

Bad Kissingen, March 2011

ALLERGY FLOW CHART

Imagine you have an **itching dog** or cat coming into your practice, what would be the best way to deal with this case? In which order would you start your diagnostics? The flowchart enclosed demonstrates the refurbishment of itching patients. This text is ment to assist in making the best choices. Most important in working up an itching patient is to ask for an accurate medical history and anamnesis. One of the most important questions is:

What started first? The pruritus or the skin lesions?

Has the pruritus been the first symptom and you observe secondary skin lesions, very likely the patient will suffer from an allergy (pruritus sine materia). In these cases you may even see secondary infections and skin lesions because of the itching, biting, and scratching of the animal. In contrast, if the disease starts with a skin problem which begins to itch in the course of time most often you have to deal with a non-itching skin disease. These non-itching skin diseases (e.g. demodicosis) develop itching after some time due to secondary infections and thus may mimic allergies at first sight.

According to the outcome of clinical examination and medical history we decide basically whether we have to think of ectoparasites (ectoparasites YES) or not (ectoparasites NOT).

In the case of ectoparasites being the preferred differential (ectoparasites YES) you have to think of following points and parasites:

Scabies:

Affection with *Sarcoptes scabiei var. canis* is an important and rather common differential diagnosis to a suspected allergic skin disease. If you see the following symptoms in your patient, you should always consider Scabies being the cause:

- severe pruritus
- also the owner or other dogs are affected
- papules ventrally, elbow, hocks
- scaly, crusty ear margins
- generalized lymphadenopathy
- positive pinnal-pedal reflex

Due to the preliminary report it is always necessary to gather additional information:

- Contact to other itching dogs?
- Abidance in animal shelter/animal hostel?
- Going for a walk in the forest (mangy fox)?
- Do human family members also have skin lesions?
- Derivation of the dog (animal shelter, pet shop or unknown origin)?

For diagnosis you can perform a *Sarcoptes* serology, a superficial skin scrape or you can induce a diagnostic therapy (cave: MDR1 sensitivity). If the pruritus disappears after termination of therapy, most likely scabies was the reason for itching.

Cheyletiella

Cheyletiella dermatitis is caused by the mite *Cheyletiella spp.* This disease is typically seen in puppies and younger animals. It is highly contagious and can affect cats and other small pets, also human beings as well. These mites do not dig, but live on the skin in dead danders. If you recognize white, dry scales with or without pruritus especially on the back of the animal, you should primary think of a Cheyletiella dermatitis.

- White scales dorsally
- Other animals or humans affected

Best way of **detection** is to use adhesive tape and/or diagnostic therapy. Due to the high contagiousity you should include all animals that live in the household into the therapy regime.

Demodicosis PLUS secondary bacterial infection

Hair follicle mites (*Demodex canis*) are transmitted during the first day after birth due to direct contact between bitch and the new born puppies. Therefore, you can find this mite in low numbers also in healthy dogs. In dogs that have an impaired immune system (e.g. stress situations, puppies or adult dogs with severe systemic diseases) you can see higher rates due to reproduction of the mites in the hair follicles. The clinical picture of this disease seen mostly in young dogs and puppies is characterized by alopecic, often circular skin lesions in the face and on the front limbs. These skin lesions can go along with (in the case of simultaneous secondary bacterial infections) or without pruritus. They are mainly benign and heal spontaneously in younger dogs (self limiting). In rare cases of generalized demodicosis in adult dogs though you can observe alopecia, scales, dander, follicular cast and comedos in widespread parts of the body. In these cases you have to search for an underlying disease. Any situation that weakens the immune system of the dog severely will be able to result in excessive reproduction rate causing a generalized demodicosis. Demodicosis is not transmittable – except transmission from bitch to new born puppies.

-alopecia, scales, crusts, follicular cast, comedos

For **diagnostics** a deep skin scraping should be performed to detect the disease. To identify a possible bacterial component a cytology should be performed on top.

In case of generalized demodicosis a strong need for a long-term therapy - which should also include an adequate antibacterial therapy - should be expected.

Other ectoparasites

- *Otodectes cynotis* is a mite which introduces the formation of thick, brown crusts in the ears. These mites mostly stay local. Rarely they are also found on neck, croup and tail. This disease is known as highly contagious with a severe pruritus and is mostly spread in young animals.
- Harvest mites are seen as small orange spots mostly on the paws of the pets and can also lead to severe pruritus.
- The red bird mite (*Dermanyssus gallinae*) is mainly seen in poultry and bird farms. The larvae mainly parasitise at night on the animals causing severe itching. Detection of the mites is difficult since they are rarely seen on the host. Severe pruritus due to red bird mites can also be seen in animals with contact to affected stables/animals.
- Adult fleas (*Ctenocephalides felis*) live on the dog and also place their eggs there. After some time the eggs fall to the ground and then stay in the environment of the dog. The larvae hatch, move away from the light and arrest in carpets, under upholstered furniture or in the ripping of the ground. The larvae become pupals which are the most resistant stage in the evolution of the fleas. They can remain in this stage up to one year depending on the environmental conditions. If the pupals are activated, e.g. by vibrations of the ground, the flea ecloses out of the pupal. Directly after eclosing the flea searches for its host. If there is no animal available, the fleas will also bite in the legs of human beings to get blood. Because only the adult flea is living on the animal and all of the other stages are living in the surrounding it is very important to treat the surroundings (e.g. flat, car, bedding of the animal) besides treating of the dog.

