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A Case Study of Superficial Necrolytic Dermatitis and Its Therapeutic Management in a Great Dane Dog

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ABSTRACT: Superficial necrolytic dermatitis is a rare, chronic, progressive and usually fatal disorder having multifactorial etiopathogenesis. A four year old female Great Dane dog weighing 30 kg was brought to the Teaching Veterinary Clinical Complex Pookode, Wayanad with a complaint of recurring skin lesion predominantly over limbs, thorax and ventral abdomen. Skin scraping examination revealed no parasitic or fungal infection. Animal was treated orally with Cephalosporin @ 25mg/kg body weight twice daily and topically with a combination of Ofloxacin, Miconazole, Clobetasol and Zinc Sulphate lotion twice daily for a week. No improvement was reported after one week and the animal was presented again with the same clinical signs. No bacterial growth was observed during culture and sensitivity test. The dog was treated with Prednisolone @ 0.5mg/Kg body weight twice daily orally for 3 weeks. The animal was presented again after 3 weeks with severe diarrhoea, anorexia, sloughed ear margins and crusty, ulcerative skin lesions all over the body except head. Haemato-biochemical examination revealed anaemia with increased ALT, ALP, bilirubin and glucose levels. Serum Creatinine and BUN were within normal range but total protein and albumin were decreased. Ultrasonography showed multiple hyperechoic nodules surrounded by hypoechoic parenchyma. Skin biopsy revealed necrolytic changes like loss of epidermis, exposure of deep dermis and scattered collagen fibres. Serum Alpha GST which is a novel liver biomarker showed a marked elevation when compared to values of healthy control group. A two fold increase (4.619 ng/ml) was observed in the Alpha GST level of diseased animal when compared to healthy control group (2.101±0.199 ng/ml). Animal was treated with topical application of mupirocin ointment. Silibin-phosphatidylcholine-antioxidant complex @ 10mg/kg as liver supplement, Pentoxifylline @ 10-15mg/Kg, Ampicillin @ 20mg/kg body weight given along with fluids parenterally for five day. Advised to continue with silibin-

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phosphatidylcholine-antioxidant complex, pentoxifylline, zyncovit syrup for one month. Animal made an uneventful recovery.

KEYWORDS: Superficial necrolytic dermatitis, Great dane, Serum Alpha GST, Silibin-phosphatidylcholine-antioxidant complex

I. INTRODUCTION

Superficial necrolytic dermatitis (SND) is a very uncommon disease in dogs and cats. Affected dogs are usually within 4 to 16 years of age. No breed or sex predilection has been proven; however, some clinicians believe terriers are over represented. SND is characterized by an erosive, crusty and scaling dermatopathy distributed symmetrically over the face, distal paws, ear tips, inguinal area as well as in areas of constant friction (Kimmel *et al.*, 2003) (Figure 1). Mucocutaneous junctions, genital area, and pressure points are often affected (Nyland *et al.*, 1996) (Figure 2). There may be marked hyperkeratosis, fissuring, and ulceration of the footpads with secondary bacterial colonization (Foster *et al.*, 1997) (Figure 3). Common owner complaints include lethargy, anorexia, weight loss, and difficult or painful walking in affected dogs. The severity of skin lesions frequently wax and wane making definitive diagnosis and evaluation of therapy difficult. Signs of the underlying condition, usually a hepatopathy, might also be seen because, liver manufactures proteins and fatty acids that are then transported to the skin via blood stream. When liver pathology is present in some patients, the transfer of fatty acids and protein does not occur and the skin becomes deficient. Lidbury and Suchodolski (2016) stated that GST is a potential biomarker of liver injury in dogs and cats and Alpha GST is one among the four isoenzymes produced by hepatocytes. However, all dogs with SND may not show other signs of hepatic disease at the time of skin lesion arises. Finding out of hepatic involvement is a difficult task. So that detection of Alpha GST helpful for the early diagnosis of underlying hepatic involvement.



Figure 1 & 2. Crusty, ulcerative skin lesions on limbs, thorax, ventral abdomen and ear margins.

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Figure 2 & 3. Crusty ulcerative skin lesion on pressure points and hyperkeratosis of the footpads of dog with SND.

