SERIES EDITOR Craig E. Griffin, DVM, DACVD
Animal Dermatology Clinic, San Diego, California
SERIES EDITOR Wayne S. Rosenkrantz, DVM, DACVD
Animal Dermatology Clinic, Tustin, California

Diagnosing the Cause of Feline Pruritus

Rudayna Ghubash, DVM, DACVD
Animal Dermatology Clinic
Marina del Rey, California

Diagnosing the underlying cause of pruritus in cats can be difficult because of the variations in clinical presentation and numerous possible etiologies. Many owners are not aware of how much their cats lick and groom themselves, making it difficult to assess the cat's degree of pruritus. The ability to interpret historical information, identify and understand the significance of clinical lesions, and appropriately use diagnostic tests aids in the diagnosis and management of feline pruritus.

At a Glance

Historical Information

Signalment

Breed and age at onset of clinical signs provide clues to underlying etiologies. Pruritus in patients younger than 6 months is most commonly caused by parasites (*Notoedres*, *Cheyletiella*, and *Otodectes* spp), allergies (especially flea and food), and dermatophytosis. When pruritus begins in middle age, the differentials are the same, but allergic disease (food allergy, atopic dermatitis) becomes more probable. When pruritus begins in older animals with no history of skin disease, conditions such as epitheliotropic lymphoma, pemphigus foliaceus, Bowen's disease, and paraneoplastic syndrome should also be considered. Food allergy can start at any age. Some breeds are predisposed to certain diseases, such as Persians (dermatophytosis) and Siamese (food allergies)[1–3] (**FIGURE 1**).

Environment

Outdoor cats have greater exposure to mosquitoes (**FIGURE 2**), parasites (e.g., fleas, *Notoedres* mites), and infectious agents (e.g., dermatophytes, viruses). Knowing whether other animals or people are affected can indicate whether a contagious or zoonotic disease is present (e.g., dermatophytosis, cheyletiellosis, scabies). Psychogenic pruritus can be triggered by environmental changes, such as construction, remodeling, moving, or introduction of a new pet or person into the household. Siamese cats and Siamese crosses seem to be at risk for psychogenic disorders; however, psychogenic pruritus should not be assumed based on breed and is diagnosed only after all other causes of pruritus have been excluded.[4]

Concurrent and Previous Disease

In cats with concurrent histories of pruritus and gastrointestinal disease (e.g., inflammatory bowel disease), food allergy should be

FIGURE 1

Facial pruritus in a food-allergic Siamese cat.

FIGURE 2

Facial and pinnal involvement in a cat with mosquito bite hypersensitivity.

FIGURE 3

Pemphigus foliaceus with secondary bacterial pyoderma around the claw folds in a cat.

diligently investigated. Atopic dermatitis should be strongly considered in pruritic animals with concurrent airway disease or asthma. Viral dermatoses should be suspected in cats with a history of upper airway viral disease and erosive facial lesions. A detailed drug history is critical because certain drugs and vaccines can trigger erythema multiforme and pemphigus foliaceus.[5]

Physical Examination

Lesion Distribution

Observing the distribution of lesions, especially in the initial stages of the underlying disease, can be helpful in narrowing the differential diagnosis. Flea allergy lesions are typically more severe in the lumbosacral, groin, and dorsocervical areas, whereas food allergy lesions are more common on the head. The clinical signs of atopic dermatitis vary but can mimic those of food and flea allergies. Cheyletiellosis lesions (scale, papules, crusts) tend to be distributed dorsally. Dermatophytosis can be localized to a specific site or can be generalized. Some cats may be asymptomatic carriers of *Cheyletiella* mites or dermatophytes. Pemphigus foliaceus usually targets the pinnae, bridge of the nose, claw folds (**FIGURE 3**), and perimammary areas but can also be generalized. **TABLE 1** lists some common diagnostic differentials based on lesion distribution.

