



A Case of Dermatitis Responding to Immunomodulators in a British Cat

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Abstract: Skin disease is one of the most common diseases in small animal medicine and its treatment is sometimes difficult.

The material of this case was a British breed male cat at the age of 5 months, weighing approximately 1.5 kg, with the complaint of alopecia brought to Animal Hospital, Faculty of Veterinary Medicine, Atatürk University. The case was initially diagnosed with superficial pyoderma and amoxicillin + clavulanic acid was administered in the treatment. However, it was observed that the lesions progressed more, and the treatment was terminated. Then, as an immunomodulator, a preparation containing levamisole HCl was applied to the treatment and vitamin D was administered intramuscularly. In the four week of the treatment, it was determined that intense hair growth started in the alopecic areas and at the eight week, the alopecic areas became hairy and the skin thickening improved. In this case report, it is aimed to give information about the treatment of a dermatosis disease that responds to immunomodulators.

Keywords: British cat, Dermatitis, Immunomodulators, Treatment.

INTRODUCTION

The skin is the largest and most multifunctional organ and reflects the activity and health of the structures under its integrity. Although the skin has many functions, its main task is to protect living things from mechanical, chemical substances, pathogens, ultraviolet radiation and even dehydration (1). Dermatological problems are one of the most common problems in pets.

Since the skin is an organ that is most easily exposed to infection and pathogenic factors, so its diseases can be easily understood by owners. Dermatological problems can generally progress with multifactorial, chronic recurrent conditions. The

etiology of dermatological diseases in young and old animals varies. While the cases of dermatitis in young animals are mostly demodicosis, otodectis, dermatophytosis, congenital and hereditary diseases, this situation is caused by autoimmune dermatoses, neoplastic diseases and endocrine diseases in old animals (2). Vitamin D (Vit-D) has an immunomodulatory property and its receptors are found in T and B lymphocytes, neutrophils, macrophages and dendritic cells (3). It has been stated that low Vit-D level in cats is formed in mycobacterial infections, inflammatory bowel disease and small cell gastrointestinal lymphomas

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(4,5). Levamisole has been reported to be effective in treating chronic recurrent bacterial, viral and inflammatory skin diseases (6). In this case report, it is aimed to give information about the treatment of a dermatosis disease that responds to immunomodulators.

CASE PRESENTATION

The material of this case was a British breed male cat at the age of five months, weighing approximately 1.5 kg, with the complaint of alopecia brought to Animal Hospital, Faculty of Veterinary Medicine, Ataturk University. In the anamnesis, it was learned that the cat had previously been treated in other clinics with the suspicion of fungal infection and there was no response to the treatment. Informed consent form was obtained. It was seen that the data was within the reference range in the routine hemogram examination of the blood samples taken from the vena cephalica antebrachi of the sick cat into tubes with ethylenediamine tetraacetic acid (EDTA). A negative result was also obtained in the examination of the area with alopecia with a wood lamp. Subsequently, feather samples received from the area for fungal analysis and deep skin scraping samples to eradicate scabies were found negative. In addition, negative results were obtained in terms of feline immunodeficiency, feline coronavirus, and feline leukemia virus, which they may cause skin diseases. Considering that the case might be superficial pyoderma, amoxicillin+clavulanic acid (Synulox[®], Haupt Pharma Latina S.r.l., Latina - Italy) was administered subcutaneously at a dose of 8.75 mg/kg for five days. However, after the treatment, it was determined that alopecia areas spread more from front to back in the head region (Figure 1). After that, the treatment was terminated and levamisole HCl (Levamis 10%[®], Provet Veterinary Products San. and Tic. A. S., Ankara-Turkey) known to be an immune system activator/immunomodulator was

administered to a dose of 2.5 mg/kg subcutaneously three times with an interval of two days and then it was administered subcutaneously once a week for two weeks. In addition, a single intramuscular dose of 500000 IU of vitamin D (Proveto-D3[®], Provet Veterinary Products San. and Tic. A. S., Ankara-Turkey) was administered for 10 kg body weight. After four weeks of treatment, intense hair growth was noticed in the alopecic areas of the head area of the cat (Figure 2). In the eight weeks after the treatment, it was observed that all alopecia areas in the head area became hairy and the skin thickening completely recovered (Figure 3).



