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DIAGNOSTIC APPROACH TO FELINE ALOPECIA

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Etiopathogenic mechanisms of alopecia
Alopecia means any kind of total or partial hair loss, whatever the distribution, and it is the second most common dermatological problem in cats, only after pruritus.

This hair loss can have different clinic presentations, from localized (alopecia focal / multifocal) to widespread: diffuse or symmetric (symmetric alopecia feline). The latter is one of the most rare and, as its name suggests, has a more or less symmetrical distribution, affecting mainly the ventral areas (abdomen, groin, perineal area) and lateral trunk, and less commonly the dorsal area of the body of cats. Sometimes, it may spread to the extremities and towards the head. Feline symmetrical alopecia was considered a problem associated with endocrine diseases for many years. However, in recent decades, we know that hairless lesions secondary to metabolic or endocrine diseases, are exceptional in the feline species and that the most common causes of symmetrical alopecia in cats are the diseases that cause pruritus.

The causes of alopecia in cats are very varied and mainly reflect four mechanisms:

1. Alterations in follicular growth
2. Alterations in follicle and shaft
3. Alterations in hair growth cycle
4. Self-induced hair loss (excessive licking)

1. Alterations in follicular growth are caused by congenital and hereditary causes and are rare. Diagnosis is based on history (alopecia in young animals or from birth) and skin biopsies that show alterations in the hair formation. Some of these diseases has been sought and genetically selected to create cat breeds like the Sphinx (Sphinx cat) or the Canadian hairless cat.

2. Alterations in the follicle and the shaft are mainly caused by the presence of infectious agents that invade the follicle, inflaming it and causing the destruction and loss of hair. The agents most commonly involved in this mechanism are the dermatophyte fungi and rarely, mites of the genus Demodex and bacteria that invade the follicle (bacterial folliculitis).

3. Alterations in hair growth cycle are usually related to the presence of endocrine or metabolic diseases that affect the formation and growth of the hair, causing it to grow weak and to fall off or break easily. These are very rare. Its diagnosis is usually based on clinical history as they often have other concomitant clinical signs (dermatological and systemic) and on blood tests and imaging diagnosis that reveal an internal cause. The biopsy can help to diagnose other diseases that may be included in this group and are also very rare, such as telogen or anagen effluvium, some malignancies and drug reactions.

4. Self-induced hair loss is the most common cause of alopecia in the cat. It is associated with the presence of pruritus that triggers an excessive grooming that pulls out or cuts the hairs. Apart from alopecia, there are some other lesions on the skin secondary to pruritus such as erosions, abrasions, and papules, amongst others. Any disease that can cause an itchy course can lead to this alopecia. The most common causes are hypersensitivities and ectoparasites, and less often psychogenic pruritus. Feline symmetrical alopecia is one of the clinical presentations most often triggered by this mechanism, termed as symmetric self-induced feline alopecia. It is included within the pruritic conditions of the cat together with facial pruritic dermatitis, miliary dermatitis and the feline eosinophilic granuloma complex.
Diagnostic approach of feline alopecia

The clinical presentation is not going to be helpful in the diagnostic approach of feline alopecia because there are many causes of focal or multifocal alopecia that can also cause diffuse or generalized alopecia.

In general, it is much more useful to determine the mechanism that caused the alopecia. The first step of the diagnostic approach will include a complete history and hair exam (trichogram) that will help us prove the cause of alopecia (self-induced mechanism or not) and allow us to focus our diagnostic plan.

- **The history** should include information such as the animal's age, duration and seasonality of the process, evidence of contagion, details of diet and environment around the animal, previous treatments and response to them, and most importantly: the existence of pruritus. Concerning this, it is sometimes difficult to obtain adequate information from the owners as they can spend few hours a day with the cat or it can hide for grooming and, therefore, they cannot assure us that their pet is scratching, biting or licking more than usual. Also in the cat, the act of licking or grooming is part of their normal activity and it is very difficult to determine if it is excessive. Regurgitation of hairballs and/or the presence of excess hair in the stool can help us to illustrate an excessive licking and, therefore, that the cat has an itchy condition.

