NOTE *Pathology*

Discoid Lupus Erythematosus (DLE) in a Spitz Dog

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ABSTRACT. A 3-year-old, female Spitz, was presented due to lack of response to therapies with a 6-month history of skin lesions characterized by diffuse erythema and scaling on the dorsal trunk. Physical examination revealed the dog was active and healthy. Skin culture isolated no fungus. Histological examination of skin biopsy specimens revealed interface dermatitis with hydropic degeneration of the basal layers, predominant plasmacytic perivascular accumulation in the dermis, and intensive plasma cell-rich interface mural folliculitis. Moderate CD3-positive lymphocytes infiltrated the superficial dermis. This report may provide unique information of canine discoid lupus erythematosus in an unusual breed with atypical cutaneous lesions.
KEY WORDS: cutaneous lupus erythematosus, interface dermatitis, interface mural folliculitis.

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Discoid lupus erythematosus (DLE) is one of the most common autoimmune skin disorder seen in dogs [1], which particularly affects the collie and Shetland sheepdog with the familial involvement [9]. DLE is differentiated from systemic lupus erythematosus (SLE) by the absence of multisystemic manifestations and negative anti-nuclear antigen (ANA) titer [11]. Canine DLE lesions are usually localized to the dorsal junction of the nasal planum and haired skin in an initial development. In a previous study, nasal planum lesions, called "Collie nose" in several breed predilections, were found to be up to 90% in terms of canine DLE. Lesions may also develop in the periocular region and in the ear pinnae with a bilateral symmetrical pattern [5, 10], on the perioral skin, and in the oral cavity [12]. Rarely, lesions may be found on the trunk, limbs, footpads, genitals, and the perianal regions [3–5, 12]. Gross *et al*. reported that generalized exfoliative dermatitis, unique in the German shorthaired pointer, initially affects the face, pinnae and dorsum and progresses to a more generalized distribution [7]. It has been demonstrated that cutaneous lesions have seasonal onset and can be aggravated by ultraviolet light exposure in summer months [1].

In canine classical DLE, skin lesions on the dorsal trunk without any evidence of other significant cutaneous or systemic involvement are unusual. The present paper describes a case of DLE of a Spitz dog, whose dorsum was initially attacked by a rare manifestation with interface dermatitis and interface mural folliculitis.

A 3-year-old female Spitz was referred to another local veterinary hospital from a previous hospital due to lack of response to antifungal drug (doses unknown) with a 6-month history of skin lesions, characterized by erythema and scaling with no pruritus on the dorsal trunk (Fig. 1). The skin biopsy was presented to the pathological laboratory at the College of Veterinary Medicine, Kyungpook National University to evaluate skin abnormality. For the dog's clinical history, no apparent skin lesions were demonstrated on the face and there were no other cutaneous lesions or systemic signs observed and reported. Physical examination revealed the dog was healthy except for skin lesions and serum biochemistry, complete blood counts and urinalysis yielded unremarkable results as to the cause of systemic disorders.

A skin biopsy was taken from the dorsal skin and was fixed in 10% neutral formalin. Hematoxylin and eosin (H&E) staining of the skin sections revealed interface dermatitis and plasma cell-rich interface mural folliculitis as a prominant histopathological pattern (Fig. 2). No mites or fungi were detected on the skin section. The dermal infiltrate was comprised of a few lymphocytes and lots of plasma cells. Marked accumulation of mononuclear and plasma cells in the dermis, especially around hair follicles as a lichenoid pattern and lymphocytic exocytosis into the basement membrane of sweat glands was observed (Fig. 2b). Lymphocytes and plasma cells obscured the dermo-

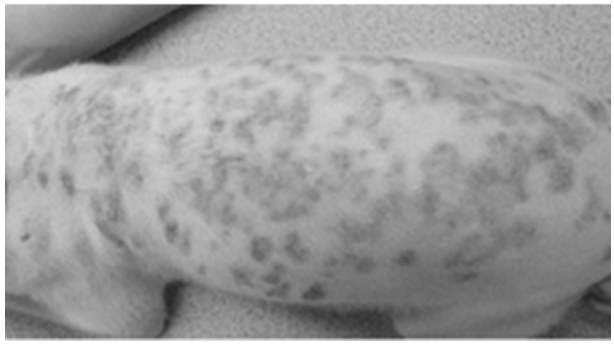

Fig. 1. Gross skin lesions characterized by diffuse erythema, scaling, and crusting throughout the dorsum of a Spitz dog.