II. RELATED WORK

Hepatocutaneous syndrome is typically seen in old dogs (Gross *et al.*, 1993). Consistent breed predisposition has not been identified. In most dogs, the presenting complaint is skin problems although the eruption occasionally develops after recognition of systemic illness especially the polyuria and polydipsia associated with diabetes mellitus (Miller *et al.*, 1990). Skin lesions in distal limbs, footpads, muzzle, mucocutaneous areas of face and also in areas of trauma. Lesions are also seen in mouth, on the pinnae, external genitalia, elbows, hocks and along the ventrum. Metabolic disturbances of the liver leads to nutritional deficiencies and decrease in plasma amino acid concentrations (Miller *et al.*, 2013) Laboratory evaluation shows normocytic, normochromic, nonregenerative anaemia; borderline or frank hyperglycemia, elevations in activity of liver enzymes and hypoalbuminemia (Miller *et al.*, 1990). Dogs with liver disease have increased postprandial bile acid levels, abnormal liver anatomy on palpation and a unique, pathognomonic “Swiss cheese” pattern on ultrasonography (Nyland *et al.*, 1996). Special laboratory tests show hypoaminoacidemia, variable plasma glucagon concentrations, and elevated insulin concentrations (Gross *et al.*, 1993). Diagnosis is also based on obtaining skin biopsies with a typical histopathology. High quality protein, a zinc supplement and a fatty acid supplement is widely used. Pancreatic enzymes can be added, if there is any clinical or biochemical evidence. Secondary infections should be treated with appropriate antibiotic and antifungal therapy. The most effective treatment for hepatocutaneous syndrome, which is only palliative, is the IV administration of amino acids (Chan *et al.*, 2002).

III. METHODOLOGY

A four year old female Great dane dog presented to the Teaching Veterinary Clinical Complex Pookode with a history of recurring skin lesion predominantly over limbs, thorax and ventral abdomen was taken for this study. The animal had severe diarrhoea, anorexia and sloughed ear margins. Faecal sample and skin scraping examination, culture and sensitivity test as a preliminary step. Haematological evaluation was performed for the detection of Hb, VPRC, MCV, MCH, RBC as per the method described by Schalm *et al.* (1975). Serum biochemical parameters like serum total protein was estimated by modified Biuret method described by Weichselbaum (1946) while albumin by bromo cresol green dye binding method (Doumas *et al.*, 1971), total bilirubin by method of Jendrassik and Groff (1938). Alanine aminotransferase was measured based on the standard reference method of the International Federation of Clinical Chemistry (IFCC). Alkaline phosphatase was measured following the recommendations of Deutsche Gesellschaft für Klinische Chemie by Anon (1970). Alpha glutathione S-transferase level detected using Alpha GST ELISA kit is based on double-sandwich ELISA technique (Kilty *et al.*, 1998). Ultrasonographic evaluation was performed by the detection

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of any hepatic impairments and skin biopsy was helpful for accurate diagnosis of SND and to predict its prognosis (Rockey *et al.*, 2009)

IV. RESULTS AND DISCUSSION

Upon clinical examination pale conjunctival mucosa, 103°F temperature, pulse 158/min, respiration 28/min and absence of lymph node enlargement was detected. Faecal sample examination no ova of any parasite could be detected. Skin scrapings from the lesions did not reveal any parasitic or fungal spores. No bacterial growth was noticed upon culture and sensitivity test. Ultrasonographic evaluation of liver revealed increased liver echogenicity with multiple hyperechoic nodules surrounded by hypoechoic parenchyma (Figure. 4) this findings concures with the findings of Nyland *et al.*, 1996, he stated that liver having hyperechoic nodules surrounded by hypoechoic parenchyma giving “Swiss cheese” pattern. Hematological parameters showed a decrease in RBC, Hb, VPRC levels and an increase in MCV and MCH levels. Serum biochemistry revealed marked increase in ALP (610 IU/L) and ALT (116 IU/L) levels. Bilirubin (0.9 mg%) and glucose levels was found to be on higher side. Serum creatinine (0.8 mg/dL) and BUN (14 mg/dL) were within the normal range but total protein (3.6 g%), albumin (1.2g%) were decreased which was suggestive of hepatic involvement. Miller *et al.* (1990) observed similar observations upon laboratory evaluation of blood such as normocytic, normochromic, nonregenerative anaemia; borderline or frank hyperglycemia, elevations in activity of liver enzymes and hypoalbuminemia. Hitopathological examination of skin biopsy revealed loss of epidermis, exposure of deep dermis and scattered collagen fibres (Figure 5). Serum Alpha GST showed a marked elevation when compared to healthy controls. The serum Alpha GST of animal with SND was found to be 4.619 ng/ml and that of control group was 2.101±0.199 ng/ml. Two fold increase was observed in the Alpha GST level of diseased animal when compared to healthy group which indicate its significance for diagnosing hepatic disorders in dogs. Coles *et al.* (2001) also reported the elevation of liver specific enzyme like Alpha GST in liver diseased animals. From the above findings and clinical lesions, the case was diagnosed as superficial necrolytic dermatitis with hepatic insufficiency. Animal was treated with topical application of mupirocin ointment. Silibin-phosphatidylcholine-antioxidant complex @ 10mg/kg as liver supplement, Pentoxifylline @ 10-15mg/Kg, Ampicillin @ 20mg/kg body weight given along with fluids parentarally for five day. Advised to continue with silibin-phosphatidylcholine-antioxidant complex, pentoxifylline, zyncovit syrup for one month. Sario *et al.* (2005) who stated that silibin-phosphatidylcholine-antioxidant complex can be used for treating patients with chronic liver disease. Martin *et al.* (1984) reported that silibin alone or in combination with choline exhibited a good regenerative effect in hepatic tissue, reducing extend of lesion and time needed for recovery. High quality protein, a zinc supplement and a fatty acid supplement is widely used. Pancreatic enzymes can be added, if there is any clinical or biochemical evidence. Secondary infections should be treated with appropriate antibiotic and antifungal therapy. Animal made an un eventful recovery.

