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CANINE AND FELINE NAIL DISEASES

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INTRODUCTION

Feline and canine patients with diseases located exclusively in the claws are seen rarely in practice but they may be extremely frustrating to manage when they do occur.

Dogs presenting with claw (or claw fold) disorders as the only dermatologic manifestation of disease constituted 1.3% of cases seen by referral clinic. In cats, the reported incidence was 2.2%.

Onychology, the study of nails, is an area of veterinary dermatology that has only recently become the focus of more detailed study, however. In recent years, several studies advancing our knowledge about this topic have been performed and they shed some light on the aetiology, diagnosis, and treatment of claw diseases.

STRUCTURE

The claw is a specialized cutaneous structure that is a direct continuation of the epidermis and dermis. Most of the claw is formed from coronary band and the central dorsal ridge. The coronary band is surrounded and hidden by the claw fold, which is free of hair on its inner surface and produces the thin stratum tectorium that is the outer edge of the proximal claw.

The epidermis of adjacent skin is continuous with that of the claw. The basal layer of the epithelium is most active in the coronary band and central dorsal ridge areas and causes growth in a circular fashion, thus producing a curved claw. The epidermis of the sole of the claw has a different granular layer (stratum granulosum). The rest of the claw, however, is primarily composed of a thick horny layer (stratum corneum) that consist of a flat cornified keratinocytes fused into a horny plate with no stratum granulosum.

A dermal-epidermal interface with a basal layer can be seen histologically. The dermis extends from the periosteum of the phalanx and is contiguous with it in the area of the ungual crest, therefore the claw may not be removed without amputation of the third phalanx.

The claw is formed by the basal layer which is most active in the coronary band and central dorsal ridge. The claw grows 1.9 mm per week, which results in a re-growth time of six-to-nine month.

The corium or dermis underneath the claw epidermis and contains the blood vessels and nerves and overlays the periosteum of the third phalanx. The constant production of nail tissue and its highly specialised structure and function may also make it a sensitive indicator of nutritional status.

The clinical terms used to describe clinical claw diseases have been extrapolated from human literature and are outlined next. The Veterinary literature has used "onycho" to describe claw disorders. The term "paronychia" indicates inflammation or infection of the claw fold. Onychosis or Onychopathy are generalized terms to specify an abnormality of the nail. An onychodystrophy is an abnormal formation of the claw which may include many clinical changes. This term can be confusing because it also is used to describe claw diseases with unknown aetiologies (i.e., idiopathic onychodystrophy).

More commonly used terms to describe lesions affecting the nails are:

- Anonychia: absence of claws (usually congenital)
- Leukonychia: whitening of the claw
- Macronychia: usually large claws.
- Micronychia: unusually small claws, often shorter or narrower than normal
- Onychalgia: claw pain
- Onychauxis: Hypertrophy of claws
- Onychia (onychitis): inflammation in the claw unit; usually in the matrix
- Onychoclasia: breaking of the claws
- Onychocryptosis: ingrown claw
- Onychodystrophy: abnormal claw formation
- Onychogryphosis: hypertrophy and abnormal curvature of claws
- Onychomadesis: sloughing of the claws
- Onychomalacia: softening of the claws.
- Onychomycosis: fungal infection of the claws.
- Onychorrhhexis: longitudinal striations associated with brittleness and breaking of the claws.
- Onychopathy (onychosis): disease or deformity of the claws
- Onychoschizia: splitting and/or lamination of claws, usually in the horizontal plane at the free edge.

At this time, these descriptive terms are non-specific for underlying aetiologies, and multiple changes can be seen with the same aetiology (table 1).

Location is described as asymmetric involvement when one claw or multiple claws on one paw are affected, while symmetric involvement implies multiple claws on multiple paws affected. Symmetric disease often is associated with underlying systemic disease.