Figure 1. Alopecia areas in the head area.

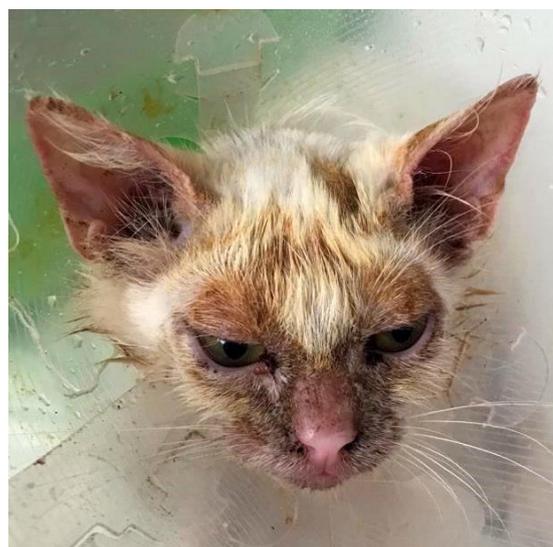


Figure 2. Appearance at 4 weeks after treatment.



Figure 3. Complete hair removal of alopecia areas 8 weeks after treatment.

DISCUSSION and CONCLUSION

Skin diseases are common in small animals. Oxidative stress or an imbalance between the prooxidant and the body's antioxidant defense system is a possible factor in the formation of skin diseases (7). Immunomodulators, immunostimulants, and immunotherapy are used to direct and control the immune system and its response. Drugs that stimulate the immune system in a nonspecific way are frequently used in veterinary medicine. The most commonly used immunostimulants in veterinary medicine are adjuvants used to increase the effectiveness of vaccines (8). Levamisole has been defined primarily as an anthelmintic in farm animals and as a vaccine adjuvant and immunostimulator that increases T and B lymphocyte activity in dogs. It has been reported that the functions of dendritic cells, monocytes and neutrophils increase with the effect of levamisole (9). It has been stated that the combined use of prednisolone and levamisole causes severe regression in more than 50% of systemic lupus erythematosus cases in dogs (10). Vit-D receptors are found in many immune system cells such as macrophages, dendritic cells, T and B lymphocytes (11). Vit-D can activate the immune system by inhibiting proinflammatory cytokines and increasing the level of anti-inflammatory cytokines (12). Vit-D

increases the protection of the skin layer. It also reduces inflammation by suppressing toll-like receptor production by monocytes and increasing interleukin-10 production, balancing overproduction of B lymphocytes and immunoglobulin E synthesis (13). In laboratory studies, it has been reported that Vit-D increases the release of antimicrobial peptides such as cathelicidin and beta defensin which prevent skin infections, and stimulates the synthesis of filagrin proteins which have important roles in the formation of the stratum corneum layer of the skin (14). Klinger et al. (15) stated that oral administration of Vit-D in dogs with atopic dermatitis resulted in a reduction in itching and lesions on the skin. In our case, it was concluded that the case of dermatosis was treated by regulating both inflammation and immune balance with the effect of the immunomodulators, which were applied to the cat brought to our hospital with the complaint of alopecia in the skin layer.

In conclusion, this case was considered important in that it reminded the importance of immunomodulators in the treatment, and the stabilization of the immune system significantly affects the course of the treatment.

Conflict of Interest

The authors declare that they have no conflict of interest.

