Proceedings of the 36th World Small Animal Veterinary Congress
WSAVA

Oct. 14 - 17, 2011
Jeju, Korea

Next Congress:

Reprinted in IVIS with the permission of WSAVA
http://www.ivis.org
DEMODICOSIS IN DOGS AND CATS: HOW TO DIAGNOSE AND TREAT IT SUCCESSFULLY

Chiara Noli, DVM, Dip ECVD
Servizi Dermatologici Veterinari, Peveragno (CN), Italy

Introduction

Demodex canis is an obligate parasite of hair follicles. A long-body form Demodex injai and a short-body form Demodex cornei, have also been described in dogs. Cats have two recognized species of Demodex mites, the long-shaped Demodex cati and the short-bodied Demodex gatoi. The latter species is considered potentially contagious to other cats.

Puppies and kitten acquire the infection during the first 72 hours of life, probably while suckling. In dogs there is a definite breed and genetic predisposition to the development of demodicosis thus in the case of generalized demodicosis, breeding from affected dogs, their siblings or their parents is discouraged.

Juvenile onset demodicosis (< 1 year of age) is a frequent benign condition in dogs, which is often self-limiting. Adult onset canine and feline demodicosis may occur as a result of immunosuppression, due to glucocorticoid, progestagen or immunosuppressive drug therapy or to systemic diseases, such as spontaneous hyperadrenocorticism, hypothyroidism, systemic infections, neoplasia, malnutrition, parasitism and debilitating systemic diseases. However many of cases of adult onset canine demodicosis have no detectable underlying disease.

Clinical presentation

Two forms of demodicosis are recognized in dogs.

1. Localized demodicosis is normally seen in animals less than one year of age. The lesions consist of one or two foci of alopecia, commonly on the face or a limb. Some of these cases resolve spontaneously and some may progress to become generalized.

2. Generalized demodicosis can develop from the localized or may appear suddenly. It is characterized by multiple and confluent areas of infestation which may include the feet (pododemodicosis) and the external ear canal (otodemodicosis).

In the absence of secondary infection, and depending on the severity, demodicosis can appear like non-inflammatory patchy to diffuse alopecia, variable erythema and underlying edema, hyperpigmentation, scale and comedone formation. In cases of secondary bacterial infection, lesions observed include pustules, furunculosis,
crusts and haemorrhagic bullae. Scarring can lead to permanent hair loss. Pododemodicosis in the milder form presents as interdigital erythema and oedema, but then extends swelling, with granuloma and fistula formation. In this form it can be difficult to eradicate, as extensive inflammation and scarring may result in false negative skin scrapings.

Otodemodicosis is nearly always found together with other signs of generalized demodicosis. The otic signs include a ceruminous brown colored exudate with mites on cytological examination.

Pruritus is a variable sign. Cases without secondary infection tend not to be pruritic while those cases with severe secondary infection may display intense pruritus. Systemic signs, such as lymphadenopathy, fever and depression, can accompany severe secondary infection.

Infestation with D. injai is characterized by greasy skin patches on the dorsum, without hair loss.

Clinical signs of D. cati infection are generally similar to those of canine demodicosis. Alopecia, erythema, crusting, and ceruminous otic discharge can all occur with D. cati infection. Clinical demodicosis due to D. cati infection in cats is often secondary to an underlying systemic disease or immunosuppression. Cats with demodicosis due to D. gatoi infection present with moderate to severe pruritus, self-induced alopecia and scaling on the dorsum, and can be contagious to other cats.

Diagnosis

Canine demodicosis is diagnosed by a deep skin scraping performed with either a scalpel blade (size 10 or 20) or a Volkman spoon (5-6mm in diameter) moistened with a drop of mineral oil. Because demodicosis has a wide spectrum of presentations, examination of a deep skin scraping in all clinical cases is a good practice, even if the diagnosis of demodicosis appears unlikely. Trichograms, performed on hairs collected from the lesions, may detect mites in the keratin infundibular sheaths. After the hair is plucked, it is placed on a drop of mineral oil, covered with a cover slip and examined using 40-100x magnification. In the majority of cases, the number of mites on the host is high and the diagnosis is obvious. In active infections adults, nymphs, larvae and eggs are visible. In cases of otodemodicosis, numerous mites can be seen by examination of a smear of the ceruminous discharge mixed with a drop of mineral oil. Pustules should be examined by cytology for bacteria. The pustule is pricked with a needle and the pus collected as an impression smear. During staining of slides, mites may be lost. Unstained mites, with characteristic body shape, may be seen in the carpet of neutrophils. Bacteria, especially if intracellular, should be noted. If rod-like bacteria are identified on cytology of a pustule then culture and sensitivity testing is indicated, for a correct antibiotic choice.

Occasionally a skin biopsy is indicated in chronic fibrotic lesions, such as the interdigital granulomas associated with pododemodicosis, where a skin scraping is difficult or impossible to perform.

Superficial skin scrapings can be used to detect the superficial mite D. gatoi. Negative scrapings do not definitively rule out D. gatoi infection, so that sometimes empirical therapy for D. gatoi infection is administered to pruritic cats to rule out demodicosis.

