Title: **Generalized pustular onychopathy of unknown etiology in a domestic cat**

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Abstract

Claw diseases are a rare condition in the cat, often associated with cutaneous lesions in other regions of the body. This case report describes an atypical manifestation of a generalized onychopathy of unknown origin in a domestic shorthair cat.

Introduction

Claw diseases in cats are rare and commonly associated with paronychia and lesions in other regions of the skin. In cats, paronychia is reported mostly due to bacterial infections or pemphigus foliaceus. Other claws abnormalities have been rarely reported, and in one of the few studies describing idiopathic onychodystrophy in cats, this term was applied to single claw growth abnormalities where the claws were thickened or curved from a suspected previous traumatic injury.[1] To the best of the authors' knowledge, conditions causing diffuse deformity of the claws have not been reported in cats.

Case report

A 9-year-old male, neutered, domestic short-haired cat was presented for a generalized, progressive onychopathy of 5-months duration. The condition had not responded to 0.05% sodium hypochlorite foot baths performed daily for two weeks and two subcutaneous administrations of cefovecin (8 mg/kg, Convenia, Zoetis Belgium; Louvain-la-Neuve, Belgium). The patient was an indoor cat, fed a complete commercial diet, and was otherwise in good general health. The cat was not receiving any treatment for external parasites and had not been vaccinated in the last eight years. On dermatological examination, the claws of all four feet showed varying degrees of onychodystrophy, onychorrexis, onycholysis and onychoclasis without apparent involvement of the nail bed (Figure 1). No pain or discomfort at manipulation was noted. No other skin lesions were observed, and the cat was reported to be non-pruritic.
Cytological evaluation of the periungual skin did not reveal any microorganisms. Wood's lamp examination and a fungal culture were negative for dermatophytes. Complete blood count, biochemistry and thyroid profile were within normal limits and the patient was negative for feline leukaemia virus (FeLV) and feline immunodeficiency virus (FIV) (SNAP® FIV/FeLV Combo Test - IDEXX Laboratories, Inc., Westbrook,

Maine, USA). Thoracic radiography and abdominal ultrasonography were unremarkable.

The third phalanx of the fourth digit of the left pelvic limb was surgically removed and the sample was routinely processed for histological examination.

Microscopically, multifocal pustular lesions affecting the nail matrix were observed (Figure 2). Pustules were of variable size and depth, from the more superficial layers (subcorneal) to full epidermal thickness, and contained neutrophils and rare acantholytic cells. The epidermis was spongiotic, with mild lymphocytic exocytosis. In the nail plate, multifocal and occasionally stratified old pustules were observed, containing cellular debris and numerous round, hypereosinophilic cells interpreted as degenerated acantholytic cells. Hyperkeratosis of the nail fold and perivascular lymphoplasmacytic and neutrophilic inflammation were also observed in the superficial dermis, below the matrix and the nailbed. Periodic acid Schiff (PAS) and Gram stains were negative. Although histopathology was not consistent with Leishmania infection, a PCR and immunohistochemical staining were performed on the paraffin embedded tissue which were negative for Leishmania infantum.

A diagnosis of neutrophilic pustular dermatitis of the nail matrix with acantholytic cells was made.

Based on the clinical presentation and the results of laboratory tests, an infectious cause was considered unlikely and the suspicion of an autoimmune or immune-mediated sterile pustular dermatitis was raised. Oral daily prednisolone (2.5 mg/kg, Prednicortone, Dechra Veterinary products Srl, Torino, Italy) was started and lack of improvement was evident at the three-month recheck. The treatment was tapered and then discontinued, and the owner did not consent to further diagnostic investigations or therapeutic attempts. 14 months after diagnosis, the claw lesions remain unchanged.

Discussion

The histological lesions affecting the nail matrix in this case closely resemble those affecting the skin in cases of feline pemphigus foliaceus (fPF). However, fPF is usually characterized by more prominent acantholysis and, clinically, by pustules and crusting on other areas such as head, ears, feet, and periareolar skin[2] which were not present in our patient. Furthermore, the typical fPF changes are characterized by paronychia with no reported involvement of the nail itself. In our case, the lesions were restricted to the nail matrix and the acantholytic keratinocytes were scarce. Moreover, fPF tends to respond well to immunosuppressive therapy, with 90% of cases achieving disease control in less than a month and 97% in 8 weeks[3], with prednisolone monotherapy being one of the most common therapeutic choices[2].

The clinical features of this case closely resemble those of canine symmetrical lupoid onychomadesis (SLO). However, the histopathological pattern of this canine disease is characterised by interface dermatitis with a lichenoid infiltrate and pigmentary incontinence that is clearly distinct from the pustular dermatitis reported here. Once again, response to immunosuppressive treatment in affected dogs is usually seen. A single case of canine pemphigus foliaceus with exclusive nail involvement has been reported[4]. The affected dog, however, presented with paronychia, periungual yellowish exudation, and pain, with good response to corticosteroid treatment; features of pemphigus foliaceus that were absent in the present case.

In human medicine, Acrodermatitis continua of Hallopeau (ACH) can resemble this clinical appearance even though it is often associated with lesions in other cutaneous areas; the lesions usually begin with the tip of one digit turning erythematous and developing painful pustules that migrate under the nail bed and matrix, leading to onychodystrophy and, in severe cases, onychomadesis. In the acute phase, the pustules rupture and coalesce to form lakes of pus that carry the nail away, as this condition is classically described. Histologically, intra-epidermal spongiform pustules filled with neutrophils are described.[5]

Although a bacterial culture was not performed, a negative bacterial cytology, the absence of paronychia and pain, failure to respond to a four-week systemic antibiotic course, as well as the generalized distribution of the lesions and the negative Gram stain made a bacterial aetiology unlikely.

The use of prednisolone as the sole therapy for an autoimmune or immune-mediated process could be deemed insufficient but in cats, it represents the most widely used drug providing the best results, at least in the acute phase, for these types of disorders[6]. Although complete healing of the feline claw may take up to 6 months, with a growth rate of about 1.9 mm per week[7], the three-month therapy in our case should have allowed at least a partial improvement of the clinical picture.

An underlying neoplastic or endocrine trigger was considered unlikely given the results of diagnostic imaging and blood tests, and a follow-up period of over 18 months from the onset of clinical signs. Similarly, an adverse drug reaction was deemed improbable as no history of drug or vaccine administration was reported.

Finally, trauma as the causative event of asymmetrical onychodystrophy was suspected in a study[1]; the generalized presentation with involvement of all claws and the lack of any history of trauma, especially in an indoor cat, make this differential highly unlikely in our case.

To the best of the authors' knowledge, this is the first report of a chronic idiopathic generalised onychopathy of suspected autoimmune or immune-

mediated origin unresponsive to first-line immunosuppressive treatment in a cat.

References:

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Figure legend

Figure 1. Hind left foot - abnormal claws with onychorrhexis and onychodystrophy

Figure 2: Histological features of the biopsy of the affected cat. a) In the epidermis of the nailbed, multifocal pustules are noted (asterisks), together with severe hyperkeratosis and multilayered crusts (arrows). Haematoxylin and eosin, 1.25X. b) Pustules are of variable size and depth, from subcorneal to intraepidermal. Haematoxylin and eosin, 10X. c) Severe hyperkeratosis and multilayered crusts are present on the surface with alternating layers of hyperkeratosis (asterisks) and degenerated neutrophils and cellular debris (arrows). Haematoxylin and eosin, 10X. d) Pustules contained neutrophils and rare acantholytic cells (arrows). Haematoxylin and eosin, 40x.