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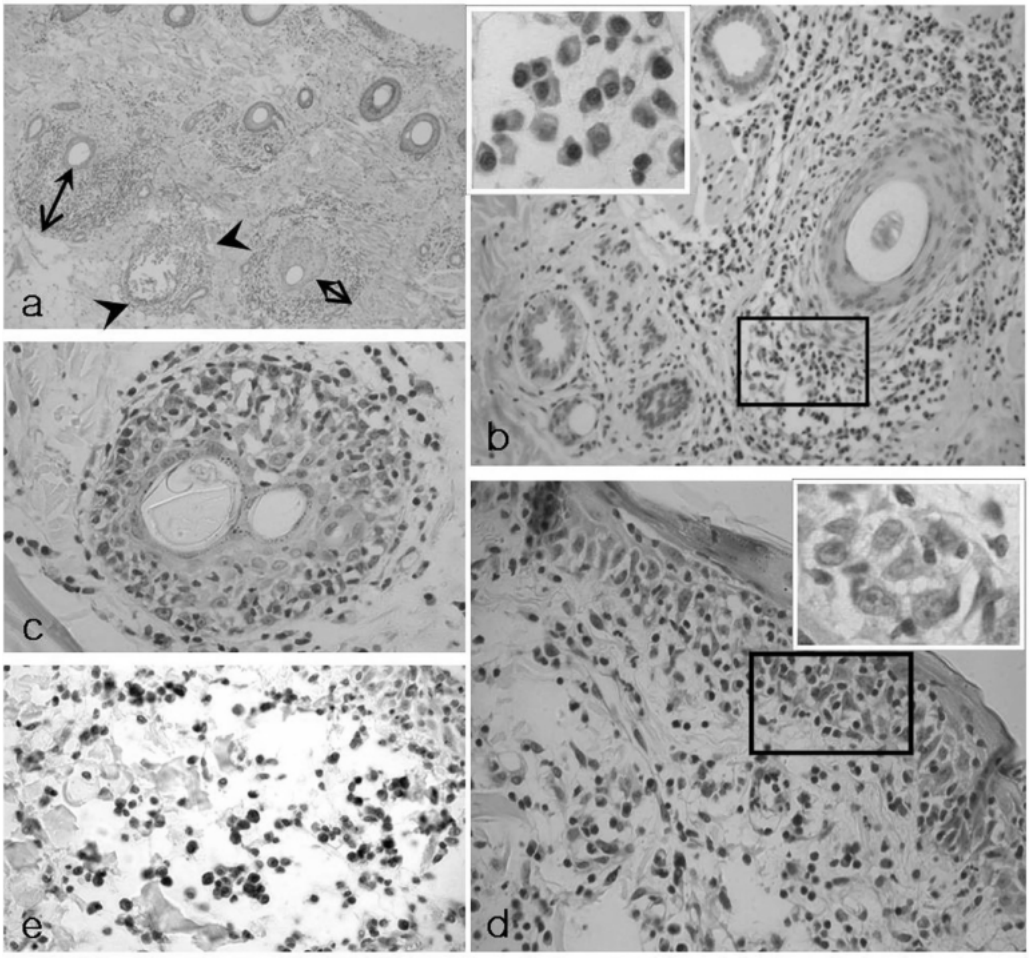

Fig. 2. Histopathological features of the dorsal skin sections stained by H&E (a-d) and CD3-immunohistochemistry (e). (a) Ichenoid band by intensive inflammatory cell infiltration shows around distal hair follicles (*arrow*) and destroyed hair follicles (*arrowhead*) are often observed (× 50). (b) Interface mural folliculitis. Plasma cells (*insert*, × 1,000) make up a large proportion of the lichenoid infiltrate around distal hair follicles (× 200). (c) Interface mural folliculitis. The cell layer of the outer root sheath is destroyed due to intensive inflammatory infiltration (× 200). (d) Interface dermatitis. Lymphocytes and plasma cells obscure the dermoepidermal junction with hydropic degeneration of the basal layer. Keratinocytes which have cytoplasmic vesicles are surrounded by lymphocytes, a process known as satellitosis (*insert*, × 1,000) (× 200). (e) The infiltration of CD3-positive lymphocytes in superficial dermis (× 200).

epidermal junction with focal hydropic degeneration of the basal layer and sometimes in the stratum spinosum (Fig. 2d). Vacuolar degeneration of basal cells of hair follicles coexisted with a similar pattern in the epidermis (Fig. 2c). Additional epidermal changes such as epidermal cleft, focal severe spongiosis, lymphocytic exocytosis, and localized chronic inflammatory plaques with scarring were observed. In addition, there was complete absence or decrease of sebaceous glands in the dermis. To identify the cell type of the lymphocytes infiltrated in the dermis, skin sections were stained immunohistochemically using the avidin-biotin-peroxidase complex method. Immunohistochemistry was conducted with a primary antibody against CD3 (1:600, Santa Cruz Biotechnology, CA, U.A.) as the T lymphocytes marker and a secondary antibody anti-mouse IgG was applied. The pretreatment for immunostaining was as followings. The sections were deparaffinized, rehydrated, incubated in a solution of 3% hydrogen peroxide in methanol for 40 min and microwaved at 750 W for 10 min in 10 mmol/L citrate buffer, pH 6.0 for antigen retrieval. Immunohistology showed moderately infiltrated CD3-positive cells in the superficial dermis (Fig. 2e). Histopathological and immunohistochemical finding of the skin lesion in the present case were considered to be compatible with those of auto-immune skin diseases of the Spitz dog, rather than those of other skin diseases.

