

Allergic Dermatitis – Part 4

Parasite Allergy

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In this last installment on allergic dermatitis we will discuss dermatitis induced by allergic reactions to parasites, including flea allergy dermatitis, demodicosis, and sarcoptic mange. All four of these conditions can result in a superficial or deep pyoderma including severe itching, papules and pustules, inflammation, and infection. Demodicosis is considered to have a heritable basis while flea allergy dermatitis is present in both the human and canine populations, and sarcoptic mange is transmissible between humans and their pets.

Flea allergy dermatitis (FAD) is an allergic reaction of an individual to the flea saliva which makes contact with the dermis of the skin during the feeding process of the flea. Fleas have a life cycle beginning with the egg, which hatches within 2-10 days into the larval stage which then pupates within 5-11 days, finally resulting in adult fleas emerging from their cocoons in 5-140 days. The average life cycle is 3-4 weeks in duration, but can last as long as 6 months if the flea is not stimulated to hatch by environmental conditions or the motion of a warm-blooded animal. Because of the variability within the life cycle, and the durability of the flea itself, ridding the household of this parasite can be very frustrating. The bite of just one flea can trigger the cascade of reactions resulting in a severe dermatitis, including itching, pustules, inflammation, and infection in both canines and their human companions. Skin lesions are typically seen on the rump, inner thighs, belly, flank, and neck. Dogs will often “chase” the fleas by nibbling at themselves in these areas, often causing lick stains, self-trauma, and hair loss.

Controlling flea populations has become easier with the advent of “spot-on” insecticides to be applied directly to the dog, with some products more effective than others. In the dog with FAD, the environment must also be controlled as the flea can often survive long enough to bite even with the spot-on preventative. Environmental control involves extermination of the parasite with various products and vacuuming. Effective treatments include area sprays indoors which combine adulticide and insect growth inhibitor (IGR), or a product like sodium polyborate (applied by a professional). It is also important to treat the yard and any outdoor area which the pet frequents, with insecticides or a combination of adulticide and IGR. Another option outside is to seed the area with beneficial nematodes, which are worm-like creatures that feed off of fleas among other insects. Ineffective treatments include electronic flea collars, garlic (either added to food or otherwise), brewers yeast, extracts of eucalyptus, tea-tree oil, sulfur, thiamine, and pennyroyal. These and many other “natural” remedies do not kill the flea quickly enough to prevent biting, and are not flea repellent, thus they do not provide any protection for the FAD pet.

Once an individual has been identified as having FAD, either by a skin test or an antigen blood test, then immunosuppressive therapy with allergy injections can be initiated along with environmental control of the insect. As described in the first article in this series, immunotherapy involves injecting minuscule amounts of the allergen under

the skin to gradually desensitize the immune system such that it no longer over-reacts to the allergen. This process can take months to over a year, beginning with weekly or twice weekly injections, and sometimes involving monthly injections throughout the lifetime of the dog who has a severe hypersensitivity to flea allergen. However, once the immune system is desensitized to as great a degree as possible, and the flea population is eradicated in the pet's environment, the skin infections and inflammation will resolve, and the dog will live a much more comfortable and normal life. During the time of desensitization treatment or if there is future exposure to fleas and their saliva, the dog may need antibiotic and/or steroid therapy to treat the dermatitis.

The next parasite to be described is the demodectic mite, whose overpopulation in the canine skin can result in demodicosis. The demodectic mite is a part of the normal microscopic fauna of the canine skin (just as humans have microscopic mites that live on them) and is present in small numbers in the skin throughout the lifetime of the dog. It is hypothesized that the allergic dermatitis which results from demodicosis occurs from some sort of immunosuppression within the animal allowing for a population explosion of the mites. As the population increases to a high number, the mites become more concentrated in the skin and cause more damage to the dermis and hair follicles resulting in itching, inflammation, and infection. Demodicosis is believed to be hereditary in that it is seen more commonly in certain breeds, and certain lines of dogs. Often, if a puppy is diagnosed with demodicosis, it is discovered that a sibling or a parent has also been affected in the past. The condition is most often seen in young dogs, individuals on chemotherapeutic drugs or steroids, dogs with Cushing's disease or hypothyroidism, and dogs with cancer.

