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Case # PT-1

Presenters: Kate Pennick, Lisa Pohlman, Gordon Andrews

Signalment: 8-month-old, male-neutered, German Shepherd mix, 18.5 kg

History: "Camry" is from a litter of 8 pups that were found on a reservation near Calgary, Alberta. He was normal until approximately 12 weeks of age, when according to the owner, "Camry" started to develop wart-like lesions on all four pawpads. The lesions would begin as swirl-like (sometimes yellowish) patterns and cause no discomfort, but would progress to raised, crusted mounds that eventually sloughed off to reveal an open, painful wound (described as a white/red pattern in appearance). "Camry" is the only one of the litter to develop these lesions. No bloodwork abnormalities or other signs of systemic illness were found. The owners noted that "Camry" had received at least one course of steroids before they acquired him.

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Histopathology: One section of nonhaired skin from the pawpad is examined. Histologic changes are confined to the epidermis and are characterized by papillated acanthosis and severe orthokeratotic to parakeratotic hyperkeratosis. The spinous and granular layers are markedly hyperplastic. There is hypergranulosis with variably sized often enlarged keratohyalin granules. The deep stratum corneum is composed of thick layers and columns of swollen polygonal keratinocytes with abundant clear to light eosinophilic cytoplasm and pyknotic to inconspicuous nuclei. This layer transitions into a thick layer of cornified keratinocytes with retained nuclei (parakeratosis). Sections of other pawpad lesions are similar with orthokeratotic rather than parakeratotic hyperkerotosis.

Morphologic diagnosis: Pawpad – marked epidermal acanthosis with orthokeratotic to parakeratotic hyperkeratosis

Discussion: Familial pawpad hyperkeratosis is a rare canine cornification defect characterized by severe keratinous proliferation that is restricted to and involves all four pawpads. Autosomal dominance is the suspected mode of inheritance for this disorder, which has been described in several families of Dogues de Bordeaux, Irish Terriers, Kerry Blue Terriers, Labrador Retrievers, Golden Retrievers, and mixed breed dogs. The disease results from various mutations in proteins that determine terminal differentiation of the cornified envelope (keratins, desmosomal proteins, loricin, connexins, and cathepsins). Pawpads initially appear 'smooth and parchment-like,' but quickly develop severe keratinous proliferations with 'lateral cone-like protusions' that may take the form of irregular cutaneous horns. Secondary bacterial or *Malassezia* infections may occur due to fissuring or splitting of the pawpads. Lameness is common; concurrent skin lesions or systemic illnesses are not present. Lesions that occur by 6 months of age in an otherwise healthy puppy are clinically diagnostic, but lesions in a healthy adult dog with unknown history must be differentiated from epidermolytic ichthyosis (Labrador Retrievers), nasodigital hyperkeratosis, pemphigus foliaceus restricted to the pawpads, and canine distemper virus-associated skin disease. Histopathologic lesions vary depending on the breed that is affected. In Labrador Retrievers, massive ballooning of superficial keratinocytes with retained nuclei within the cornified layer resulting in severe parakeratosis, along with an increased granular layer and variably sized granules are present. Relationship of this disorder to nasal perakeratosis of Labrador Retrievers is not known. Moderate acanthosis and orthokeratotic hyperkeratosis with hypergranulosis and lack of normal cohesion or a ruptured appearance of the stratum corneum has been reported in Irish Terriers. Papillated epidermal hyperplasia with diffuse orthokeratotic hyperkeratosis has been described in Dogues de Bordeaux.

References:

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