Ectoparasites NO:

First of all you need to decide whether there is an infection or not. Then you have to consider the following diseases:

Infection YES:

Malassezia: *Malassezia pachydermatitis* provides an infection with yeast which often leads to skin lesions and pruritus. Mostly there are seen massive ear infections or yellowish, fatty, scaly skin lesions mainly on the neck and paws. Furthermore you can recognize the typical smell of the yeast. This kind of infection is very often secondary due to other various underlying diseases.

- yellowish, fatty scales: **Diagnostic:** The affection with yeast can be detected by cytology, a culture or in rare exceptional cases with the help of a patho-histological analysis. Malassezia-Antibodies (IgE) are determined with the Fcε-receptor test where you can see an additionally sensitization due to yeast. **Therapy:** apart from the topical +/- systemical symptomatic therapy the underlying reasons need to be detected, controlled and treated if possible. Also performing an ASIT (allergen-specific immunotherapy) with the extract of Malassezia can be considered.

Bacterial infections

Due to colonization of the hair follicles with bacteria like *Staphylococcus pseudintermedius* you can see itchy skin lesions like papules, pustules, collarettes, and crusts. If you have a chronic and long-lasting disease, the skin can get thickened, hyperkeratotic and dark pigmented (lichenification). Secondary hair loss may result from infection of the hair follicles. Most often a bacterial infection of the skin will occur secondary due to various primary underlying diseases.

- scales, collarettes
- papules, pustules

To diagnose a bacterial infection of the skin you can run either cytology and/or bacterial culture. If the patient shows recurring infection, it is also possible to detect staphylococcus antibodies.

Therapy: first of all the infection should be treated with an adequate antibiotic systemically as well as topically. Afterwards you need to diagnose, control, and treat the primary reason responsible for the secondary bacterial infection. In some cases of chronic recurring pyoderma utilization of a staphylococcal vaccine may be useful.

Dermatophytosis

A fungal infection can lead to various clinical signs: first of all you can see the "classical" type of fungal infection, where the patient shows circular, hairless and scaly lesions. In this context you will also find danders, follicular cast, diffuse alopecia, and so on. If you have a secondary bacterial infection, the pet also shows pruritus. Never try to diagnose a fungal infection merely by the clinical presentation because there is no such typical picture. **To diagnose** a fungal disease a fungal culture is obligatory. A positive Wood's lamp or a trichogram can give hints but should not be used for ultimate diagnosis.

Therapy: systemic and topic therapy of all affected and concomitant animals are absolutely necessary and should be performed.

Infection NO:

Other reasons for pruritus:

Autoimmune

Autoimmune diseases may go along with pruritus. In these cases cytology may reveal suspicion of e.g. pemphigus foliaceus. For a final diagnosis usually histopath on a skin biopsy is needed.

Others

Neoplasia of the skin (e.g. lymphoma) may go along with severe pruritus. In these cases the cytology leads to estimated diagnosis. The final diagnosis should be confirmed with the help of patho-histological investigations.

In all diseases mentioned above, pruritus should disappear after successful therapy. If pruritus still persists despite successful therapy, you should go ahead like mentioned below:

Pruritus still persists:

Allergic diseases are the most common cause. The utilization of compendia is very suitable for clarification of an allergy. The medical history really helps a lot to get the right order of differential diagnosis.

Adverse reactions to food/food intolerance

In the case of food allergy you can have allergic reaction to one or more components of the food. The pet can develop severe pruritus with different clinical pictures at any time during life. Itching and scratching (self trauma) can lead to secondary infections of the skin.

- pruritus: generalized or looking exactly like atopic dermatitis or flea dermatitis allergy
- chronic recurring otitis externa
- animals at any age can be affected (also very young or old ones)
- gastrointestinal symptoms (diarrhoea, vomitus, flatulence, obstipation, frequent defecation)

Adverse reactions to food can appear while your dog did not have any food change and even if it has always been fed the same food for many years. Puppies and even older dogs, which have been fed the same food for many years, can show sudden onset of food allergy.