Adult onset cases (>2 years of age) and cats should be rigorously screened for an underlying disease processes by a complete physical examination, hematology, biochemistry, endocrine function tests and tests for internal parasites and for viruses in cats.
Therapy

Several authors recommend that localized demodectic mange requires no treatment. This is based on the fact that the majority of cases of localized demodicosis will resolve spontaneously, the risk of developing resistant strains of Demodex and the masking of potential generalized cases that should be removed from breeding program. Other authors advise topical treatment of the lesions only, using preparations containing lime sulphur dip or benzyl peroxide. If the localized lesions become multiple or increase in size then they should be managed as generalized demodicosis.

Amitraz is a highly efficient miticide, often resulting in a rapid decrease in mite numbers found on skin scrapings. The commercial product should be diluted immediately before each application and sponged over the whole body of the dog. For heavily infested dogs, or dogs with long coats, clipping of the whole coat is advisable. Cure rates in the order of 80% have been achieved using a 0.125% solution daily on alternating halves of the body. In cases of moderately severe generalized demodicosis, the authors recommend the use of a 0.05-0.1% solution applied twice weekly in dogs and 0.0125% to 0.025% in cats. The solution is left on to dry and not rinsed off. Treatment should take place in the open air or in well-ventilated room. Treatment administrators should wear gloves. Up to 40% of cases will display lethargy, depression or transitory pruritus. Chihuahuas and toy breeds are very sensitive to amitraz and the agent should not be used in these breeds.

Dogs with secondary infection, excessive scale/exudate or with numerous comedones should be shampooed with 2.5% benzyl peroxide before each amitraz dip. Benzyl peroxide has disinfectant, astringent and keratolytic properties and has the capacity to flush debris from hair follicles, facilitating the entry of amitraz.

Pododemodicosis can be treated by immersion of the feet for at least 10 minutes in a footbath of amitraz. In the case of otodemodicosis, several authors recommend using ear drops made up of commercial amitraz concentrate diluted 1:10 with mineral oil.

Ivermectin at a dose rate of 0.3-0.6 mg/kg PO daily is very effective against canine and feline demodicosis. Certain breeds and their crosses such as the Collie, Shetland Sheepdog, Old English Sheepdog, Border Collie, Bearded Collie and Australian Shepherd have a high incidence of permeability of the blood brain barrier to ivermectin. Reports exist of toxicity in West Highland White terriers. Ivermectin should not be used in these breeds, as there is a grave risk of depression, ataxia, coma and death. A recently available PCR test to identify individuals with an MDR-1 receptor defect is of value in identifying individuals susceptible to ivermectin toxicity.

Milbemycin, like ivermectin, is an oral avermectin registered for heartworm prevention in dogs. When used at a dose rate of 1-2mg/kg daily the drug is very effective in the treatment of canine demodicosis. Much fewer side effects than with ivermectin have been reported and the drug may be used as a valid alternative to ivermectin in breeds and individuals suspected to be susceptible to ivermectin toxicity.

Both moxidectin and doramectin share the same toxic potential and contraindications as ivermectin. Moxidectin is effective against generalized demodicosis at a dose rate of 0.2-0.4 mg/kg PO daily. Doramectin at 0.6mg/kg weekly by subcutaneous injection or PO seems to be also effective in both dogs and cats. An imidacloprid (10% w/v) and moxidectin (2.5% w/v) spot-on administered at two- to four-week intervals can be used in mild forms of the disease, but is probably not able to tackle the more severe ones. A new spot-on formulation containing metaflumizone and amitraz was recently evaluated as a topical monthly or bi-monthly treatment for generalized demodicosis, with a success rate of 43% and 63%, respectively.

Lime sulfur is the safest therapeutical optino in cats at 1.6% to 2% once or twice-weekly. Using an
Elizabethan collar is recommended until the product dries to prevent oral ingestion.

One of the most common reasons for failure of treatment is stopping therapy too soon. Skin scrapings should be examined monthly and treatment continued until two consecutive negative skin scrapings, two weeks apart, have been obtained. It is unusual that dogs present with a negative scraping at the first re-examination. Normally 2-3 months of treatment is required. After a period of therapy, if there is no reduction in mite numbers, especially if active mite reproduction is occurring (eggs, larvae and nymphs are seen) then alternative treatment should be considered.

Secondary infection is common and often caused by staphylococci. These cases require 4-6 weeks of antibiotic therapy with cephalixin (20-30mg/kg BID), cefadroxil (20-30mg/kg SID) or amoxycillin-clavulanate (15-25mg/kg BID). If rod bacteria is seen on cytology, treatment should be based on culture and sensitivity testing.

In every case of demodicosis, the use of local or systemic corticosteroids, progestogens or other immunosuppressive agents is strictly contraindicated. These agents inhibit the host immune response and prevent resolution or induce relapses. Relapse may occur anyway at times of stress such as estrus, pregnancy, lactation and systemic diseases. Adult onset cases tend to relapse if the underlying disease process goes out of control (e.g. spontaneous hyperadrenocorticism) or is not addressed or identified.

A list of references can be provided upon request.