Diagnostic Exercise
From The Davis-Thompson Foundation*

Case #:**231**; Month: **February**; Year: **2024**
Answer sheet

Title: Feline notoedric acariasis

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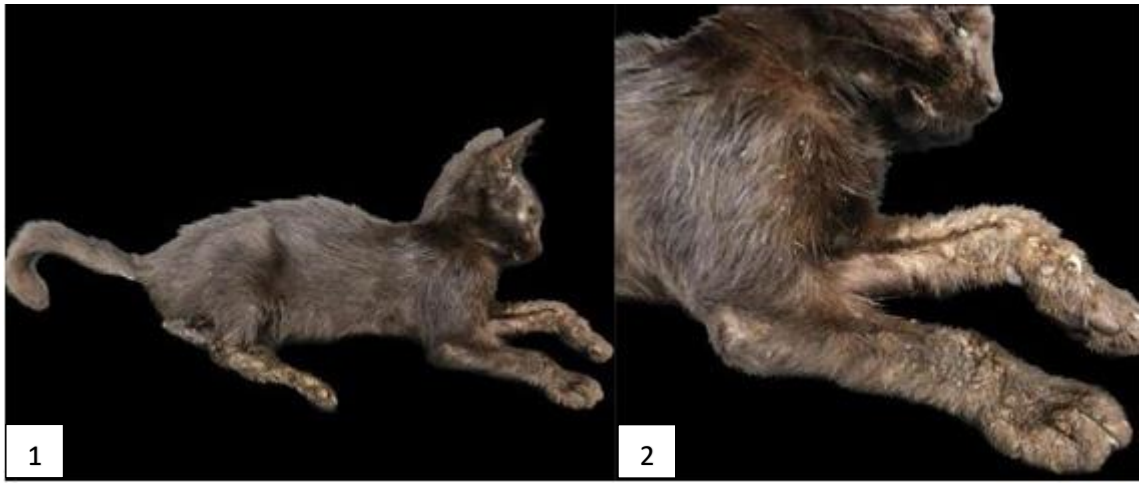
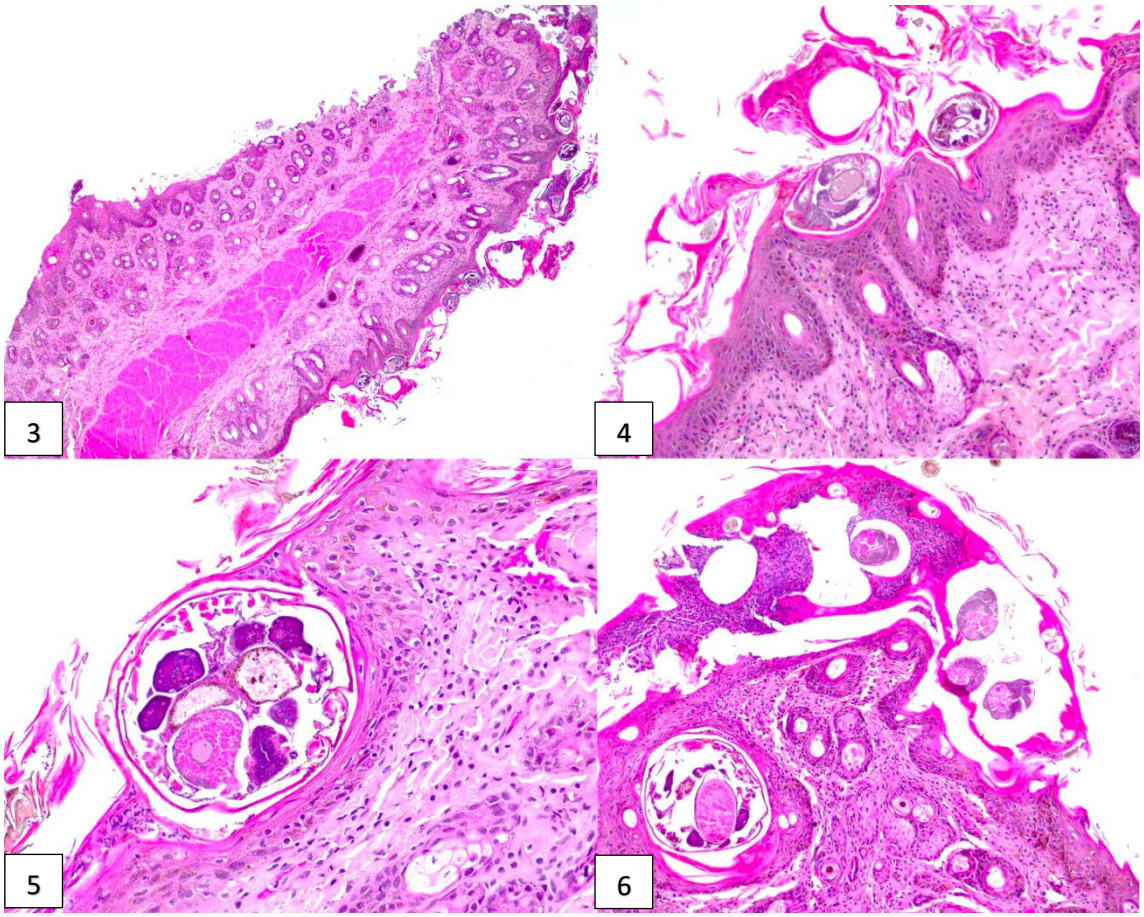
History: A stray domestic short hair cat, approximately 7 weeks of age, died under the care of a first contact practitioner and was submitted to autopsy.

