



Pruritus

Silvia Colombo

Abstract

Pruritus, also called itching, is an irritating sensation in the upper surface of the skin, thought to result from stimulation of sensory nerve endings. Pruritus is common in cats and can be further classified based on its distribution (localized or generalized), location on the animal's body and severity (mild, moderate, or severe). From a clinical point of view, pruritus in cats is most commonly caused by ectoparasitic, allergic, infectious or immune-mediated diseases. Cats manifest pruritus by overgrooming, which makes it particularly difficult to recognize and evaluate, and to be differentiated from pain or a behavioral problem. In a very young cat, ectoparasites and dermatophytosis are common, while in an adult cat, allergic and immune-mediated skin diseases should also be considered. History is relevant for concurrent drug administration or systemic disease and for severity and seasonality of pruritus. Most pruritic cats present with one (or more) of four clinical patterns, namely, head and neck pruritus, miliary dermatitis, self-induced alopecia and the eosinophilic granuloma complex. The diagnostic approach to pruritus should always be carefully followed in each of its steps in order to make a correct diagnosis.

Definitions

Pruritus, also called itching, is defined as an unpleasant feeling that causes the desire to scratch. In the vast majority of cases, the irritating sensation develops in the skin and is thought to result from stimulation of sensory nerve endings. In rare cases, pruritus may originate in the central nervous system. Pruritus is extremely common in veterinary dermatology and may be due to a wide variety of diseases.

S. Colombo (✉)
Servizi Dermatologici Veterinari, Legnano, Italy

It is an obvious clinical sign in dogs, while it can be very subtle in cats because it can be expressed as excessive grooming, which is a normal feline behavior, or because cats often hide from owners when they feel the desire to scratch. Pruritus is further classified based on its distribution (localized or generalized), location on the animal's body and severity (mild, moderate, or severe).

Pathogenesis

The vast majority of the information about mechanisms, pathways, and mediators of pruritus comes from human or laboratory animal studies and has been reviewed elsewhere [1, 2]. From a clinical point of view, pruritus in cats is usually caused by ectoparasitic, allergic, infectious or immune-mediated diseases and can be worsened by concurrent factors such as stress, boredom, dry skin or high environmental temperature (Table 1). Although pruritus may be interpreted, in some cases, as a defense mechanism (scratching or licking to remove ectoparasites), skin lesions often occur as a consequence of behaviors carried out by the cat to relieve it.

Cats manifest pruritus by overgrooming, in other words by increasing the frequency and intensity of a normal, programmed feline behavior. Cats groom to keep their skin and hair coat clean and healthy, to remove ectoparasites and dirt, to control their body temperature and to relieve tension or stress [3, 4]. Grooming in cats

Table 1 Selected causes of pruritus in cats

Pruritus	Herpesvirus infection
	Superficial pyoderma
	Complicated chin acne
	Flea infestation
	Cheyletiellosis
	Notoedric mange
	Otodectic mange
	Demodicosis (<i>Demodex gatoï</i>)
	Trombiculiasis
	Dermatophytosis
	<i>Malassezia</i> overgrowth
	Flea-bite hypersensitivity
	Adverse reaction to food
	Feline atopic syndrome
	Mosquito-bite hypersensitivity
	Allergic/irritant contact dermatitis
	Adverse drug reaction
	Hyperthyroidism
	Pemphigus foliaceus
	Lymphocytic mural folliculitis
	Familial pedal eosinophilic dermatosis
	Urticaria pigmentosa-like dermatitis
	Idiopathic facial dermatitis of Persian and Himalayan cats

include oral grooming, which is stroking the tongue through the pelage and nibbling with the incisor teeth, and scratch grooming, which is scratching with the hind paws [5]. According to one study, indoor, ectoparasite-free adult cats spend 50% of their time sleeping or resting. Of the time spent awake, oral grooming accounts for about 1 hour per day and scratch grooming for about 1 minute per day. Ninety-one percent of oral grooming is directed to multiple body regions, while scratch grooming is always directed to single regions [5].

Being the increased expression of a physiological behavior, overgrooming is often not recognized by the owner or not interpreted as a sign of pruritus, pain or stress. Moreover, cats tend to express their discomfort by hiding away from owners, who may not be aware of their pet's overgrooming. For all these reasons, pruritus can be particularly difficult to recognize and evaluate in cats and to be differentiated from pain (e.g., licking the abdomen due to cystitis) or a behavioral problem (causing licking, scratching, or hair pulling).

