An 11-year-old male sterilized Lapinkoira with chronic hepatopathy and 2-month history of pododermatitis. Which of the following is the most likely diagnosis?

Atopic dermatitis
Superficial necrolytic dermatitis
Pemphigus foliaceus
Zinc deficiency

Signalment and history: An 11-year-old male sterilized Lapinkoira, also known as Finnish Lapponian dog, was referred for a 6-weeks-history of skin lesions affecting the footpads. Four months before the referral the dog was presented for a pruritic scrotal dermatitis and an enlarged testicle was identified by manual palpation. Prior to the surgical castration a full blood panel indicated increased liver enzymes, in particular ALT was 561 U/L (10-125), ALKP 421 U/L (23-212) and GGT 16 U/L (0-11). Histopathological examination of skin biopsies from the scrotum was read out as an ulcerative chronic hyperplastic dermatitis. Three Leydig cell tumors were identified in the affected testicle. An ultrasound of the abdomen was performed to identify a possible cause for the elevated liver parameters. The ultrasound revealed a diffuse hepatopathy, likely cirrhosis, and portal hypertension. In the following months the levels of the liver enzymes were rechecked several times, but remained elevated, despite the administration of s-adenosylmethionine and propentofylline. At this point the dog developed skin lesions on the footpads, that were treated with an ointment containing nystatin, neomycin sulfate, thiostrepton and triamcinolone acetonide. The lesions did not improve. The dog was then referred for a dermatological consultation. The general examination of the dog revealed no abnormalities. During the dermatological exam crusts were noted on the footpads and crusts with subjacent erosion and ulcerations were found on the left hock (Figures 1, 2). The differential diagnoses for the skin lesions were superficial necrolytic dermatitis, pemphigus foliaceus, systemic lupus erythematosus, zinc deficiency and generic dog food dermatosis. Two 6mm skin biopsy punches were taken from the footpads and one from the left hock. While the dog was under anesthesia, skin biopsies of the liver were taken laparoscopically and the histological examination showed severe vacuolar hepatopathy with mild fibrosis, bile duct proliferation and the formation of regenerating nodules.

Histopathologic description (skin): Similar histopathological lesions were present in all three punch biopsies (Figures 4, 5, 6 and 7). The epidermis was severely irregularly hyperplastic forming multifocally papillary projections above the epidermal surface and long to carcinomatous rete ridges towards the deep dermis. Throughout long stretches of the upper part of the stratum spinosum and the stratum granulosum a severe hydropic vacuolar degeneration (epidermal pallor) was present. The hyperplastic epidermis was covered by a thick layer of laminar to mostly compact parakeratotic keratin. In addition, a moderate lymphoplasmacellular infiltrate was present in the superficial dermis.

Morphologic diagnosis (skin): severe papillary to pseudo carcinomatous epidermal hyperplasia with severe hydropic vacuolar degeneration in the superficial parts of the epidermis and abundant diffuse parakeratotic laminar to compact hyperkeratosis

Name of the condition: superficial necrolytic dermatitis

Follow up: While waiting for the results, the dog received intravenous amino acid supplementation once. Unfortunately, because the lack of response to the treatment and the fast deterioration of the general condition, the owner opted for euthanasia.

Comment: Superficial necrolytic dermatitis (SND), hepatocutaneous syndrome, metabolic epidermal necrosis and necrolytic migratory erythema are all terms used to define the same necrotizing skin
disorder associated with numerous metabolic conditions. In human medicine this disease has been described almost always in association with pancreatic glucagonoma and the term preferred is necrolytic migratory erythema. Histologically, the distinctive epidermal feature of SND is the so called “French flag”, consisting of superficial parakeratosis (red), striking pallor of upper-level keratinocytes (white) and hyperplastic suprabasal and basal keratinocytes (blue). Dermal changes are usually minimal and consist of a perivascular lymphoplasmacytic infiltrate and superficial edema. In dogs a severe degenerative vacuolar hepatopathy usually parallels the development of cutaneous lesions, sometimes with a history of phenobarbital administration, causing hypoaminoacidemia. The amino acid concentrations in urine and plasma of dogs with SND have been recently investigated and it has been demonstrated that hypoaminoacidemia prominently involved amino acids associated with the urea cycle and synthesis of glutathione and collagen. Different from humans, the association of SND and pancreatic lesions has been rarely demonstrated. However there are some publications describing pancreatic lesions associated with superficial necrolytic dermatitis. These include glucagon-producing pancreatic endocrine tumors, hyperplasia of pancreatic neuroendocrine cells and extrapancreatic glucagonoma. SND in dogs has a poor prognosis, and survival times are less than 1 year in most cases. Treatment generally includes parenteral and oral administration of supplemental amino acids, zinc, and essential fatty acids. Recently a combination of amino acid and stem cell therapy has been suggested as a new treatment option of SND. If the disease is caused by a glucagon-secreting pancreatic neoplasm, surgical removal of the neoplasm can lead to resolution of skin lesions.

References:


**Contributors:** Dr. Stefano Borio, Dermatologist, Thun, Switzerland; Histopathology: Prof. Dr. Monika Welle, Institute for Animal Pathology, Vetsuisse Faculty, University of Bern, Switzerland.

Figure 1.

Figure 2.