The age of the animal is also important since an alopecia that appears in neonates or very young cats often has a hereditary and/or congenital. On the contrary, in geriatric animals that also have concurrent systemic signs one must suspect the existence of a systemic disease as the most likely cause of alopecia.

- **Direct exam of the hair** should always be done in any cat with alopecia. Perform a direct observation and record the resistance offered when trying to pluck them. In cases where the animal licks the hair pulling or fracturing it (self-induced alopecia), the hair is shorter than normal but resistant, so it is difficult to pluck it out. By contrast, in cases where the problem is a disruption in the hair development or growth due to an endocrine or metabolic disease, it tends to epilate easily.

- **Microscopic examination of hair or trichogram** is the most helpful ancillary test to determine the mechanism by which hair loss occurs. The technique is simple: using a mosquito forceps whose ends have been previously wrapped in plastic, take hair samples from the affected area with a firm tug. We get both the hairs that are in a decay phase (telogen phase) and are easy to pluck, and the hairs that are in growth phase (anagen phase) located in the deeper dermis. Then, place the sample on a slide with a previously put drop of mineral oil and cover it with a coverslip. Observe the sample at low magnification checking the shape of the tip and root of the hairs. In a self-induced alopecia, the tips of the hairs are broken due to excessive licking by the cat. However, the roots are normal and exhibit a correct anagen:telogen rate. This shows that a traumatic rupture of the hair causes alopecia. When alopecia is caused by problems in its growth or changes in the hair structure, we can see changes in the shaft (cuticle) and/or roots and/or a higher proportion of roots in a decaying phase (telogen). This appears in some metabolic and endocrine diseases in which the hair falls out spontaneously. Exam of the hair shaft is also important because it is sometimes possible to detect the growth of dermatophyte fungi on the hair cuticle or the presence of mites or their eggs attached to it.

Once we have determined whether the cause of alopecia is self-induced (itching problem) or spontaneous (changes in hair growth and/or metabolic diseases, etc.) but have not yet found the cause of alopecia, even after the previously described steps, we have to use a series of laboratory tests to find out the disease that has caused it. The diagnostic plan will vary depending on whether this is a case of self-induced alopecia in which the cause of alopecia is the presence of a pruritic dermatitis or psychogenic pruritus or if this is a case of spontaneous alopecia in which the most likely cause is a systemic disease with or without an infectious agent.
1. **Diagnostic protocol for feline self-induced alopecia (Chart I).**
The clinician should conduct the necessary tests to help identify and rule out potential causes of pruritus. The most common causes of pruritus in cats are hypersensitivities and ectoparasites. Dermatophytosis should also be included because it may cause pruritus in cats. The diagnostic approach involves basic laboratory tests like scrapings, Scotch tape test, fungal culture, and so on. If these turn out to be negative, a diagnostic plan has to rule out the presence of hypersensitivities implementing a comprehensive parasite control, a hypoallergenic diet and intradermal tests and/or serological tests to determine the allergens involved. If, despite everything, any of these causes can be found, then the presumptive diagnosis is that of a psychogenic alopecia and a therapeutic trial with anxiolytics should be performed to confirm the diagnosis.

**Chart I. Diagnostic protocol for feline self-induced alopecia.**

![Diagram of diagnostic protocol for feline self-induced alopecia](image)

2. **Diagnostic protocol for feline spontaneous alopecia (Chart II).**
When the clinical history, physical and dermatological exam and the trichogram indicate that the hair loss is caused by a disruption in the development or growth, the diagnostic approach is quite different from that performed for pruritic dermatoses. Feline symmetrical alopecia due to excessive hair shedding rather than to an excessive grooming is much more rare in cats and is often associated with endocrine and/or metabolic diseases and, rarely, with other conditions such as telogen/anagen effluvium, drug reactions or malignancy. Animals that suffer this type of alopecia must have a systematic exam of their clinical status in order to find out the underlying disease. A skin biopsy is often helpful, and sometimes the only way to diagnose some diseases that can cause this condition. It is also important to perform basic laboratory tests such as skin scrapings and fungal culture because, sometimes, cats with severe systemic diseases that compromise their immune system may have opportunistic infections that affect the skin, such as demodicosis and dermatophytosis.

**Chart II. Diagnostic protocol for feline spontaneous alopecia.**
REFERENCES