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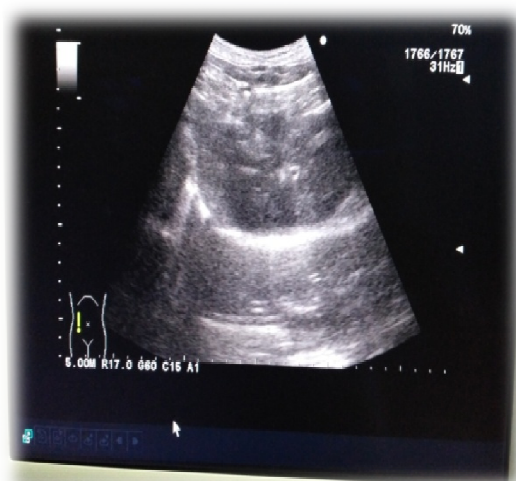


Figure 4. Ultrasonographic appearance
of liver of a dog with SND.

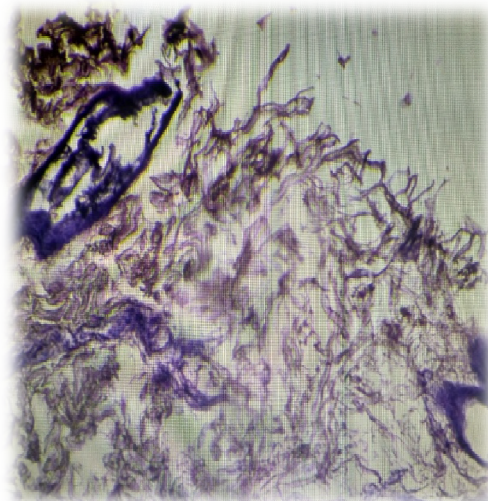


Figure 5. Histopathological appearance
Skin biopsy sample.

V. CONCLUSIONS

The animal was presented with a history of recurring skin lesion predominantly over limbs, thorax and ventral abdomen, severe diarrhoea, anorexia, sloughed ear margins. Skin scrapings and faecal sample examination were negative. No bacterial growth was observed during culture and sensitivity test. Haemato-biochemical examination revealed anaemia with increased ALT, ALP, bilirubin and glucose levels. Serum Creatinine and BUN were within normal range but total protein, albumin were decreased. Ultrasonography showed multiple hyperechoic nodules surrounded by hypoechoic parenchyma. Skin biopsy revealed necrotic changes like loss of epidermis, exposure of deep dermis and scattered collagen fibres. Sensitive and relatively specific liver biomarker, Serum Alpha GST Showed a marked elevation when compared to healthy controls. Two fold increase (4.619 ng/ml) was observed in the Alpha GST level of diseased animal when compared to healthy control group (2.101±0.199 ng/ml). Animal was treated with topical application of mupirocin ointment. Silibin-phosphatidylcholine-antioxidant complex @ 10mg/kg as liver supplement, Pentoxifylline @ 10-15mg/Kg, Ampicillin @ 20mg/kg body weight given along with fluids parenterally for five day. Advised to continue with silibin-phosphatidylcholine-antioxidant complex, pentoxifylline, zyncovit syrup for one month. Animal made an un eventful recovery.

