

INSIGHTS IN DERMATOLOGY

Eosinophilic Folliculitis/ Furunculosis in a Dog

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Canine eosinophilic skin diseases (dermatoses) are uncommon heterogeneous disorders of different clinical phenotypes characterized by the development of acute skin lesions.^{1,2} Eosinophils have many roles in the homeostasis of the immune system and are considered the effector cells involved primarily in the defense against parasites and allergic inflammation.¹ Dermatitis with eosinophilic infiltration has, rarely, been reported in association with parasites such as *Pelodera* species and hookworms in dogs.³ More reports describe acute “sterile” canine eosinophilic dermatoses, such as acute eosinophilic dermatitis with edema and eosinophilic folliculitis/furunculosis.^{1,4}

Although the etiology of sterile eosinophilic dermatoses is unknown, a type I hypersensitivity or an adverse drug reaction is considered to play a possible role.^{1,4} These eosinophilic dermatoses tend to progress rapidly, and patients are frequently presented through emergency services. Therefore, clinicians should be familiar with eosinophilic folliculitis/furunculosis to establish an accurate diagnosis and initiate early successful therapy.

HISTORY

A 5.5-year-old, 29-kg (64-lb), female spayed German shorthaired pointer was presented during the summer with a 4-day history of an acute, pruritic cutaneous

Abstract

Canine “sterile” eosinophilic dermatoses are uncommon heterogeneous disorders that tend to progress quickly, with patients frequently presented through emergency services. A 5.5-year-old, 29-kg (64-lb), female spayed German shorthaired pointer presented during the summer with a 4-day history of an acute, pruritic cutaneous eruption and hemorrhagic exudate confined to the bridge of the nose. The history of fever, clinical features (e.g., peracute development, lesion localization, cytology findings showing numerous eosinophils and no bacteria) and histopathologic findings were consistent with canine eosinophilic folliculitis/furunculosis. Oral immunomodulatory prednisone intervention resulted in significant improvement in the dog’s condition and resolution of skin lesions over the following 24 days. Clinicians should be familiar with the disease to establish an accurate diagnosis and initiate early successful therapy.

Take-Home Points

- Canine eosinophilic skin diseases (dermatoses) are uncommon heterogeneous disorders of different clinical phenotypes characterized by the development of acute skin lesions.
- Acute “sterile” eosinophilic dermatoses in dogs, such as acute eosinophilic dermatitis with edema and eosinophilic folliculitis/furunculosis, have recently been frequently reported in the literature. These “sterile” eosinophilic dermatoses tend to progress quickly, with patients frequently presented through emergency services.
- This case report details the diagnostic approach and successful therapy of a canine patient diagnosed with eosinophilic folliculitis/furunculosis.
- Canine eosinophilic folliculitis/furunculosis is diagnosed based on history, characteristic clinical signs, cytology, and skin biopsies.
- Oral systemic glucocorticoids have been the mainstay of therapy for canine eosinophilic folliculitis/furunculosis cases; effective dosages for prednisone/prednisolone of 1–2 mg/kg have been recommended in previous publications.
- Clinicians should be familiar with the disease to establish an accurate diagnosis and initiate early successful therapy.

eruption and hemorrhagic exudate confined to the bridge of the nose. The sudden change in the dog’s health was not associated with any vaccine or drug administration; the patient was previously healthy. The owner reported that, initially, the lesions consisted of

edema and small bumps, but they had progressively increased in size and worsened in sensitivity and discomfort over 4 days. The patient received regular monthly oral afoxolaner for tick and flea prevention. Amoxicillin–clavulanic acid (375 mg q12h) had been



FIGURE 1. Eosinophilic folliculitis/furunculosis in a 5.5-year-old German shorthaired pointer. **(A)** Erythematous, eroded plaques with hemorrhagic exudate confined to the cranial part of the bridge of the nose. **(B)** Small satellite skin lesions characterized by several multifocal erosions to ulcers with crusting (**arrow**). **(C)** Dorsal view.

initiated a day before referral by the primary veterinarian; however, there was no improvement in clinical signs.

PRESENTATION AND DIAGNOSIS

At the time of presentation, the physical examination revealed no abnormalities apart from the dermatosis. The patient was alert and responsive; lymphadenopathy was not observed. Skin lesions consisted of 2 erythematous, eroded to ulcerated plaques with hemorrhagic exudate confined to the cranial part of the bridge of the nose (**FIGURE 1**); these lesions were pruritic and painful on palpation. Small satellite skin lesions surrounded the plaques and were characterized by several multifocal erosions to ulcers with crusting (**FIGURE 1B**). There was no involvement of mucous membranes, mucocutaneous junctions, or other body sites. The results of a complete blood count and serum biochemical profile were unremarkable. The differential diagnoses included eosinophilic folliculitis/furunculosis, staphylococcal nasal folliculitis/furunculosis, demodicosis, thermal burn, solar dermatitis, dermatophytosis, and juvenile cellulitis.