DIAGNOSTIC APPROACH TO NAIL DISEASES HISTORY

As in any other dermatological problem, a good history may give crucial clues to the diagnosis:

- Age and sex predilection
- Breed predisposition (King Charles Spaniels, German Shepherd dog, American Cocker Spaniel)
- Cleaning routines, exercise
- Acute onset *versus* slow progression
- Human and other pets affected (dermatophytosis)
- Nutrition
- Evidence of internal disease, systemic signs
- One digit or paw *versus* several or all paws affected

CLINICAL EXAMINATION

It is recommended to perform a complete clinical examination of the entire patient to determine whether there are any other lesions that were not recognized or considered to be irrelevant by the owner or to identify any evidence of systemic disease.

The lymph nodes should be palpated. Special attention should be taken to mucous membranes of the mouth, vulva or prepuce, and anus, which may be affected in diseases such as pemphigus vulgaris or bullous pemphigoid. The nasal planum, the lips, pinnae and perineum should be examined for evidence of lesions such as vesicles, ulcers or crusts that may suggest the presence of autoimmune disease such as pemphigus foliaceus or discoid lupus erythematosus.

Abnormalities in hair keratinisation may accompany nail dystrophies. Some breed of cats may manifest seborrheic disease solely as accumulation of malodorous lipid in the nail fold.

It should be examined the four feet (nails, pads, interdigital areas, nail fold). If a single digit is affected, either neoplasia, process affecting the bone, or trauma should be suspected. If multiple digits of several paws are affected or if symmetric claw disease is observed, systemic disorders, such as immunomediated disease, endocrinopathy, keratinisation defects and nutritional deficiency should be suggest.

DIAGNOSTIC TESTS

The tests that could be performed in the diagnosis of nail diseases include:

- Cytological preparations for microorganisms and inflammatory or neoplastic cells. Secondary bacterial paronychia is common in dogs with claw disease. Cytological examination of paronychia exudates is helpful in establishing the presence of bacterial or fungal infection (suppurative to pyogranulomatous to granulomatous inflammation, degenerate neutrophils and/or eosinophils and numerous acantholytic keratinocytes) and neoplasia
- Skin scraping from affected claws and folds may reveal the presence of *Demodex* mites
- Fungal cultures are recommended in all dogs and cats in which fungal infection is strongly suspected; different zoonotic species should be identified.
- Bacterial culture only if appropriate empirically therapy fails or unusual microorganisms are identified on cytology.
- Elimination diet if allergic aetiology is suspected.
- Serum biochemistry, complete blood count and urinalysis may be helpful in patients when systemic disease should be rule out.
- Radiograph of the affected claw is useful in the diagnosis of secondary osteomyelitis (severe pain and swelling of the affected digit).

Biopsy of the claw, claw matrix, and claw fold is necessary for the diagnosis of neoplasia, autoimmune disease or drug eruption. General anaesthesia is required. Biopsy sample is taken by punch rotating slowly in one direction deep into tissue or by removing, with amputation, of the third phalanx.

In addition to collating a detailed history, to perform a complete clinical examination and laboratory tests, the owner should be informed that the current status of our knowledge of nail disorders of dog and cat is not so large than in other areas of the Dermatology. The owner should be known that many instances an identifiable aetiology is not recognised. In consequence, treatment tends to be supportive and non-specific, although this should not preclude a thorough investigation. Furthermore, even with identification and the successful treatment of a specific condition or effective symptomatic therapy the owner should be cautioned that a period of several months should be allowed for normal nail growth to re-establish.

Therapy

Therapy in **traumatic lesions** of the claws involve clipping cleansing, removal of the fractured portion of affected claw and topical antiseptic soaks every 12 hours (2% chlorhexidine diluted 1:40 in water).

If **bacterial infections** are suspected oral antibiotics based on culture and sensitivity testing should be prescribe. Empiric choices include cephalexine (20 mg/kg q 12h, PO, 3 month), enrofloxacin (5-10 mg/kg q 24h, PO, for 2 months), amoxicillin/clavulanate potassium (20 mg/kg q 12h, PO, 3 months), Clindamycin (5 mg/kg q 12h, PO for 4-5 months), metronidazol (15 mg/kg q 12h, PO 1-2 months) or potentiated sulfonamides (30 mg/kg q 12h). If refractory recurrence appears should be controlled underlying aetiologies: osteomyelitis, hypothyroidism, or hyperadrenocorticism.