Necropsy findings: Gross examination revealed marked symmetric alopecia primarily affecting the limbs, with associated crusting, hyperkeratosis, and mild ulceration (Fig. 1). The lesions extended to the lateral and medial borders of the pinna. Similar lesions involving the nail beds, paw pads, and pressure points were evident (Fig. 2).



Figs. 1 and 2: Macroscopic findings in a cat with feline notoedric acariasis.



Figs. 3-6: Haired skin and pinna. Microscopic findings in a cat with feline notoedric acariasis.

Microscopic description:
Haired skin and pinna: The epidermis had marked, diffuse, irregular hyperplasia (acanthosis) with severe overlying orthokeratotic and mild parakeratotic hyperkeratosis frequently associated with abundant degenerate and viable neutrophils and cellular debris (Figs. 3 and 6). The expanded stratum corneum contained numerous, vertically oriented, approximately 200-µm wide burrows containing mites (Fig. 4). In cross-sectional profiles, the mites measured 170 µm in the widest dimension and were ovoid with jointed appendages. The mites had a striated, eosinophilic to yellow, chitinous exoskeleton with internal skeletal muscle, hemocoel, reproductive organ, and sometimes eggs (Fig. 5). Within the superficial dermis, there was mild, perivascular to interstitial inflammatory infiltrate of eosinophils with fewer lymphocytes and plasma cells (Fig. 6).

Morphologic diagnosis:
Haired skin and pinna: Marked, diffuse, epidermal hyperplasia and hyperkeratosis with mild superficial perivascular to interstitial eosinophilic dermatitis and intracorneal burrowing mites.

Etiology: *Notoedres cati.*

Disease: Feline notoedric acariasis.

Comments:

Mites are a group of arachnids characterized by nymphs and adults with 4 pairs of legs & larval stage with 3 pairs of legs, and a fused head, thorax, and abdomen. Many mites can cause disease in domestic and wild animals as well as humans. They are frequently classified according to their habitat (1). Mites that dwell in the epidermis are called burrowing mites. The female burrowing mites dig tunnels into the skin to lay eggs, such as *Scarcoptes scabei*, *Notoedris cati* and *Knemidocoptes* spp. The non-burrowing mites, which live in the hair follicles, glands, or surface of the skin, include *Cheyletiella yasguri*, *Chorioptes bovis*, and *Psoroptes* spp. (5).

Notoedres cati is an obligately parasitic sarcoptiform burrowing mite, associated with dermatitis in domestic cats, wild felids, rabbits, rats, bats (3) and humans with frequent contact with infested cats (2). This mite has been reported worldwide (3). In cats, notoedric acariasis is infrequent; however, it is a highly contagious disease, and transmission happens mostly with direct contact (6).

