and clavulanic acid-potentiated amoxicillin are used most commonly and usually are continued for a minimum of 8 weeks.

Topical adjunctive therapy is beneficial. Antibacterial and follicular flushing shampoos containing benzoyl peroxide aid greatly in management of both demodicosis and secondary pyoderma. Whirlpool baths using chlorhexidine remove debris and encourage drainage in severely affected dogs.

Amitraz (Mitaban) remains the only FDA approved treatment for generalized canine demodicosis. Before Amitraz rinses, all medium and long-coated dogs should be clipped and the hair kept short throughout therapy. Clipping plus benzoyl peroxide-containing shampoos afford better penetration of the dipping solution. Mitaban is diluted according to label directions in the USA (0.025% solution) and applied every 2 weeks. A stronger Amitraz solution (0.050% solution) has been used on a weekly basis routinely in Germany, Australia and elsewhere. Using evidence-based medicine, good evidence is available for the efficacy of Amitraz rinses (0.025-0.05% solutions) used every 1 or 2 weeks.

Amitraz rinsing should be performed either outdoors or in an open garage. Rubber gloves should be worn by the applier. Amitraz is an MAO inhibitor and should not be used by anyone taking other MAO inhibiting drugs. Continuous rinsing of the entire dog with the dipping solution and soaking of the feet in the solution should continue for 15 minutes. The
dog should be kept as dry as possible (avoiding of walking on wet lawns) between rinses.

Amitraz rinses should be continued every 2 weeks until multiple negative skin scrapings and hair plucks (no adults, larvae, or eggs) are achieved. After negative scrapings and hair plucks have been achieved, 3 additional rinses should be performed. After 3 additional rinses, reexamination should include 6 to 10 skin scrapings and hair plucks before rinses are terminated. It is not uncommon for 10 to 15 rinses to be required before negative scrapings are achieved.

Side effects of amitraz therapy include lethargy, weakness, ataxia, hyperglycemia, polyuria, hypothermia, and bradycardia. Atipamezole (Antisedan) (50 µg/kg, IV) and yohimbine (0.11 mg/kg, IV; 0.25 mg/kg, IM) may be used as a pretreatment in dogs with previous reactions to amitraz or can be used as antidotes for toxicity.

Resistant cases may require off label application of amitraz rinses weekly rather than biweekly. In cases that are controlled but not cured, a maintenance program of every 1 to 2 week rinses may be instituted to keep mite numbers low and clinical signs minimized. Dogs with adult onset demodicosis and concurrent immunosuppressive diseases frequently require extended therapy regimens.

Ivermectin (Ivomec) is a commonly used, but non-approved, treatment for generalized canine demodicosis. Many of the dogs referred to the University of California have failed ivermectin therapy. These dogs are treated with ivermectin given daily per os at a dosage between 400 and 600 micrograms/kg daily. High dose ivermectin is the most efficacious and cost-effective treatment for generalized demodicosis that is non-responsive to amitraz. Using evidence-based medicine, good evidence is available for the efficacy of ivermectin given per os (300-600 micrograms/kg daily).

Severe adverse reactions to ivermectin have been reported in both dogs and cats. Collies are particularly sensitive with over 75% of Collies being either carriers or homozygous for the dangerous mutant MDR1 allele leading to neurotoxicity. Information on testing for this mutation can be found at http://www.vetmed.wsu.edu/depts-vcpl/ Other herding breeds such as the Shetland Sheepdog, Australian Shepherd, and Border Collie also may be at increased risk for toxicity. However, idiosyncratic toxicity may be seen in any breed.

Similar to the monitoring of efficacy used with amitraz topical therapy, dogs are reevaluated monthly until multiple negative skin scrapings and hair plucks (no adults, larvae, or eggs) are achieved. After negative scrapings and hair plucks have been achieved, therapy is continued for an additional 2 months. Two months beyond the last negative skin scraping and hair pluck, reexamination should include 6 to 10 skin scrapings and hair plucks before therapy is terminated. It is not uncommon for 4 to 6 months of therapy to be required before negative scrapings are achieved.

Moxidectin (ProHeart 6), currently not available in the USA, also has been used as another non-approved, treatment for generalized canine demodicosis. Evidence-based medicine indicates good evidence for the efficacy of moxidectin given per os (400 micrograms/kg daily).

For the treatment of feline demodicosis, there is good evidence-based information to recommend lime sulfur rinses (LymDyp) (2%) weekly for the treatment of demodicosis. There is fair evidence to support the use of amitraz rinses (0.0125%) weekly.

SUGGESTED READINGS