

## SUPERFICIAL NECROLYTIC DERMATITIS IN A DOG

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**Abstract.** Superficial necrolytic dermatitis (SND) is a skin reaction characterized by an erosive, crusting, and scaling dermatopathy distributed generally over the face, distal paws, and inguinal area. A 5 year old German Shepherd bitch was presented with 3 weeks history of generalized dermatopathy in the dorsum part. The biopsy sample was taken from the alopesic erosive lesion and *Trichophyton violaceum* was detected by culture. Histologically, complete lysis of epithelium and necrolytic areas with inflammatory cells located between subcutis layer were detected. A diagnosis of SND was based on clinical presentation, clinical chemistry supported by the histological findings. Primary hepatic disease was also diagnosed by blood analysis and ultrasonographic examination. Surgically, erosive skin resection was applied and enlarged spleen was removed. After the operation, immunosuppression therapy (cyclosporine 2 mg/kg) was performed. The dog recovered by 6-month immunosuppression therapy. SND is a rare skin disease for dogs, also of which dorsum lesions were rarely seen. This case was found worthy to be presented as severe generalized lesions were observed in dorsum part and surgically removal of lesions combined with immunosuppression therapy was found to be an effective treatment choice.

**Keywords:** *SND, dog, hepatic tumour, dermatopathy.*

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### 1. Introduction

Superficial necrolytic dermatitis (SND) is a rare cutaneous disease in dogs resembling human necrolytic migratory erythema [11]. SND is a rare skin disease for dogs, also of which dorsum lesions were rarely seen. This dog with SND associated with primary hepatic disease was found worthy to be presented as paraneoplastic syndromes have been recently recognized disorders for dogs. Severe generalized lesions were observed in dorsum part and surgically removal of lesions combined with immunosuppression therapy was found to be an effective treatment choice for the lesions.

### 2. Case history

A 5 year old German Shepherd bitch was presented with 3 weeks history of generalized dermatopathy in the dorsum part. The owner had not noticed any changes except itching problem. The lesions were distributed on the dorsum part bilaterally (Figure 1A). Exudative necrolytic areas presented beneath some crusts of extensive ulcerative dermatitis affecting the skin of thorax of the dog. Skin biopsies, a complete

blood count, blood chemistry profile, radiographic and ultrasonographic examinations were performed.



**Figure 1.** A) Appearance of the lesions before treatment B) Recovery of the lesions 2 months after treatment

The biopsy sample was taken from the alopecic erosive lesion and *Trichophyton violaceum* was detected by culture. Antibiotherapy with Metronidazole (30 mg/kg twice daily orally) and Clarithromycin (15 mg/kg twice daily orally) was applied to the dog for secondary bacterial infection.

Histologic lesions confirmed the diagnosis of SND. Complete lysis of epithelium and necrolytic areas with inflammatory cells located between subcutis layer The skin biopsies examined in the epithelial layer was completely disintegration. In a limited area of the epithelial layer and the subcutis histiocytes, lymphocytes and neutrophil cells were observed. Also inflammatory reaction area on the skin was moderately necrotic.

Elevated results of alkaline phosphatase (ALP=864 U/L) and alanine aminotransferase (ALT=488 U/L) were detected in the serum biochemical analysis. The blood glucose, blood urea nitrogen, alanine transaminase levels were in reference ranges (Table 1).

**Table 1.** Biochemical blood analyses results

<b>GLU (mg/dl)</b>	98	<b>ALT (IU/L)</b>	488
<b>BUN (mg/dl)</b>	9	<b>ALP (IU/L)</b>	864
<b>CREA (mg/dl)</b>	0,9	<b><math>\gamma</math>-GT (IU/L)</b>	0
<b>TP (g/dL)</b>	2.1	<b>CHOL(mg/dl)</b>	314
<b>AMYL (U/L)</b>	576	<b>T.BIL (mg/dL)</b>	0.1

Also no hormonal alteration was detected in blood analysis of thyroid profile test results, serum estradiol, progesterone, ACTH (24 pg/ml) and cortisol level (1.4 ug/dl)

and a result in normal range of IgE level (2.1 mIU/ml) was found. Positive c-ANCA and negative results of p-ANCA were detected. Antinuclear antibody (ANA) results were positive (<1/40) and speckled. Also leishmania test (IDEXX SNAP®) result was negative. In the liver ultrasound examination, the findings were unremarkable with homogeneous parenchymal structure.

However, the spleen was found to be enlarged by ultrasound with SIUI Apogee 3500, upper limit and the shape and orientation was normal (Figure 2A). The enlarged spleen was removed and no any other macroscopic alteration of the abdominal organs was noticed in the diagnostic laparotomy.



**Figure 2.** A) Appearance of enlarged spleen in ultrasonography B) Ultrasonographic view of the liver and mass that originated from liver

Primary liver disease was revealed in the development of SND in this case. A diagnosis of SND was based on clinical presentation, clinical chemistry supported by the histological findings. Surgically erosive skin resection was applied and enlarged spleen was removed. After the operation, immunosuppression therapy (cyclosporine 2 mg/kg) was performed. The dog was recovered by 6-month immunosuppression therapy (Figure 1-B). Vitamin E (200 IU), milk thistle a compose supplement of “B1 vitamin B1 (15 mg), B2 (15 mg), B6 (10 mg), B12 (0.01 mg), C (200 mg), folic acid (1.5 mg), H (0.15 mg) PP (50 mg)” were used.