Idiopathic ulcerative dermatitis presents as a very severe and extremely pruritic, usually single, crusted ulceration affecting the dorsal neck (Fig. 1) in which pruritus, neuropathic itch and behavioral disorder have all been considered relevant in the disease pathogenesis. Idiopathic ulcerative dermatitis is diagnosed by exclusion of diseases which may induce pruritus to the dorsal neck, such as allergies and

Fig. 1 Idiopathic/behavioral ulcerative dermatitis on the dorsal neck



Table 2 Examples of non-dermatological diseases to be differentiated from pruritic skin diseases

Feline idiopathic cystitis
Psychogenic alopecia
Feline idiopathic/behavioral ulcerative dermatitis
Feline orofacial pain syndrome
Feline hyperesthesia syndrome
Localized neuropathies

ectoparasites. A recent case report proposed that idiopathic ulcerative dermatitis may be a neuropathic itch syndrome, and the cat responded completely to topiramate, an anti-epileptic drug [6]. However, the same disease has also been investigated from a behavioral point of view. In 13 affected cats, in an open, uncontrolled study, environmental enrichment and improvement of overall welfare led to resolution of skin lesions, and psychotropic drugs were employed only in one case. The authors of this study proposed to change the disease name to feline behavioral ulcerative dermatitis [7].

Finally, an orofacial pain syndrome has been reported in cats. This syndrome occurs more commonly, although not exclusively, in Burmese cats and is clinically characterized by self-trauma to the face and oral cavity and occasionally by mutilation of the tongue. The disease may be associated with teeth eruption, dental disease, and stress and is suspected to be a neuropathic disorder, which should be considered in cats presenting with severe facial excoriations or ulcers [8].

In conclusion, overgrooming, which includes excessive licking and excessive scratching, may be the expression of non-dermatological diseases, which should always be considered when listing the differential diagnoses in an apparently “dermatological” case presenting for “pruritus” (Table 2).

Diagnostic Approach

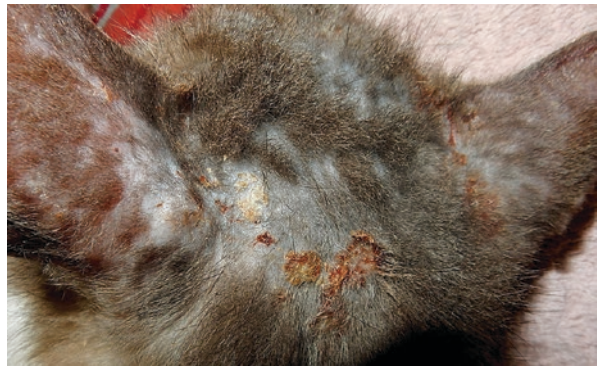
Signalment and History

Depending on the cat’s age, some diseases may be more likely than others. In a very young cat, ectoparasites and dermatophytosis are common, especially if the kitten has been found as a stray or adopted from a cattery, where crowding plays an important role too. Some diseases, such as dermatophytosis, cheyletiellosis and notoedric mange, are very contagious. These diseases may affect in contact animals as well as people, and questions about the presence of skin lesions on other pets or family members are mandatory. In an adult cat, allergic and immune-mediated skin diseases should also be considered, while in an older cat, hyperthyroidism may occur and explain the excessive grooming. Older cats may present with pruritus due to *Malassezia* overgrowth, which can be the marker of an underlying systemic disease or paraneoplastic syndrome (Fig. 2) [9].

Fig. 2 Alopecia and brown greasy material typical of *Malassezia* overgrowth in an old cat with pancreatic paraneoplastic alopecia



Fig. 3 Alopecia and excoriations on the head and pinnae of a cat affected by seasonal feline atopic syndrome



History should include drugs administered for other diseases, which may cause adverse drug reactions, and ectoparasite prevention. Immunosuppressive therapy or systemic disease may predispose the cat to dermatophytosis if it gets exposed, for example, because the owner adopts a new kitten. Seasonality of pruritus may be useful to limit the list of differentials: ectoparasites and seasonal feline atopic syndrome are more likely in a cat scratching in spring and summer (Fig. 3). Severity of pruritus should also be analyzed in depth because some diseases are characterized by extremely severe pruritus (notoedric mange) while in others pruritus may be very mild (cheyletiellosis, dermatophytosis).