REFERENCES

1. Anderson, M. and Sevelius, E., "Breed, sex and age distribution in dogs with chronic liver disease: a demographic study", *J. Small. Anim. Pract.* 31:1-5, 1991.
2. Angarano, D.W., "Metabolic epidermal necrosis", *Current Veterinary Dermatology*, pp.302-5, 1993.
3. Cellio, L.M. and Dennis, J., "Canine superficial necrolytic dermatitis", *compendium on continuing education for the practising veterinarian-north american edition-*, 27(11), p.820, 2005.
4. Chan, D.L., Freeman, L.M., Labato, M.A. and Rush, J.E., "Retrospective evaluation of partial parenteral nutrition in dogs and cats", *J. of vet. Inter med.* 16(4), pp.440-445, 2002.
5. Coles, B.F., Morel, F., Rauch, C., Huber, W.W., Yang, M., Teitel, C.H., Green, B., Lang, N.P. and Kadlubar, F.F., "Effect of polymorphism in the human glutathione S-transferase A1 promoter on hepatic GSTA1 and GSTA2 expression", *Pharmacogenetics* 11, 663-669, 2001.
6. Foster A.P, Panciera D.L, Cooley A.J., "Recognizing canine hepatocutaneous syndrome", *Vet Med* 92(12):1050-1055, 1997.
7. Gadgoli, C. and Mishra, S.H., "Antihepatotoxic activity of p-methoxy benzoic acid from Capparis spinosa", *Journal of ethnopharmacology*, 66(2), pp.187-192, 1999.

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8. Gross, T.L., Song, M.D., Havel, P.J. and Ihrke, P.J., "Superficial necrolytic dermatitis (necrolytic migratory erythema) in dogs", *Vet. Pathol.*, 30(1), pp.75-81, 1993.
9. Janakat, S. and Al-Merie, H., "Evaluation of hepatoprotective effect of Pistacia lentiscus, Phillyrea latifolia and Nicotiana glauca", *Journal of ethnopharmacology*, 83(1-2), pp.135-138, 2002.
10. Kimmel S.E, Christiansen W, Byrne K.P., "Clinicopathological, ultrasonographic, and histopathological findings of superficial necrolytic dermatitis with hepatopathy in a cat", *JAAHA* 39:23-27, 2003.
11. Lidbury, J.A. and Suchodolski, J.S., "New advances in the diagnosis of canine and feline liver and pancreatic disease", *The Vet. J.*, 215, pp.87-95, 2016.
12. Martin, R., Wittwer, F., Thibant, J., Flores, M. and Hernandez, O., "Hepatic regenerative drugs in dogs: effect of choline and silibilin in dogs with liver damage", *Vet. Med.Small Anim. Clinician.*, 79:504-510, 1984.
13. McNeil, P.E., "The underlying pathology of the hepatocutaneous syndrome: a report of 18 cases", *Advances in veterinary dermatology*, 2, pp.113-129, 1993.
14. Miller Jr, W.H., Scott, D.W., Buerger, R.G., Shanley, K.J., Paradis, M., McMurdy, M.A. and Angarano, D.W., "Necrolytic migratory erythema in dogs: a hepatocutaneous syndrome", *J Am Anim Hosp Assoc.*, 26(6), pp.573-581, 1990.
15. Miller, W.H., Griffin, C.E., Campbell, K.L. and Muller, G.H., *Muller and Kirk's Small Animal Dermatology7: Muller and Kirk's Small Animal Dermatology*. Elsevier Health Sciences, 2013.
16. Nyland, T.G., Barthez, P.Y., Ortega, T.M. and Davis, C.R., "Hepatic ultrasonographic and pathologic findings in dogs with canine superficial necrolytic dermatitis", *Vet. Radiol. Ultrasound*, 37(3), pp.200-205, 1996.
17. Rockey, D.C., Caldwell, S.H., Goodman, Z.D., Nelson, R.C. and Smith, A.D., "Liver biopsy", *Hepatology*, 49(3), pp.1017-1044, 2009.
18. Sario, A. D., Bendia, E., Taffetani, S., Omenetti, A., Candelaresi, C., Marzoni, M., De Minicis, S. and Benedetti, A., "Hepatoprotective and antifibrotic effect of a new silybin-phosphatidylcholine-vitamin E complex in rats", *Dig. liver dis.* 37 869-876, 2005.
19. Schalm, O.W., Jain, N.C. and Carroll, E.J., *Veterinary hematology* (No. 3rd edition). Lea & Febiger, 1975.
20. Weichselbaum, Captain TE. "An accurate and rapid method for the determination of proteins in small amounts of blood serum and plasma." *American journal of clinical pathology* 16.3_ts (1946): 40-49.
21. Yager, J.A. and Wilcock, B.P., *Color atlas and text of surgical pathology of the dog and cat. Volume 1: Dermatopathology and skin tumors*. Wolfe Publishing Ltd, 1994