REFERENCES

1. Piya Weller RH., John A., Savin J., Dahl M., 2008. The function and Structure of Skin. 5th edn., Wiley-Blackwell: Massachusetts, MA, USA.
2. Bruyette DS., 2020. Approach to the patient with dermatologic disease. In "Clinical Small Animal Internal Medicine", Ed., LV Reiter, 1st edn., 1375, John Wiley & Sons, Inc, USA.
3. Feng R., Li Y., Li G., Li Z., Zhang Y., Li Q., Sun C., 2015. Lower serum 25 (OH) D concentrations in type 1 diabetes: A meta-analysis. *Diabetes Research and Clinical Practice*, 108, e71-75. doi: 10.1016/j.diabres.2014.12.008.
4. Lalor SM., Mellanby RJ., Friend EJ., Bowlt KL.,

- Berry J., Gunn-Moore D., 2012. Domesticated cats with active mycobacteria infections have low serum vitamin d (25(OH) D) concentrations. *Transboundary and Emerging Diseases*, 59, 279-281. doi: 10.1111/j.1865-1682.2011.01265.x.
5. Lalor S., Schwartz AM., Titmarsh H., Reed N., Tasker S., Boland L., Berry J., Gunn-Moore D., Mellanby RJ., 2014. Cats with inflammatory bowel disease and intestinal small cell lymphoma have low serum concentrations of 25-hydroxyvitamin D. *Journal of Veterinary Internal Medicine*, 28, 351-355. doi: 10.1111/jvim.12294.
 6. Scheinfeld N., Rosenberg JD., Weinberg JM., 2004. Levamisole in dermatology: A review. *American Journal of Clinical Dermatology*, 5, 97-104. doi: 10.2165/00128071-200405020-00004.
 7. Jewell DE., Yu S., Joshi DK., 2002. Effects of serum vitamin E levels on skin vitamin E levels in dogs and cats. *Veterinary Therapeutics*, 3, 235-243.
 8. Thacker EL., 2010. Immunomodulators, immunostimulants, and immunotherapies in small animal veterinary medicine. *Veterinary Clinics: Small Animal Practice*, 40, 473-483. doi: 10.1016/j.cvsm.2010.01.004.
 9. Zhang WJ., Du XG., Zhao G., Jin HL., Kang YM., Xiao C., Liu MY., Wang B., 2009. Levamisole is a potential facilitator for the activation of Th1 responses of the subunit HBV vaccination. *Vaccine*, 27, 4938-4946. doi: 10.1016/j.vaccine.2009.06.012.
 10. Day MJ., 2011. *Clinical Immunology of the Dog and Cat*. 2nd edn., 361, Manson Publishing Ltd, London.
 11. Prietl B., Treiber G., Pieber TR., Amrein K., 2013. Vitamin D and immune function. *Nutrients*, 5, 2502 - 2521. doi: 10.3390/nu5072502.
 12. Jeong MS., Kim JY., Lee HI., Seo SJ., 2014. Calcitriol may down-regulate mRNA over-expression of toll-like receptor-2 and -4, LL-37 and proinflammatory cytokines in cultured human keratinocytes. *Annals of Dermatology*, 26, 296-302. doi: 10.5021/ad.2014.26.3.296.
 13. Muehleisen B., Gallo RL., 2013. Vitamin D in allergic disease: Shedding light on a complex problem. *Journal of Allergy and Clinical Immunology*, 131, 324-329. doi: 10.1016/j.jaci.2012.12.1562.
 14. Hata TR., Kotal P., Jackson M., Nguyen M., Paik A., Udall D., Kanada K., Yamasaki K., Alexandrescu D., Gallo RL., 2008. Administration of oral vitamin D induces cathelicidin production in atopic individuals. *The Journal of Allergy and Clinical Immunology*, 122, 829-831. doi: 10.1016/j.jaci.2008.08.020.
 15. Klinger CJ., Hobi S., Johansen C., Koch HJ., Weber K., Mueller RS., 2018. Vitamin D shows in vivo efficacy in a placebo-controlled, double-blinded, randomised clinical trial on canine atopic dermatitis. *Veterinary Record*, 182, 406. doi: 10.1136/vr.104492.