The life cycle is similar to the one described for *Sarcoptes scabiei* (1). After mating, the females, which are frequently found in aggregation, burrow into the epidermis, sometimes below the stratum corneum, laying their eggs. Once the larvae hatch and feed on skin debris, they develop into nymphs, which eventually develop into adults that feed on the skin of the host (Fig. 7). This cycle takes around 6-10 days.

Felines infected with *Notoedres cati* usually present lesions first in the ear tip and that may extend to the face and distal limbs (8). The clinical signs are intense pruritus, crusts, alopecia, and, as the disease progresses, lichenification (4). Infections in young, undernourished, and immunocompromised cats can lead to debilitation, generalized disease, and even death (6). Histologically, the most common findings are thickened epidermis with marked hyperkeratosis, eosinophilic superficial perivascular dermatitis, and frequent segments of the mites in the stratum corneum (5). The adult mite measures up to 240 µm and has no spines on the body.

The pathogenesis is correlated with the mite tunneling activity causing direct damage that, along with its excrements and secretions acting as antigens and inducing hypersensitivity, lead to pruritus and dermatitis accompanied by epidermal hyperplasia. Excessive self-excoriation causes erythema and alopecia, as well as oozing blood and serum, which forms crusts and eventually scabs and thickening of the skin (6).

The diagnosis can be achieved with history, clinical examination, and demonstration of the mite on skin scraping, acetate tape impression, or biopsy. The number of mites is abundant, and they can be easily seen (7). Clinically, differential diagnoses should include allergic dermatitis and pemphigus foliaceous, which are conditions that also cause pruritus. Infections with *Sarcoptes scabiei,* although quite rare, can be seen in cats as well. The morphology of *S. scabiei* resembles that of *Notoedres* histologically; however, the number of mites is smaller and the size of the mites in the cross section is larger (5).

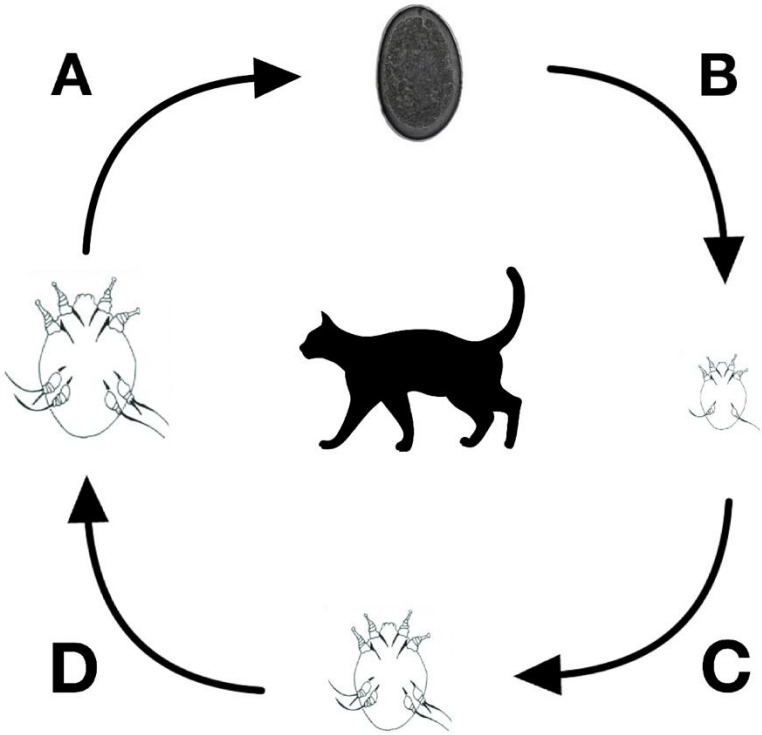


Fig. 7: *Notoedres cati* life cycle.

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*The Diagnostic Exercises are an initiative of the Latin Comparative Pathology Group (LCPG), the Latin American subdivision of The Davis-Thompson Foundation (DTF). These exercises are contributed by members and non-members from any country of residence. Consider submitting an exercise! A final document containing this material with answers and a brief discussion will be posted on the DTF website.

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