Persian cats of any age are predisposed to dermatophytosis. An older Persian cat may be affected by dermatophytosis, if it is an asymptomatic carrier, without the need for contact with a diseased animal [10].

Clinical Presentation

In cats, pruritus is expressed by overgrooming; however, only increased scratching is easily recognized by the owner. Since they scratch with their hind paws, excoriations usually involve areas that the cat can reach, such as the face, ears, head and neck. The so called “head and neck pruritus” is a common clinical presentation in pruritic cats (Fig. 4) [11]. Variably sized excoriations, erosions and ulcers in these locations may be very severe and deep and are often secondarily infected. This clinical presentation is specifically addressed in Chapter, [Excoriations, Erosions and Ulcers](#).

Less obviously, alopecia may be caused by an overgrooming, pruritic cat [11]. Self-induced alopecia is characterized by the presence of very short hair fragments which can be observed by looking closely at the skin or with the help of a magnifying lens. Hair cannot be easily epilated. The alopecic area usually has very well-defined margins, with abrupt change to normal hair, and involves parts of the body that can be reached by the tongue (Fig. 5). Self-induced alopecia is described in Chapter, [Alopecia](#).

Miliary dermatitis is a peculiar feline clinical presentation also associated with pruritus [11]. It is characterized by small, crusted papules “resembling millet seeds,” hence the name, which are more easily felt by touching through the haircoat than

Fig. 4 Excoriations on the head of an allergic cat



Fig. 5 Self-induced alopecia on the abdomen of a cat with flea-bite hypersensitivity



Fig. 6 Small, crusted papules typical of miliary dermatitis



seen (Fig. 6). Miliary dermatitis is often associated with self-induced alopecia and is addressed in Chapter, [Papules, Pustules, Furuncles and Crusts](#).

Another clinical pattern associated with pruritus is a group of lesions named eosinophilic granuloma complex or eosinophilic dermatitides (Figs. 7 and 8) [12]. These conditions, or clinical presentations, are often caused by allergic diseases and are discussed in Chapter, [Plaques, Nodules and Eosinophilic Granuloma Complex Lesions](#).

Many pruritic diseases, in cats, can be associated with one or more of the four previously described clinical patterns and/or with recurrent otitis (Chapter, [Otitis](#)). However, each disease has its own preferential distribution of pruritus and lesions on the animal body (Table 3). Some other unusual presentations are also associated with pruritus and may be caused by hypersensitivity reactions to food or environmental allergens, at least in some cases. Lymphocytic mural folliculitis, for example, is a histopathological reaction pattern occasionally identified in allergic cats

Fig. 7 Eosinophilic plaques on the abdomen



Fig. 8 Bilateral indolent ulcer in a domestic short-haired cat



presenting with pruritus, localized or generalized, partial or complete alopecia and scaling (Fig. 9) [13]. Urticaria pigmentosa-like dermatitis occurs in Devon Rex or Sphynx cats and is clinically characterized by an erythematous to hyperpigmented papular eruption, which is often pruritic (Fig. 10) [14, 15].

Pruritic and non-pruritic dermatoses may be secondarily infected by bacteria or yeasts. Although this occurs in cats much less frequently than in dogs, one should always keep into consideration and diagnose/rule out these diseases when examining a pruritic cat [9, 16].

Diagnostic Algorithm

This section is illustrated in Fig. 11. Red squares with numbers represent the steps of the diagnostic process, as explained below.

Table 3 Common locations of selected feline skin diseases associated with pruritus

Locations	Disease
Face	Herpesvirus infection
Chin	Complicated chin acne
Rump	Flea infestation
Thorax, abdomen	Demodicosis (<i>Demodex gatoi</i>)
Dorsum	Cheyletiellosis
Ear canal	Otodectic mange
Pinnae, paws, abdomen	Trombiculiasis
Pinnae, face, neck, paws, perineum	Notoedric mange
Head, pinnae, paws, tail, generalized	Dermatophytosis
Chin, claw folds, face, ear canal, generalized	<i>Malassezia</i> overgrowth
Rump	Flea-bite hypersensitivity
Dorsal nose, pinnae, paws	Mosquito-bite hypersensitivity
Abdomen, medial thighs, head, neck	Other allergic diseases
Head, pinnae, claw folds, abdomen	Pemphigus foliaceus
Paws	Familial pedal eosinophilic dermatosis
Face	Idiopathic facial dermatitis of Persian and Himalayan cats