Lesion Appearance

The ability to recognize and identify lesion types can provide valuable information in the evaluation of a pruritic cat. **Excoriations**, a nonspecific sign of self-trauma typically associated with pruritus, are characterized by their linear shape and are most prevalent on the head and neck. **Erosions** are superficial

TABLE 1

Common Diagnostic Differentials for Feline Pruritus Based on Lesion Location

Lesion Location	Diagnostic Differentials
Ear canals	Food allergy Atopic dermatitis *Notoedres* infection *Otodectes* infection
Head and neck	Food allergy Atopic dermatitis Flea allergy *Notoedres* infection Mosquito bite hypersensitivity *Otodectes* infection Viral dermatoses Idiopathic facial dermatitis ("dirty face" syndrome) Drug reaction
Nasal planum	Mosquito bite hypersensitivity Viral dermatoses Squamous cell carcinoma Pemphigus foliaceus *Cryptococcus* infection
Dorsal cervical region	Flea allergy Atopic dermatitis Food allergy Injection-site reaction
Dorsal and lumbar region	Flea allergy Cheyletiellosis
Claw folds	Pemphigus foliaceus Bowen's disease
Ventral abdomen	*Demodex gatoi* infection Food allergy Atopic dermatitis Flea allergy Psychogenic pruritus
Generalized	Dermatophytosis Food allergy Atopic dermatitis Flea allergy Pemphigus foliaceus Epitheliotropic lymphoma Drug reaction Paraneoplastic syndrome Erythema multiforme

*Quick***Notes**

Observing the distribution of pruritic lesions, especially in the initial stages of the underlying disease, can be very helpful in narrowing the differential diagnosis.

FIGURE 4

Indolent ulcers in a cat with flea allergy dermatitis.

lesions that are similar to, but often wider than, excoriations. Erosions caused by scratching tend to be linear, whereas those associated with licking tend to be circular. Erosions are often associated with eosinophilic plaques.

Ulcers can appear as focal, nonpruritic lesions on the upper lip, known as *rodent* or *indolent ulcers* (**FIGURE 4**). These lesions are one of the components in the eosinophilic granuloma complex (EGC) triad. EGC lesions are reaction patterns that typically indicate an underlying allergy or hypersensitivity reaction, not a specific disease.[6] Other conditions that can create skin ulcers with variable degrees of pruritus include vasculitis, autoimmune diseases, drug reactions, and neoplasia.

Papules are small (1 to 5 mm), raised lesions that are often associated with crusts and are the most common lesions seen in miliary dermatitis. Like EGC lesions, miliary dermatitis is a sign of an underlying disease. It can be associated with flea allergy dermatitis (most common), atopic dermatitis, food allergy, bacterial folliculitis, cheyletiellosis, dermatophytosis, pemphigus foliaceus, and drug reactions.

Plaques appear as moderate to well-defined elevations of the skin with erythema. Eosinophilic plaques, one of the EGC variants, are most commonly associated with underlying allergic disease (**FIGURE 5**). Eosinophilic **granulomas**, the third component of the EGC complex, are firm, sometimes ulcerated, raised areas that are often found in the mouth or in a linear pattern on the body (**FIGURE 6**).

Alopecia that is associated with pruritus usually presents as broken off, barbered hairs from overgrooming, scratching, or rubbing. Other lesions of pru-

FIGURE 5

Eosinophilic plaques in a cat with atopic and flea allergy dermatitis.

FIGURE 6

Oral eosinophilic granulomas in a cat with concurrent indolent ulcers.

ritus are often present with alopecia; however, in some cases, broken or barbered hair is the only clue that the cat is pruritic.

Thin flakes of shed epidermis characterize **scale**, a nonspecific sign that is commonly seen in cheyletiellosis.

Diagnostic Tests

Cytology/Skin Scrapings

Used appropriately, dermatologic diagnostic tests can be powerful tools. Skin scrapings are one of the easiest and most important of these tests and should be conducted for all pruritic cats except those with seasonal signs. Some of the more common parasites that can be identified on skin scraping samples include *Cheyletiella blakei, Otodectes cynotis, Lynxacarus radovskyi, Trombicula autumnalis, Felicola subrostratus, Notoedres cati, Demodex cati,* and *Demodex gatoi*. Cytology can be used to assess samples for the presence of bacteria, inflammatory cells, fungal spores and hyphae, acantholytic cells, and neoplastic cells.

Cytology should be conducted for any pruritic cat with dermatologic lesions other than noninflammatory alopecia. True pyoderma cases should demonstrate intracellular bacteria, usually within neutrophils and, sometimes, within eosinophils. Eosinophils are inflammatory cells that are common in a variety of disorders, but they are most commonly associated with ectoparasites, allergies, and some forms of EGC lesions. Fungal spores and hyphae are common in cases of dermatophytosis. A fungal culture should always be performed for speciation. Cytology can also be of value in identifying some forms of cutaneous neoplasia. On rare occasions, it can identify ectoparasites such as *Cheyletiella*, especially when adhesive tape is used to collect the sample. Acantholytic cells suggest pemphigus foliaceus, although they can also be seen in dermatophytosis.