Onychomycosis therapy should be aggressive because dermatophyte tendency to be refractory or recurrent in dogs and cats. Therapy include griseofulvin (50 mg/kg q 12h, PO), ketoconazole (10 mg/kg q 12 h, PO), itraconazole (10 mg/kg q 24h, PO) and terbinafine (20-40 mg/kg q 24h) continuously for 1 to 3 months (sometimes 6 month) beyond complete claw regrowth and negative culture. Topical antifungal therapy includes 2% chlorhexidine, 0.2% enilconzol, 10% povidona-iodine, and 1% miconazol.

Immunesuppressive drugs in claw diseases include oral prednisone (2 to 4 mg/kg/day for 2-9 weeks and then gradually reduce to the maintenance dose), tetracycline alone or a combination of tetracycline and niacinamide (500 mg of each q 8h for patients more than 10 kg and 250 mg of each q 8h for patients less than 10 kg, for 3 to 6 months), chlorambucil and golds salts in cats, azathioprine, chlorambucil and gold salts in dogs.

Other drugs of interest in the treatment of nail disease are: pentoxifiline (200-800 mg/dog), fatty acids, gelatine (10 grains orally q 12h), biotin, retinoids, Zinc, Vitamin A, Vitamin E (400 mg twice daily) and hydratation.

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Table 1: Described causes of claw disorders (Carlotti, Griffin, Miller, Muller and Scott,)

1. Environmental agents.
 - Acute trauma (hunting and racing dogs)
 - Prolonged immersion
 - Exposure to very hot water
 - Prolonged exposure to a dry environment
 - Exposure to caustic agents
 - Overzealous clipping
2. Infectious agents
 - Virus
 - Cowpox
 - Feline herpesvirus and calicivirus
 - Feline leukaemia virus
 - Feline immunosuppressive virus
 - Distemper
 - Bacteria
 - Typically secondary to any primary cause of nail bed or pedal inflammation or to systemic disease and immunosuppression.
 - Fungi
 - Dermatophytes (specially *Trichophyton mentagrophytes*, *M*
 - *Microsporium gypseum* and *Microsporium canis*)
 - *Candida* spp. secondary to Diabetes mellitus
 - Blastomycoses
 - Geotrychosis
 - Cryptococcosis
 - Protozoa
 - *Leishmania* spp.
 - Helminths
 - *Ancylostoma* spp.,
 - *Uncinaria stenocephala*
 - Arthropods
 - *Demodex canis*
3. Hypersensitivities
 - Atopy
 - Food hypersensitivity and intolerance
 - Drug eruption
4. Immune mediated disorders
 - Pemphigus complex, particularly foliaceus and vulgaris
 - Bullous pemphigoid
 - Discoid lupus erythematosus
 - Systemic lupus erythematosus
 - Epidermolysis bullosa
 - Cold Agglutination disease
 - Vasculitis
 - Drug eruption
5. Systemic diseases
 - Endocrine disorders
 - Canine hypothyroidism
 - Canine hyperadrenocorticism
 - Feline hyperthyroidism
 - Acromegaly
 - Diabetes mellitus
 - Superficial necrolytic dermatitis or hepatocutaneous syndrome
 - Serious internal disease that potentially compromises either nutrition or immunity
6. Idiopathic (onychodystrophy, and others)
7. Nutritional deficiency
8. Neoplasias:
 - Squamous cell carcinoma, squamous papilloma
 - Eccrine Adenocarcinoma
 - Inverted papilloma
 - Mast cell tumor
 - Melanoma
 - Keratoacanthoma
 - Neurofibrosarcoma, fibrosarcoma, undifferentiated sarcoma
 - Hemangiopericytoma,
 - Osteosarcoma, myxosarcoma
 - Neoplasias that may metastasize to multiple distal digits:
 - pulmonary adenocarcinomas
 - visceral squamous cell carcinoma
9. Congenital (anochyia and onychogryphosis)
10. Seborrheic onychodystrophies