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Superficial mites in small animal dermatology

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Scabies

Sarcoptic mange is a contagious disease caused by *Sarcoptes scabiei* var. *canis* in dogs and by *Notoedres cati* in the cat. In our experience it is much more common in dogs. Transmission is usually via direct contact with affected animals, rarely animals can infect themselves from a recently contaminated environment. Clinically nonaffected carrier animals occur. The mite does not survive off the host for very long periods of time. The life cycle is accomplished in approximately 21 days.

Clinically, scabies is characterized by tremendous pruritus. Papules, scales and crusts develop at affected sites, typically the elbows, hocks, face and pinnae in the dog and the face, ears and neck in the cat. Occasionally, nonlesional pruritus is caused by scabies mites (Scabies incognito).

Diagnosis is made by superficial skin scrapings. However, as mites may be difficult to demonstrate, therapeutic trials are commonly used to confirm the diagnosis in animals with negative skin scrapings. Pruritus often increases during the first days of therapy due to the dying mites and concurrent glucocorticoids therapy for the first 3-5 days may be useful.

Otodectes cynotis(Ear Mites)

These are large, white and freely moving mites with four pairs of legs extending beyond the body margin (except the rudimentary fourth pair of the female). The life cycle lasts 3 weeks. The egg is laid with cement sticking it to the substrate. After 4 days of incubation, a 6-legged larva hatches and feeds actively for 3-10 days, rests a day and hatches to the protonymph (8 legs, last pair very small) and later moults into the deutonymph. The adult male attaches to the deutonymph end-to-end. If the deutonymph is a female, copulation will take place and the female will become egg-bearing. Females that were not attached, don't lay eggs. They live for 2 months. Transmission occurs via direct and indirect contact, mites can survive for up to 8-12 weeks in the environment. Fleas are thought to be able to transmit mites and eggs that can adhere to the flea.

The mites feed on epidermal debris and tissue fluid from the superficial epidermis. They cause intense irritation and thick reddish brown crusts in the ears of dogs and cats. Mites are commonly found on other areas of the body, especially the neck, rump and tail. The parasites are highly contagious and especially prevalent in the young. Fifty percent or more of all otitides in cats and 10% in dogs are thought to be caused by ear mites. Infestations of cats vary from country to country with values as low as 3.5% in Australia (!) and as high as 75% in the States.

Cheyletiella ("Walking Dandruff")

Cheyletiella are large mites (385µm) that affect cats (*C. blakei*), dogs (*C. yasguri*), rabbits (*C. parasitovorax*) and humans (transiently affected by *C. yasguri* or *blakei*). Host specificity is still a controversial topic. Four pairs of legs bear combs instead of claws. The most diagnostic feature is the accessory mouthparts or palpi that terminate in prominent hooks. The heart-shaped sensory organ on genu I is diagnostic for *C. yasguri*, the cone shaped for *C. blakei* and the global one for *C. parasitovorax*.

The yellowish adult mites move rapidly in the stratum corneum but do not burrow. They live on tissue fluid piercing the skin periodically. The ova are smaller than louse nits and are attached to hairs by fine fibrillar strands (not cemented firmly to the hairs as nits). They hatch in 4 days. The 6-legged larva moults to the 8-legged nymph I after 7 days, nymph II after 4 1/2 days and adult after 5 days. The mite is an obligate parasite that does not live off the host for longer than 48 hours (except for females which may live for up to 10 days if carefully refrigerated). The mites are highly contagious, especially to young animals.

The course in small animals is chronic, most severe and generalised in 2- to 8-week old puppies. Older individuals may become asymptomatic carriers. Usually scaling is the only change (due to mites and keratin scales) with none to mild pruritus noted. Cats may develop widespread papulocrustous eruptions and severe pruritus in some cases.

Diagnosis is made by tape impressions, superficial scrapings, KOH digestion of debris gathered with a flea comb or faecal flotation samples. Other ectoparasites and seborrhoea are the two major differentials. A hyperplastic, superficial perivascular dermatitis with hyperkeratosis and a variable number of eosinophils is seen on biopsy. Cheyletiellosis is a local disease; it is seen extremely frequently in some areas and very rarely in others.