Demodicosis is not contagious to people, and transfer of the mites between the bitch and her puppies usually only occurs within the first few days of life. The skin lesions most characteristic of the disease include hair loss, crusting, inflammation, itching, pain, comedones (blackheads), and an unpleasant odor. Affected areas can be localized to the head, legs, belly, and chest, or may be more generalized over the entire body. In severe cases, hair loss can occur over the entire body and result in life-threatening infection and septicemia (bacteria within the bloodstream). Demodicosis is diagnosed through taking a scraping of the skin and identifying the mites or eggs microscopically. Biopsy of the skin will also show mites in the hair follicles.

Treatment for demodicosis includes antiseptic shampoos and antibiotics for the infections, periodic miticidal dips with amitraz, or the use of oral medications such as ivermectin or milbemycin (both are also used in lower doses as heartworm preventatives and heartworm medication should be discontinued while on this treatment regimen). Either the miticidal dips or the oral medications should be prescribed, not both together. Each type of treatment has side effects and should involve the close monitoring of a veterinarian. Amitraz toxicity can cause lethargy, depression, decreased or absent appetite, increased drinking and urination, incontinence, ataxia and other neurological signs, and even death in some cases (usually smaller dogs under 20 pounds). Ivermectin toxicity can cause similar side effects, although if it is dosed in a step-wise fashion the treatment can be adjusted to avoid some of the more severe side effects. It is not

recommended to use ivermectin in collies or shelties as these breeds are known to be susceptible to adverse reactions to the drug. There can be recurring episodes of demodicosis in immunosuppressed animals, or the disease may be eradicated in individuals once their immune system is functioning normally.

Another type of mite which can cause a severe allergic dermatitis is the *sarcoptes scabei*, which primarily affects dogs but can be transmitted to humans. Mites are transmitted by direct contact, and are often carried by wildlife and deposited in their sleeping areas. Hunting dogs are particularly susceptible to sarcoptic mange, as they often have direct contact either with the wildlife they are hunting or the dens and nesting areas. The mite eggs are laid in a burrow within the epidermis of the skin. In 3-5 days the six-legged larvae will hatch and crawl onto the surface of the skin where they molt into the second stage called a nymph and then mature to adults. The adult mites breed on the surface of the skin and then burrow to lay their eggs. As the female mite burrows into the skin she causes mechanical damage to the skin cells and chemical damage to the surrounding area with her saliva. Much like flea saliva, the saliva of the sarcoptic mite is highly allergenic, and causes severe itching, inflammation, and infection due to self-trauma of the affected animal.

Diagnosis of sarcoptic mange includes taking a thorough history to determine likelihood of exposure to the mite, multiple skin scrapings, and observation of the characteristic skin lesions. Skin scrapes are often negative, usually the mite is only found about 30% of the time. Therefore, sarcoptic mange is often misdiagnosed as food allergy, atopy, or flea allergy. It is recommended to treat for *sarcoptes scabei* if a hypersensitivity reaction is suspected, and then observe response to treatment. Like demodectic mange, the treatment includes antiseptic shampoos and antibiotics for the infections, lime sulfur, amitraz, or organophosphate dips, or ivermectin (administered orally or subcutaneously). Again, it is not recommended to combine dips with ivermectin, rather to use one or the other but not both together. Scabies is relatively easy to treat, once the condition is identified and appropriate intervention initiated. If a person within the household becomes affected, consult with his/her physician is recommended.

While this article describes allergic dermatitis in relation to parasites, it can be seen in this series of articles that allergic dermatitis is not a simple matter. A wide variety of organisms such as yeast, bacteria, fleas, and mites, as well as food allergens and environmental allergens cause skin infections, itching, and inflammation. In severe cases the infections stemming from allergic dermatitis can be life-threatening or lead to such a poor quality of life that owners sometimes consider euthanasia for their pet. Dermatology cases can be amongst the most difficult and most expensive to diagnose and treat. Many owners simply want the symptoms treated over and over again, as opposed to finding and treating the underlying cause. Even finding the underlying cause can be difficult, expensive and time consuming. Treatment plans often have to be tailored to the individual pet, and what works for one animal does not always work for the next. Veterinarians and owners should not hesitate to refer a difficult case to a board certified veterinary dermatologist, who often has the tools and experience to diagnose and treat severe cases more effectively. Ultimately, the most important point is to maintain the

comfort and high quality of life for our dogs. Poodles have many and varied skin issues, some genetic and other not; hopefully this series of articles has helped to identify many of the skin issues which can plague our canine companions.