Fig. 9 Alopecia, scaling and hyperpigmentation on the head of a cat with lymphocytic mural folliculitis

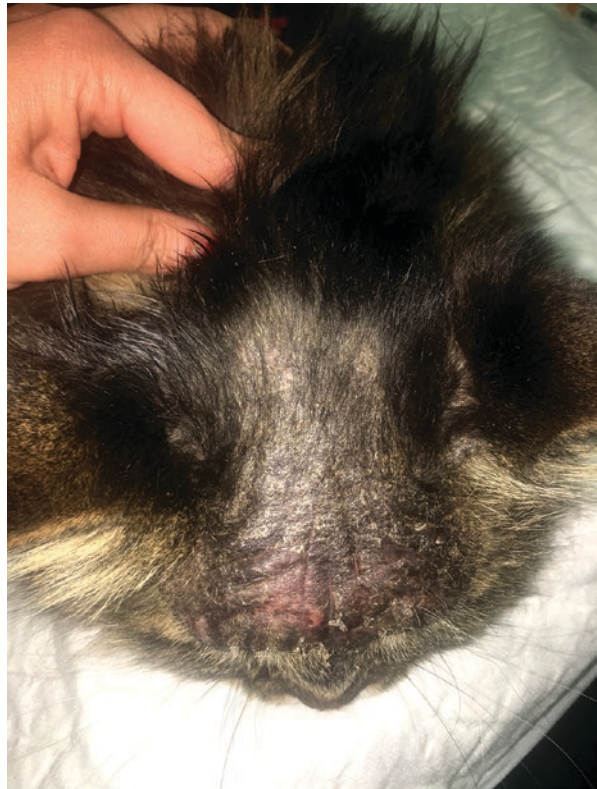


Fig. 10 Coalescing, crusted, and non-crusted papules in a Sphynx cat with urticaria pigmentosa-like dermatitis

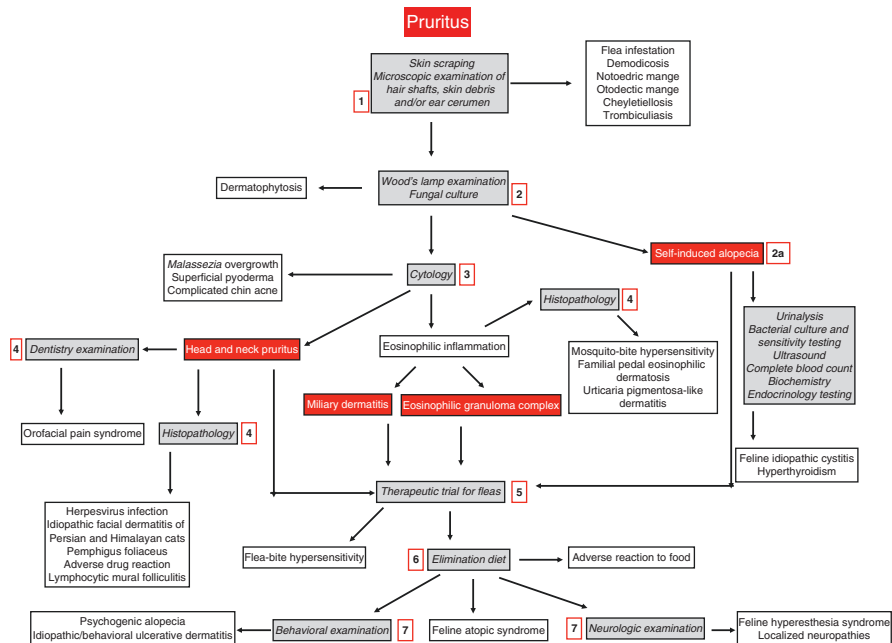


Fig. 11 Diagnostic algorithm of pruritus

- 1 Perform skin scrapings and microscopic examination of hair, skin debris and/or ear cerumen.