***Dermanyssus gallinae* (Poultry Mite)**

The “red mite” (only red when engorged with blood) attacks poultry, wild and cage birds, dogs, cats, cattle, horses and humans. Its size is 1mm, it lives in nests and cracks in cages or houses and lays up to 7 eggs after a meal. These hatch to 6-legged nymphs that do not feed. After 48 hours these moult to 8-legged protonymphs, another 48 hours later to deutonymphs and two days later to adults. The whole life cycle thus ideally takes 7 days but may last up to 5 months.

Most cases in small animals are associated with pets having access to (sometimes old or converted) chicken houses. Thus, taking a good history is essential in diagnosing the disease. Erythema, pruritus and a papulocrustous eruption especially over the back and extremities can be seen, but generalised severe scaling without pruritus was also reported in a dog. Diagnosis may be made by skin scraping. However, the mites tend to live in the environment and feed at night time. Insecticidal dips or sprays will eliminate the mites, but treating the premises is essential to prevent reinfestation.

***Lynxacarus radovsky* (Cat Fur Mite)**

These small mites (0.5mm) have flap-like sternal extensions containing the first two legs, which grasp the hair of the host. The mites are not highly contagious and usually there is little itching. They attach to the hair and give a “salt and pepper” appearance to the dull and dirty coat. Hair is easily epilated, the skin is normal or shows a papular eruption. Diagnosis is made by skin scraping or tape impression, the animals are treated with insecticidal dips or sprays.

Trombiculidiasis (Chiggers, Harvest Mites)

Chiggers are scavengers living on decaying vegetable material. They are orange-red, the size of a pin and live about 10 months (females may live longer than a year). The eggs are laid in moist ground and hatch to 6-legged red larvae that are parasitic. They feed on the animal (any large animal, small animal or human may be affected), drop on the ground and become nymphs and finally adults. The entire life cycle is complete in 50-70 days. The bites, usually on ground-skin contact areas like the legs, feet, head, ears and ventrum, produce severe irritation and an intensely pruritic, papulocrustous eruption, but may also produce non-pruritic pustules and crusts with secondary scaling and alopecia in small animals. The organisms adhere tightly to the skin. In humans, intense pruritus on the ankles, legs and belt line is seen, the red mite is frequently scratched off. In sensitised individuals urticarial or granulomatous reactions can occur.

Chiggers are seasonal in summer and autumn. Skin biopsy reveals superficial perivascular dermatitis in which eosinophils are prominent. One or two parasiticide dips and thiabendazole drops in the ear canals are used for therapy, but patients must be kept from contaminated areas to prevent reinfestation. Corticosteroids for 2-3 days will help relieve the itching.

Treatment of superficial mites

- Selamectin is a spot on registered for the treatment of scabies and ear mites in many countries. It also has been shown to be effective against cheyletiellosis. I use it every 2 weeks for 3 treatments.
- Moxidectin is available as a spot-on registered for the treatment of canine scabies as well.
- Topical treatments include lime sulfur dips, amitraz, ivermectin and other antiparasitic rinses. They are used weekly for 4 weeks.
- Systemic therapy may be undertaken with ivermectin or milbemycin. The routine protocol for a dog that did not receive ivermectin before, is a slow increase from 50 mcg/kg to 100 mcg/kg to 150 mcg/kg to 300 mcg/kg on subsequent doses every day. The owners get told to monitor the animal carefully during that time for the above mentioned side effects. If any signs of ataxia or tremors occur, administration of the drug must be discontinued immediately. Once the maintenance dose is reached, we continue that dose once weekly for 3 more weeks in suspected or proven cases with scabies, cheyletiellosis or infestations with *Otodectes cynotis*.

Giving milbemycin oxime at 2 mg/kg twice weekly for 3-4 weeks has also proven a very safe, easy and successful treatment protocol for canine scabies.

- All animals in contact with the patient need to be treated as well!
- Initial deterioration during the first days of treatment may occur and may be treated with glucocorticoids daily for 3-4 days at 1 mg/kg body weight.
- Remission should be achieved within 4 weeks in most patients, although extended treatment for 8 weeks has been needed in some patients.

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