Microscopic examination of skin scrapings and hair plucks failed to detect ectoparasites or dermatophytes. Cytologic examination of eroded plaques using Diff-Quik staining showed intense cellularity with numerous eosinophils, occasional macrophages, and very few neutrophils (**FIGURE 2**). No acantholytic

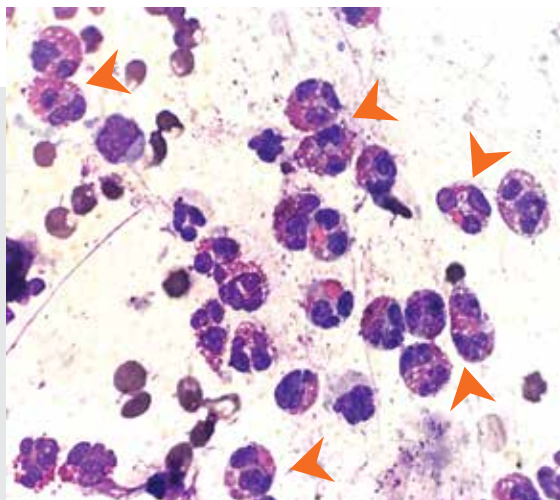


FIGURE 2. Cytologic examination of eroded plaques using Diff-Quik staining showed intense cellularity with numerous eosinophils (**arrowheads**).

keratinocytes suggestive of pemphigus foliaceus or microorganisms (e.g., cocci, rods) were observed.

The patient was sedated with intravenous medetomidine, and an injection of 0.5 mL of lidocaine

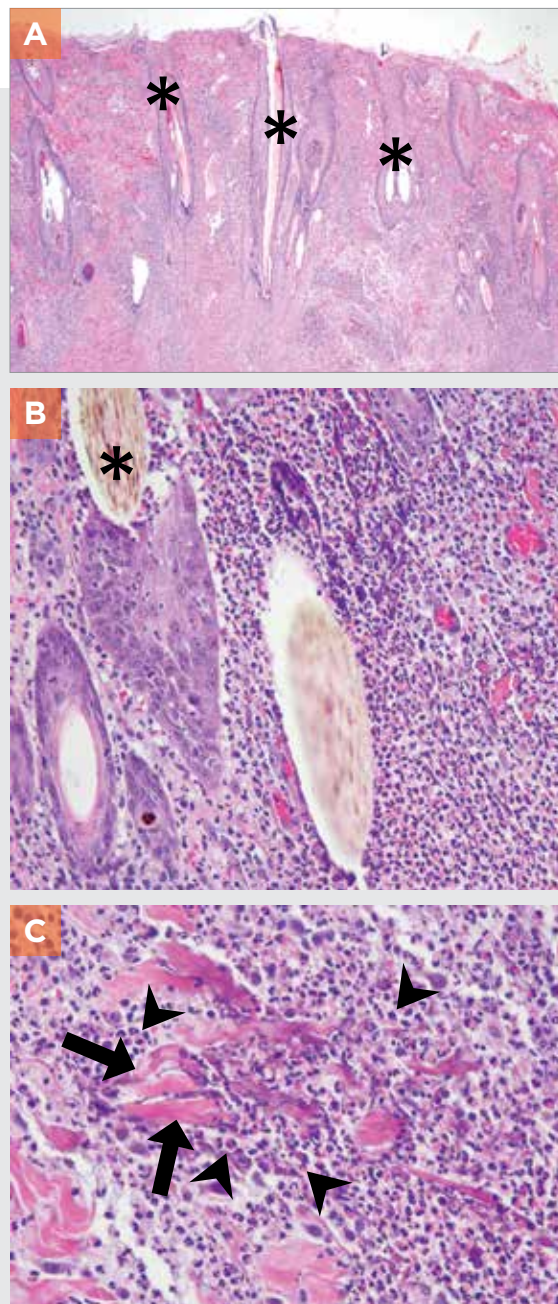


FIGURE 3. Histopathologic examination. (**A AND B**) Epidermal hyperplasia with ulcerations and intense, predominantly eosinophilic and destructive folliculocentric (around hair follicles, **asterisks**), inflammation was observed (magnification **A**, 4×; **B**, 20×). (**C**) Smaller foci of eosinophil degranulation (**arrowheads**) are seen around collagen fibers (**arrows**). This finding is also called “flame figures” (magnification, 40×).