In the diagnostic approach to pruritus, it is mandatory to begin with simple tests to diagnose or rule out ectoparasites. Multiple skin scrapings are useful for notoedric mange and demodicosis, and fungal spores can be seen surrounding and invading fragments of hair shafts in dermatophytosis. Cheyletiellosis and trombiculiasis may be diagnosed by microscopic examination of acetate tape strips, after collecting samples directly from the cat's coat or, for *Cheyletiella* spp., from the material collected from the examination table after vigorous stroking of the coat. This latter way of collecting specimens may also be used to find flea dirt, together with coat combing. If pruritus is mainly affecting the ears, microscopic examination of ear cerumen is required to diagnose otodectic mange.

- 2 Perform Wood's lamp examination and fungal culture.

The second step is to rule out or diagnose dermatophytosis, which may have already been suspected after microscopic examination of hair shafts. Wood's lamp examination may support the diagnostic hypothesis and fungal culture is required to confirm dermatophytosis. If negative results are obtained, these tests are helpful to rule it out. Since dermatophytosis is common in cats, a fungal culture is appropriate in all cases, although pruritus can be of variable severity.

- 2a If the clinical presentation is self-induced alopecia involving the groin and abdomen, urinalysis, bacterial culture and sensitivity testing, and abdominal ultrasound should be performed to investigate feline idiopathic cystitis or other urinary tract diseases. Self-induced alopecia in an old cat may also be caused by hyperthyroidism, and hematology, biochemistry and endocrine testing should be carried out in this specific situation.

- 3 Perform cytology.

Cytology is the easiest and quickest diagnostic test to support the clinical suspicion of diseases characterized by eosinophilic inflammation, which are numerous and very common in cats. Eosinophilic plaque and granuloma and miliary dermatitis are often clinical patterns of allergy, characterized by eosinophilic inflammation, and the diagnostic process should continue to identify the primary disease. On the other hand, familial pedal eosinophilic dermatosis, mosquito-bite hypersensitivity and urticaria pigmentosa-like dermatitis show eosinophilic inflammation on cytology and are specific diseases which should be confirmed by histopathological examination. Cytology is also important because secondary bacterial or yeast infections may complicate the primary disease and increase the severity of pruritus, although this occurs less frequently in cats compared to dogs. Samples may be taken by impression smear, using a cotton swab or a piece of acetate tape to look for *Malassezia* yeasts, bacteria and inflammatory cells. Finally, identification of acantholytic cells admixed with neutrophils may suggest pemphigus foliaceus.

4 Perform histopathology.

As anticipated, histopathology is the confirmatory diagnostic test for many feline diseases cytologically characterized by eosinophilic inflammation. When pruritus affects mainly the face, histopathological examination is required to diagnose idiopathic facial dermatitis of Persian and Himalayan cats and herpesvirus infection, although in this latter disease immunohistochemistry may be necessary to confirm the etiology. In cases with clinical manifestation of severe self-trauma to the face and oral cavity, a dental examination may be required to investigate orofacial pain syndrome. Histopathological examination is useful to diagnose pemphigus foliaceus and, together with history, adverse drug reactions.

5 Perform a therapeutic trial for fleas.

In the majority of cases presenting for pruritus, ectoparasites and dermatophytosis can be ruled out at the beginning of the diagnostic approach, and cytological examination only shows secondary infections or eosinophilic inflammation, which is neither specific nor particularly useful. These cases usually present with one of the four clinical patterns typical of pruritus and should be investigated in a systematic way. The first step is a therapeutic trial for fleas, which may have not been identified during the initial investigations for ectoparasites. A positive response to the trial suggests flea-bite hypersensitivity.

6 Perform an elimination diet.

If the therapeutic trial for fleas is unsuccessful, the second step is performing an elimination diet with novel protein sources or a hydrolyzed diet, to be carried out for at least 8 weeks. If the cat improves on the diet, challenge with the previous food is required to diagnose an adverse reaction to food.

7 After ruling out food as the cause of pruritus, the clinician is left with a possible diagnosis of feline atopic syndrome. There are different treatment options for environmental allergy in cats and the diagnosis is confirmed by response to treatment.

Depending on history and clinical presentation, in some cases, a behavioral problem can be suspected, especially if the cat presents with self-induced alopecia or ulcerative dermatitis affecting the dorsal neck. In other cases, a neurologic problem such as feline hyperesthesia syndrome may be considered and needs to be investigated. These conditions are usually addressed only when all the other differentials have been ruled out, and the cat does not respond to treatment for feline atopic syndrome.