Using a fine-tooth comb on the entire haircoat for several minutes to collect dander and scale for microscopic examination is considered the most reliable method to find *Cheyletiella* mites in both symptomatic and asymptomatic animals.[7]

Fungal Culture

Fungal culture using dermatophyte test medium (DTM) is considered the gold standard for identifying dermatophytes. Dermatophyte infections can present as pruritic infections with any lesion type. When cultured on DTM, dermatophytes produce an alkaline by-product that changes the color of the medium from yellow to red. However, saprophytic contaminants may also turn the medium red under certain conditions. Therefore, DTM should be inspected daily for color change, and any growth must be examined microscopically for evidence of microconidia and macroconidia. Suspected fungal growth can be lifted with clear adhesive tape, stained with lactophenol cotton blue, and examined microscopically. Speciation of the dermatophytes should always be performed to determine the source of infection and help prevent future reinfection.

*Quick***Notes**

Various allergies look the same on histopathology, so biopsy is usually not used to diagnose allergy and is never used to differentiate allergic reactions.

Hair Examination

Hair examination using a Wood lamp can be helpful in suspected cases of dermatophytosis, but fluorescence is seen in only a small percentage of cases of *Microsporum canis* infection. Hairs that fluoresce should be plucked for culture for definitive diagnosis.[1] Direct microscopic examination of the hair can also identify dermatophytosis. Hyphae and spores can often be seen when the condenser lens is turned down, although culture should always be performed to confirm the diagnosis. In cases of alopecia in which the degree of pruritus is unknown, conducting trichograms to examine the tips of plucked hairs can help determine if the alopecia is caused by self-trauma, in which case, the hair tips appear fractured and jagged.

Skin Biopsy

Skin biopsy can be a powerful tool when used appropriately. Many specific infectious, parasitic, autoimmune, and neoplastic diseases can be diagnosed using biopsy. Biopsy is indicated for unusual lesions or clinical presentations or when a case does not respond to standard treatment. However, samples taken from lesions of allergic disease look the same on histopathology, so biopsy is not usually used to diagnose allergies and is never used to differentiate them.

Flea Control Trials

If all nonallergic differentials have been ruled out, a systematic approach to allergies must be pursued. Atopic dermatitis, flea allergy, and food allergy can look identical. Flea allergy is the most common allergy in cats in flea-endemic locations, and flea control trials should be conducted to eliminate this differential.[8]

The goal of a flea control trial is to keep the cat free of fleas, optimally for 4 to 6 weeks, and evaluate the degree of subsequent resolution of pruritus. If the environmental flea burden is high, the first step should be to suggest that the owner consult an exterminator about treating the indoor and outdoor environments. The option of keeping the cat exclusively indoors during the flea control trial should always be discussed, although it is not always feasible. Because studies in cats have found oral nitenpyram to have 100% efficacy against adult *Ctenocephalides felis* fleas within 3 hours, an ideal method of performing a flea control trial, especially in outdoor animals, is to use this product daily to every other day for the 4- to 6-week period.[9] However, this method can be expensive and is difficult in cats that are hard to pill. Another option is to use a topical formulation of a flea control product that is approved for cats every 2 weeks for a 4- to 6-week period. Some of these products are labeled for more frequent than monthly application.

Food Elimination Trials

When evaluating a cat for food allergy dermatitis, a food elimination trial must be conducted, as serologic testing is unreliable and inaccurate in domestic animals.[10] Food-allergic cats can have the same clinical signs as animals with atopic dermatitis or flea allergy, but they commonly present with severe pruritus of the head and neck. The only way to diagnose food allergy is to feed an elimination diet for an 8- to 12-week period. I prefer a trial consisting of a home-cooked diet or a novel limited protein–based commercial diet. I typically only use a hydrolyzed diet if the other diets are not eaten. Owners who are willing to make a home-cooked diet can be directed to **balanceit.com**, where they can purchase recipes and supplements, or should contact a veterinary nutritionist for a consultation. Because cats have unique nutritional needs, it is imperative that home-cooked diets be balanced, as feeding an unsupplemented diet for more than 4 weeks can lead to nutritional deficiencies.[11] At the end of the 8- to 12-week trial period, the cat is rechallenged with the original diet and observed for exacerbation of clinical signs.