The **diagnosis** of food allergy mainly is a clinically estimated diagnosis. Elimination diet with subsequent provocation trials is state of the art to confirm the diagnosis and identify the allergens responsible for clinical signs. Alternatively you can use a serological food allergy test (sensi-test), which detects IgE and IgG antibodies to various food components. Ingredients that did not provoke antibodies are considered to be safe for feeding as elimination diet.

- single allergen detection of IgE and IgG antibodies to food ingredients

According to the test result the veterinarian will recommend an **elimination** diet. During that time, which should last for 2 months, the dog is only allowed to be fed a dedicated food. In the beginning it may be advisable to feed a self-prepared home cooked diet and later on to use hydrolysed or hypoallergenic diets which are only available at the veterinarian. It is very important that the ordered diet is strictly followed. Only small amounts of other food (cat food, chewing bones, treats, and so on ...) can ruin the effect of the elimination diet and you have to start the whole trial from the beginning again.

- strictly feeding of one protein and one carbohydrate
- at least 2-3 months
- no treats, chewing articles, and so on
- no flavoured drugs!

If the clinical signs do not disappear while strictly feeding elimination diet, you should think of atopic dermatitis next.

Fleas/flea allergy

In general you have to distinguish between affection with fleas and allergic reaction to fleas. Flea allergy dermatitis is one of the most common allergic skin diseases. By the bite of a flea the dog is encountered with flea saliva and can develop a sensitization to this. This type of allergy does not depend on the number of fleas parasitising the dog. Even a low number of fleas can lead to allergic reaction because of their saliva. These affected dogs show severe pruritus and skin lesions especially on the backside of the body which means on the croup, the tail and on the hind limbs. Thus you have to perform a strict and consequent flea prophylaxis, because any event of flea biting could cause development of typical skin lesions.

- flea allergy versus affection with fleas
- backside of the body; mainly croup, base of the tail

To diagnose this kind of disease, you combine observation of typical clinical symptoms, appearance of fleas or faeces of the fleas, a serological test for detection of IgE to flea antigen (Fcε-receptor test®) or a diagnostic therapy.

If the pruritus still persists after strict elimination diet and consequent flea treatment, you should then consider atopic dermatitis as a possible differential diagnosis.

Atopic dermatitis (AD)

Atopy is known as an allergy to pollen, dust mites or moulds. Main symptom is pruritus with age of onset between 6 month and 3 years. Preferred areas of pruritus are face, ears and paws. Atopic dermatitis always starts with pruritus without any skin lesions (pruritus sine materia), but due to the continuous scratching secondary skin lesions usually are observed. These skin lesions are mostly superinfected with yeast and/or bacteria resulting in more and more itching. Primarily this type of allergy is often seen during certain months of the year (seasonal variability), but in the course of time it can also become perennial.

- *pruritus sine materia*
- paws, limbs/extremities, head, otitis
- seasonal variability
- good response to cortisone
- mostly onset between 6 months and 3 years of age

To **diagnose** atopic dermatitis you need to look for medical history and clinical symptoms (clinical diagnosis). To identify the causing allergens you can either perform an intra-dermal skin test or run serological tests (Fcε-receptor test®). If you use serology a so-called screening test may be an alternative to start with. This test analyses groups of various allergens like mites, pollen, moulds and flea saliva. Depending on the outcome of the screening test you can continue with main tests (Fcε-receptor test®) to identify the single allergens. There is the possibility to start with main tests right away as well. Here we offer the seasonal panel (single allergen detection to grass, weed and tree pollen), the perennial panel (single allergen detection to moulds, dust and storage mites), the insect panel (single allergen detection to various insects) and the feather/hairs/epithelium panel (single allergen detection to various feathers and epithelia).

In the event of negative results you have to ask for following questions:

- has the animal been pre-treated at the testing time (cortisone)?
- has the test been performed at the wrong point of time (no exposure to causing allergen)?
- is it possible that the patient suffers from atopic-like disease (intrinsic type, which means that you cannot detect allergen-specific IgE antibodies)?
- do we have the wrong clinical diagnosis?

If you have positive results in the allergy test that correspond with clinical symptoms and medical history, **best choice of management/therapy** would be to avoid the causing allergens. If this is not possible though, you should strongly consider to perform an allergen-specific immunotherapy (ASIT, hyposensitization).

Hyposensitization is carried out by injecting the pet subcutaneously those allergens to which it has reacted positively to in the allergy test. Doing that you have to stick to defined injection intervals and increasing concentrations. In 75% of the affected dogs we can register an excellent success with using this type of therapy.

- allergen extract, includes positive tested allergens
- if there is a good response to the ASIT, therapy should be carried out life-long

It is important to understand that allergies are not curable. The disease is controllable though e.g. by life-long therapy. Optimum management and very good owner's compliance are crucial for a substantial success.