References

1. Metz M, Grundmann S, Stander S. Pruritus: an overview of current concepts. *Vet Dermatol.* 2011;22:121–31.
2. Gnirs K, Prelaud P. Cutaneous manifestations of neurological diseases: review of neuropathophysiology and diseases causing pruritus. *Vet Dermatol.* 2005;16:137–46.
3. Beaver BV. *Feline behavior. A guide for veterinarians.* Second edition. St. Louis: WB Saunders; 2003.

4. Bowen J, Heath S. Behaviour problems in small animals. Practical advice for the veterinary team. Philadelphia: Elsevier Saunders; 2005.
5. Eckstein RA, Hart BL. The organization and control of grooming in cats. *Appl Anim Behav Sci.* 2000;68:131–40.
6. Grant D, Rusbridge C. Topiramate in the management of feline idiopathic ulcerative dermatitis in a two-year-old cat. *Vet Dermatol.* 2014;25:226–e60.
7. Titeux E, Gilbert C, Briand A, Cochet-Faivre N. From feline idiopathic ulcerative dermatitis to feline behavioral ulcerative dermatitis: grooming repetitive behavior indicators of poor welfare in cats. *Front Vet Sci.* 2018; <https://doi.org/10.3389/fvets.2018.00081>.
8. Rusbridge C, Heath S, Gunn-Moore D, Knowler SP, Johnston N, McFadyen AK. Feline orofacial pain syndrome (FOPS): a retrospective study of 113 cases. *J Feline Med Surg.* 2010;12:498–508.
9. Mauldin EA, Morris DO, Goldschmidt MH. Retrospective study: the presence of *Malassezia* in feline skin biopsies. A clinicopathological study. *Vet Dermatol.* 2002;13:7–14.
10. Moriello KA, Coyner K, Paterson S, Mignon B. Diagnosis and treatment of dermatophytosis in dogs and cats.: clinical consensus guidelines of the world Association for Veterinary Dermatology. *Vet Dermatol.* 2017;28(3):266–8.
11. Hobi S, Linek M, Marignac G, et al. Clinical characteristics and causes of pruritus in cats: a multicentre study on feline hypersensitivity-associated dermatoses. *Vet Dermatol.* 2011;22:406–13.
12. Buckley L, Nuttall T. Feline eosinophilic granuloma complex(ITIES): some clinical clarification. *J Feline Med Surg.* 2012;14:471–81.
13. Rosenberg AS, Scott DW, Erb HN, McDonough SP. Infiltrative lymphocytic mural folliculitis: a histopathological reaction pattern in skin-biopsy specimens from cats with allergic skin disease. *J Feline Med Surg.* 2010;12:80–5.
14. Noli C, Colombo S, Abramo F, Scarampella F. Papular eosinophilic/mastocytic dermatitis (feline urticaria pigmentosa) in Devon rex cats: a distinct disease entity or a histopathological reaction pattern? *Vet Dermatol.* 2004;15:253–9.
15. Ngo J, Morren MA, Bodemer C, Heimann M, Fontaine J. Feline maculopapular cutaneous mastocytosis: a retrospective study of 13 cases and proposal for a new classification. *J Feline Med Surg.* <https://doi.org/10.1177/1098612X18776141>.
16. Yu HW, Vogelnest L. Feline superficial pyoderma: a retrospective study of 52 cases (2001–2011). *Vet Dermatol.* 2012;23:448–e86.

General References

For definitions: Merriam-Webster Medical Dictionary. <http://merriam-webster.com> Accessed 10 May 2018.

Albanese F. Canine and feline skin cytology. Cham: Springer International Publishing; 2017.

Goldsmith LA, Katz SI, Gilchrist BA, Paller AS, Leffell DJ, Wolff K. Fitzpatrick's Dermatology in General Medicine. 8th ed. New York: The McGraw-Hill Companies; 2012.

Miller WH, Griffin CE, Muller CKL. Kirk's small animal dermatology. 7th ed. St. Louis: Elsevier; 2013.

Noli C, Toma S. Dermatologia del cane e del gatto. 2nd ed. Vermezzo: Poletto Editore; 2011.