After 2 years free of dermatological clinical signs, the patient was presented with lethargy, inappetence and vomiting. Complete blood counts and blood biochemistry were performed. The results of blood biochemistry were shown in Table 1. On abdominal ultrasonographic examination with linear transducer using frequencies with 3-5 MHz, enlarged liver was demonstrated with an anechoic mass inside ranged with 11.1 cm (Figure 2-B). Hypoechoic mass in hyperechoic fatty liver was demonstrated. In this period, no clinical improvement obtained with the medication. The dog died after 2 weeks and the owner didn't accept post-mortem examination.

### 3. Discussion

Similar to necrolytic migratory erythema, histological examination may put forward distinctive findings in SND in dogs. It is easy to differentiate SND from erythema multiform, drug eruption, pemphigus foliaceus, systemic lupus erythematosus, contact-irritant dermatitis, demodicosis, dermatophytosis and bacterial

folliculitis by histologic examination of skin biopsies [12]. The common sign on necrolytic migratory erythema in human beings is hyperglucagonemia due to presence of a glucagon-secreting pancreatic islet cell tumor [2, 12]. No pancreatic tumor was reported on a study conducted on 22 dogs with SND, although severe vacuolar hepatopathy suggesting metabolically or hormonally induced hepatic dysfunction was detected in 21 dogs [2]. In contrast to findings in human, SND, in dogs occur mostly in association with hepatopathy [12]. In that study, the finding of increased alkaline phosphates was in accordance with our case [2]. In this case hepatic excretion of glucagon might be high but examination of glucagon level was not allowed by the patient owner. However, glucagonoma is a really rare condition in dogs, it is more common and highly metastatic in humans. Some canine studies have reported that glucagonoma have mostly metastasized to the liver and it's changing can be seen on the liver with ultrasonography even if primary mass can't be detected with surgery [7]. Solely, the large mass images visualized by ultrasonography after 2 years also indicate that the dog might have hepatic tumor indeed. As, gross hepatic mass detected by ultrasonography most commonly refers to a primary hepatic tumor, with varying grades of malignancy [6]. Liver biopsy or advanced imaging techniques could have been helpful to elicit the possible hepatic cancer formation in the initial examination of the dog.

Also positive results of c-ANCA and ANA were detected in this case. In one study 20 of 38 patients with liver disease has shown high incidence of antinuclear antibody. Although there is a remarkable difference between ANA tests, there was no difference in lesions between ANA positive and negative patients [1]. It is determined that the positive results of ANA can be observed due to high concentration of circulating antibodies in such cases of severe liver disease [4]. Also many studies have reported that in patients with SND, ANA tests were negative [9, 10].

The lesions usually localize in paw pads. Major dermatological signs far more commonly occur on pressure points such as feet, elbows and hocks [12]. In one study 21 of 22 dogs were having cutaneous lesions in paw pads [2]. Also lesions of paw pads were reported in some case reports [5, 8, 11, 13]. However in accordance with reported findings, this case was having highly distributed lesions localized in dorsum part. As it was an inactive large breed dog, pressure effect of long-duration of lying may have been effective against the emergence of the lesions.

In a study, Octreotide (1 µg/kg subcutaneously) with intravenous amino-acid infusion was used for treatment and recovery was achieved. Octreotide was used as somatostatin analogue because it can inhibit release of hormones like growth hormone and glucagon. In this case, SND was developed because of a glucagonoma [8]. And also Mizuno et al. (2008) [7] was used octreotide and also systemic prednisolone therapy (0.5 mg/kg once a day). But in this case, recovery wasn't that evident and patient died after the beginning of therapy. In another study SND was developed because of liver cirrhosis. Hepatic support diet, colchicine (0.03 mg/kg/day) and essential fatty acid supplementation was used for therapy. 1 month later patient was recovered and liver function tests were elevated [3]. In our case; with immunosuppressive therapy and Vitamin E (200 IU), milk thistle a compose supplement of "B1 vitamin B1 (15 mg), B2 (15 mg), B6 (10 mg), B12 (0.01 mg), C (200 mg), folic acid (1.5 mg), H (0.15 mg) PP (50 mg) after skin resection, the recovery was achieved in 2 months.

The limitations of this report is incomplete characterization of the hepatic disease, however skin lesions were well described. In one study, a comparison of circulating amino acid levels were obtained and lower levels were detected in dogs with SND, however these levels increase in dogs with acute or chronic hepatitis. So it is difficult to predicate the pathogenesis of SND on compromised hepatic function [12]. As the relation of the cutaneous and hepatic lesions was uncertain, further investigations are needed to rule out the resemblance between cutaneous and biochemical features of canine SND to human necrolytic migratory erythema [2].

This case was found worthy to be presented as severe generalized necrolytic lesions with primary liver disease were observed in dorsum part and surgically removal of lesions combined with immunosuppression therapy was found to be an effective treatment choice. As the relation of the cutaneous and hepatic lesions was uncertain, further investigations are needed to rule out the resemblance between cutaneous and biochemical features of canine SND to human necrolytic migratory erythema.

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