hydrochloride 2% was administered subcutaneously to provide additional local anesthesia. Two 6-mm punch biopsy samples were obtained from the skin lesions. Samples from the eroded/ulcerated plaques featured extensive epidermal ulceration, edema, and marked dermal inflammation characterized by large numbers of eosinophils, scattered neutrophils, and few macrophages that infiltrated and surrounded the hair follicles (**FIGURE 3A AND 3B**). An occasional follicular rupture (furunculosis) with free dermal hair shafts was observed (**FIGURE 3B**). In some areas, a multifocal

aggregate of degenerated eosinophils and neutrophils surrounded hyper eosinophilic, shrunken, and fragmented collagen fibers (“flame figures”; **FIGURE 3C**). Special stains (Gram, Giemsa, periodic acid–Schiff) did not reveal any microorganisms.

The history of peracute development, clinical features (e.g., lesion localization, cytology findings showing numerous eosinophils and no bacteria) and histopathologic findings were consistent with canine folliculitis/furunculosis.

TREATMENT AND FOLLOW-UP

Amoxicillin–clavulanic acid was discontinued. Oral prednisone was started at 1 mg/kg q24h for 10 days, and the dose was progressively tapered and stopped over a total course of 24 days. After 1 week of treatment, the owner reported significant improvement in clinical signs without any other complaints (**FIGURE 4**). At the time of this writing, the dog’s skin lesions have been maintained in clinical remission for more than 5 months and no recurrences have been observed.

DISCUSSION

Some dermatologic conditions, such as sterile eosinophilic dermatoses, can cause severe cutaneous signs with progressive worsening and may have serious systemic consequences.^{1,2,4} A lack of familiarity with these conditions may delay diagnosis and appropriate treatment. In this patient, the history of fulminant progressive development; presence of erythematous, eroded to ulcerated plaques localized to the nasal bridge; cytologic findings of numerous eosinophils without any microorganisms; and histopathologic findings of sterile eosinophilic folliculitis and furunculosis supported the diagnosis of canine eosinophilic folliculitis/furunculosis.

Canine eosinophilic folliculitis/furunculosis is an uncommon skin disease that predominantly affects young large-breed dogs aged between 2 and 5 years; no sex predilections have been reported.^{1,2,5-9} Most reported patients had abundant access to the outdoors, like public gardens and parks. The exact pathogenesis remains unknown, but the histopathologic findings and the pattern/localization of lesions suggest a reaction to insect bites and arthropods.^{1,2,5-9}

In a “typical” insect bite–induced type I hypersensitivity reaction, skin lesions show a tendency

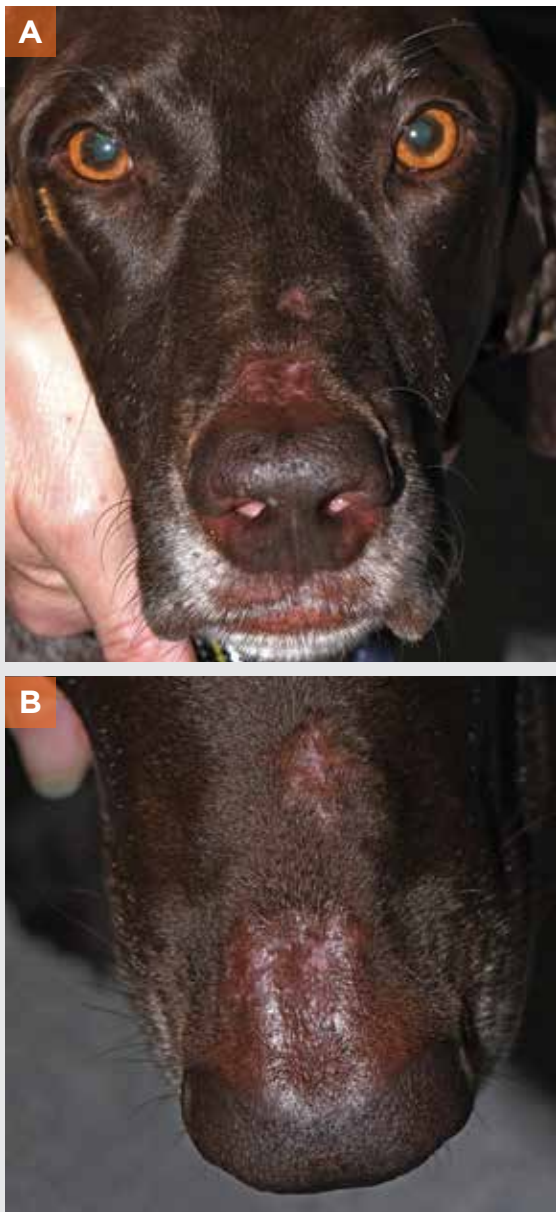


FIGURE 4. Resolution of active eosinophilic folliculitis/furunculosis skin lesions with some residual scarring and alopecia 3 weeks after therapy with prednisone.