Allergy Testing

The diagnosis of atopic dermatitis is made primarily on the history and physical findings after ruling out all other pruritic diseases. Once atopic dermatitis is diagnosed, allergy testing is used to determine the specific allergens to which the patient is sensitive, typically to start immunotherapy. Intradermal skin testing, although considered the gold standard of allergy testing, is difficult to conduct in cats. Feline skin is thinner than canine skin, making intradermal injections harder to perform.[12] Furthermore, the degree of reactivity at the injection sites is often flatter, producing false-negative results.[12] In vitro allergy tests are available and provide a reasonable alternative to skin testing. Some specialists prefer this method of allergy testing in cats.

QuickNotes

If a diagnosis of atopic dermatitis is made, allergy testing is used to determine the specific allergens to which the patient is sensitive, typically to start immunotherapy.

Conclusion

Pruritus in cats can be difficult and frustrating to treat. However, with a methodic approach and appropriate diagnostic tests, practitioners can significantly decrease the severity of pruritus and improve the quality of life for most cats without chronic use of long-term repository steroids. C

TO LEARN MORE

For a more detailed discussion of flea allergy dermatitis, see the May 2009 Applied Dermatology article, "Overview of Flea Allergy Dermatitis," on **CompendiumVet.com**.

References

1. Scott DW, Miller WH, Griffin CE. Fungal skin diseases. In: Scott DW, Miller WH, Griffin CE, eds. *Muller & Kirk's Small Animal Dermatology.* 6th ed. Philadelphia: WB Saunders; 2001:336-442.

2. Carlotti DN, Remy I, Prost C. Food allergy in dogs and cats: a review and report of 43 cases. *Vet Dermatol* 1990;1:55.

3. Rosser EJ. Food allergy in the cat. A prospective study of 13 cats. In: Ihrke PJ, Mason IS, White SD, eds. *Advances in Veterinary Dermatology II.* New York: Pergamon Press; 1993:33.

4. Waisglass SE, Landsberg GM, Yager JA, Hall JA. Underlying medical conditions in cats with presumptive psychogenic alopecia. *JAVMA* 2006;228(11):1705-1709.

5. Scott DW, Miller WH, Griffin CE. Immune-mediated disorders. In: Scott DW, Miller WH, Griffin CE, eds. *Muller & Kirk's Small Animal Dermatology.* 6th ed. Philadelphia: WB Saunders; 2001:667-779.

6. Scott DW, Miller WH, Griffin CE. Miscellaneous skin diseases. In: Scott DW, Miller WH, Griffin CE, eds. *Muller & Kirk's Small Animal Dermatology.* 6th ed. Philadelphia: WB Saunders; 2001:1125-1183.

7. Moriello KA. Cheyletiellosis. In: Griffin CE, Kwochka KA, MacDonald JM, eds. *Current Veterinary Dermatology: The Science and Art of Therapy.* St Louis: Mosby; 1993:90-95.

8. Scott DW, Miller WH, Griffin CE. Skin immune system and allergic skin diseases. In: Scott DW, Miller WH, Griffin CE, eds. *Muller & Kirk's Small Animal Dermatology.* 6th ed. Philadelphia: WB Saunders; 2001:543-666.

9. Schenker R. Tinembart O, Humbert-Droz E, et al. Comparative speed of kill between nitenpyram, fipronil, imidacloprid, selamectin and cythioate against adult flea *Ctenocephalides felis* (Bouche) on cats and dogs. *Vet Parasitol* 2003;112:249-254.

10. Jeffers JG, Shanley KJ, Meyer EK. Diagnostic testing of dogs for food hypersensitivity. *JAVMA* 1991;198(2):245-250.

11. Mueller RS, Jackson H. Atopy and adverse food reaction. In: Foster AP, Foil CS, eds. *BSAVA Manual of Small Animal Dermatology.* 2nd ed. Gloucester, England: BSAVA; 2003:125-136.

12. Gilbert S. Feline pruritus therapy. In: Bonagura JD, Twedt DC, eds. *Kirk's Current Veterinary Therapy.* 14th ed. St. Louis: Saunders Elsevier; 2009:405-410.