After diagnosis of DLE, an oral corticosteroid therapy consisting of prednisolone (0.5 mg/kg q12h) was initiated and the dog was shampooed with an antibacterial (chlorhexidine) and emollient agent for a maintenance therapy. In

addition, ofloxacin (15 mL/mg q12h) administration in combination with itraconazole (5 mg/kg q12h) was effective. The erythematous plaques and crusts of the dorsal skin gradually improved for 6 weeks of therapy. The skin lesions have not recurred during the following 5 months.

Interface mural folliculitis usually has immunological origin, whereas most luminal folliculitis is caused by infectious or parasitic agents. Similar to interface dermatitis, interface folliculitis reflects immune-mediated destruction of the outer most cell layer of the outer root sheath, apoptosis of basal cells, and vacuolar degeneration. The differential list for interface mural folliculitis is erythema multiforme, graft-versus-host, demodicosis, ischaemic dermatopathy, DLE and SLE [8]. Erythema multiform or graft-versus-host was not associated with the present case since histopathology revealed intensive cell-rich interface dermatitis and no history of drug administration or allogeneic tissue transplants [12]. *Demodex* or other infectious agents were not found in the hair follicles and ischaemic dermatopathy, characterized by cell-poor interface dermatitis with severe atrophic and irregular forms of hair follicles [8], was not associated with the skin lesions in the present case. SLE is manifested by a variety of clinical and laboratory abnormalities, including extracutaneous disorders such as polyarthritis, oral ulcers, proteinuria, and hematologic changes and cutaneous lesions [6], although histopathological findings were similar to DLE in the present case.

Vesicular cutaneous lupus erythematosus (VCLE), recognized in the adult rough collie and Shetland sheepdog, represent typical interface dermatitis [9]. Characteristic skin lesions are annular, polycyclic and serpigenous ulcerations distributed over less haired areas of the body, especially the ventral abdomen, axilla, groin, and pinnae. Affected subjects exhibit lymphocyte rich interface dermatitis and folliculitis with vesiculation at the dermo-epidermal junction as representative histological features [9]. Typical ulcerative lesions in the ventral abdomen were not observed in the present case. Moreover, compared to VCLE the thick lichenoid plasmacytic interface mural folliculitis is more characteristic and hydropic degeneration, proceeding to focal epidermal spongiosis, is more severe in this disease.

Exfoliative cutaneous lupus erythematosus (ECLE), described as unique to young adult German short-haired pointer, initially attack the muzzle, pinnae and dorsum and which may be generalized [2]. Histological features are lymphocytic interface dermatitis and superficial mural folliculitis as VCLE in the adult rough collie and Shetland sheepdog but predominantly diffuse hyperkeratosis is a distinguishing histopathological feature of ECLE compared to classic DLE. In a dog with severe ECLE haematological abnormalities of anaemia and thrombocytopenia were also detected [2]. ECLE was ruled out since there was no marked hyperkeratosis in the present dog and Spitz is not a predilected breed for ECLE.

In this case, histological examination was especially characterized by intensively thick band-like plasmacytic infiltrate around hair follicles, in addition to mild infiltration of lymphocytes in the epidermis. Theses findings are relatively different from typical histological changes of VCLE in rough collies and Shetland sheepdogs, and those of ECLE in German short-haired pointers. Reports on the strongly affected breeds by DLE have been consistently presented. Nevertheless, there is little published information on unusual breeds, which may be associated with heredity or not, for this disease.

Finally, DLE rarely occurs on the dorsal trunk and there have been no reports of dorsal lesions other than on facial skin. Localization of skin lesion and histopathological changes in the present Spitz dog may be different from common canine DLE, characterized by lymphocyte-rich interface dermatitis. The present case illustrates that DLE should be considered as one of the differential diagnoses for untreatable red maculopapular eruptions of the dorsum in a Spitz. A skin biopsy and careful examination of the entire body is important, because SLE may show only cutaneous manifestations as an initial abnormality. In addition, an ANA test should also be conducted to provide prognostic information even when the dog had no clinical systemic symptoms. Most of all, pathological diagnosis is important since canine DLE tends to have disorders that are detectable only with histopathology and immunopathology [1]. Therefore, it is hoped this report will provide unique information for the early diagnosis of DLE with atypical clinicopathological features.

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