Histopathology typically shows eosinophilic folliculitis and furunculosis; occasionally, there may be a mixed inflammatory infiltrate with dermal hemorrhage and collagen degeneration.²

to slowly resolve a few hours to days after the initial exposure. In contrast, skin lesions of canine eosinophilic folliculitis/furunculosis generally show a progressive worsening after the initial development. The nasal bridge is the affected site predominantly described in cases of canine eosinophilic folliculitis/furunculosis; other sites, such as the periocular area, pinnae, thorax, and limbs, have been affected in some patients.^{1,2,5-9} Papules, plaques, and nodules that rapidly fistulate and drain serosanguinous exudate are characteristic of canine eosinophilic folliculitis/furunculosis.^{1,2,5-9} Severely affected dogs may be febrile, lethargic, and anorectic, whereas pruritus and pain are variable.^{1,2,5-9} The history, type, and localization of skin lesions in the dog in this case closely resembled those uniquely described in canine eosinophilic folliculitis/furunculosis.

Canine eosinophilic folliculitis/furunculosis is diagnosed based on history, characteristic clinical signs, cytology, and skin biopsies.^{1,2,5-9} Cytologic examination of impression smears commonly reveals numerous eosinophils, whereas in long-standing (e.g., lasting more than 10 days) progressive and ulcerated skin lesions, secondary infection with degenerate neutrophils and intracellular bacteria may sometimes be observed.^{1,2,5-9} This secondary infection is likely a consequence of skin barrier impairment by epidermal ulceration and the progression of skin lesions over time. Histopathology typically shows eosinophilic folliculitis and furunculosis; occasionally, there may be a mixed inflammatory infiltrate with dermal hemorrhage and collagen degeneration.² The epidermis is typically ulcerated with a marked dermal and cutaneous mucinosis, and flame figures are often observed.² In the present case, skin cytology revealed numerous eosinophils and histopathologic examination showed eosinophilic folliculitis and furunculosis with flame figures. No microorganisms were found on the

cytologic and histopathologic examination; however, the patient was also provided with systemic antibiotics before diagnostic samples were obtained.

Textbooks list several clinical diagnostic differentials for canine eosinophilic folliculitis/furunculosis, such as staphylococcal nasal folliculitis/furunculosis, demodicosis, thermal burn, dermatophytosis, juvenile cellulitis, and drug eruptions (e.g., Stevens-Johnson syndrome/toxic epidermal necrolysis [SJS/TEN]).² Juvenile cellulitis commonly manifests in puppies between 5 weeks and 6 months of age, with papular, pustular, nodular, and alopecic skin lesions and draining tracts most prevalent on the lips, muzzle, and eyelids.¹⁰ Cytologic and histopathologic examination in juvenile cellulitis reveal “sterile” pyogranulomatous inflammation.¹⁰ Despite the potential similarity in clinical signs of juvenile cellulitis and canine eosinophilic folliculitis/furunculosis, the cytologic and histopathologic findings in this case, as well as the age of onset, did not support the diagnosis of juvenile cellulitis. Staphylococcal nasal folliculitis/furunculosis, sometimes called “nasal pyoderma,” is primarily characterized by a neutrophilic inflammatory cell infiltrate with numerous bacteria but few eosinophils¹¹; bacteria were absent and numerous eosinophils were observed on cytology in this dog. Drug hypersensitivities/eruptions such as SJS/TEN were deemed less likely, as diffuse erythematous or purpuric rash with only epidermal erosions was not present and mucocutaneous junctions were not involved.¹²

Oral glucocorticoids have been the mainstay of therapy for canine eosinophilic folliculitis/furunculosis; dosages for prednisone/prednisolone from 1 to 2 mg/kg have been recommended.^{1,2,5-9} In the present case, remission of skin lesions followed the implementation of short-term, slowly tapered prednisone initiated at 1 mg/kg q24h. Antimicrobial therapy should be instituted if a secondary infection is observed on cytology and/or bacterial culture.

SUMMARY

The case described in this report emphasizes the importance of an accurate diagnosis of canine eosinophilic folliculitis/furunculosis as well as early and adequate treatment to promote a satisfactory response. Patients with canine eosinophilic folliculitis/furunculosis may present on an emergency basis, and lack of familiarity with this disease may delay diagnosis and appropriate treatment. **TVP**

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