Case Report

SUCCESSFUL MANAGEMENT OF CANINE ATOPIC DERMATITIS USING OCLACITINIB - A CASE REPORT

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ABSTRACT

A Dalmatian dog was brought to the Referral Veterinary Polyclinic, ICAR-Indian Veterinary Research Institute, Izatnagar with a complaint of erythematous lesions, alopecia and intense itching and had been treated for a long time. Atopic dermatitis was diagnosed based on the history and the exclusion of other infectious agents as potential causes of the dermatitis. The dog was treated with oclacitinib, antibacterial, fatty acids and antihistaminic medications and showed remarkable improvement after therapy.

Keywords: Allergy, Atopic dermatitis, Janus kinase inhibitor

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Canine atopic dermatitis (CAD) is a complex multifactorial genetically predisposed inflammatory and pruritic allergic skin disease with an estimated prevalence of 10 to 15% (Santoro, 2019). It is believed to be caused by immediate and late-phase hypersensitivity reactions to food or environmental allergens mediated by immunoglobulin E (Rodriguez *et al.,* 2020). It originates from interactions between a dog's genetics, epigenetics, exposure to environmental allergens and the resultant immune response (Harvey *et al.,* 2019). House dust mites, storage mites, mould spores and pollens are the common allergens associated with CAD, which triggers allergen-specific IgE release and clinical manifestations of atopy (Shaw *et al.,* 2004). It appears to be caused by a confluence of genetic and environmental variables that result in impaired skin barrier function, immunological dysregulation and dysbiosis of the skin's microbiota (Marsella, 2021a; Uchiyama *et al.,* 2022).

Atopic skin is quickly colonized by *Staphylococci* and *Malassezia* (Eisenschenk, 2020; Marsella, 2021b; Sofou *et al.,* 2022). Secondary infections should be diagnosed and treated as soon as possible.Clinical signs and treatment responses show breed

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and individual variations. The emergence of clinical symptoms has primarily been observed in dogs between 6 months to 3 years (Kotnik, 2018). CAD is genetically more likely to occur in breeds viz., Beagle, Boxer, Dalmatian, Cocker spaniel,Golden Retriever, Labrador Retriever, Pug and Lhasa Apso (Nuttall *et al.,* 2019). Most impacted are indoor pets (Olivry *et al.,* 2010). In the early stages, affected dogs develop pruritus without any significant skin lesions or sometimes may associated with primary lesions such as erythema, papules and self-induced alopecia. It affects parts of the body where the allergen is more easily absorbed via the skin. Skin folds and places with thinner skin and fewer hair are examples of these areas. The most frequently affected areas include the face, distal extremities of limbs, concave side of the ear pinnae, axilla, inguinal region, and perineal region (Saridomichelakis and Olivry, 2016; Chermprapai *et al.,* 2019). The distribution of lesions may differ from breed to breed. 50% of dogs with CAD may develop otitis externa.

Skin lesions around the ear margins (mostly in *Sarcoptes*) and dorso-lumbar area (common in flea allergy dermatitis) are unusual in CAD (Favrot *et al.,* 2010; Hensel *et al.,* 2015). Chronically affected dogs have been shown to develop hyperpigmentation, lichenification and bilateral otitis externa. Secondary skin infections with bacteria and yeast are very common which tend to exacerbate the clinical signs of CAD. Each dog should be treated as an individual, and no single treatment is likely to be beneficial in all situations. Once the potential causes of the flare have been identified and removed, acute flares should be treated with a combination of non-irritating shampoos and topical glucocorticoids. When needed, oral glucocorticoids and antimicrobial therapy may be provided. The use of dietary supplements, cytokine and inflammatory mediators (e.g. calcineurin inhibitors, oclacitinib), allergen specific immune therapy and treatment with recombinant interferons may also be considered in chronic flares. CAD is a chronic condition that generally lasts for a lifetime. The best outcomes are linked to long-term treatment that keeps the clinical symptoms in remission. Since it is a genetically determined condition, the implications of breeding from affected dogs should be explained to owners.

A 35 kg 3 year old Dalmatian male dog was presented to Referral Veterinary Polyclinic, ICAR-IVRI with history of erythematous and ulcerative lesions over distal extremities of limbs, inguinal region and interdigital areas for past six months. Self-induced alopecia and itching were noticed. No history of ectoparasitic infestation was reported. Pet was reared indoor and bathing done once in 15 days. Deworming and vaccination were properly done. The dog had been previously treated for mange, bacterial and fungal infections without successful management. The animal was treated with prednisolone and antibiotics but had shown improvement for a while only.

Clinical examination revealed vital parameters to be normal. The rectal temperature (102.2°F), respiration rate (19/minute) and heart rate (91 bpm) were normal.

The patient seemed dull yet receptive. No abnormality could be detected in both ears by otoscopic evaluation. Papular eruptions were found on the dorsum of body. Patchy alopecia, erythematous and ulcerative lesions over the skin of distal extremities of limbs (Fig. 1) and interdigital areas indicated pyoderma. Ectoparasites were not observed during the examination of the skin coat.

Diagnosis is generally made by ruling out other diseases with comparable symptoms, such as ectoparasitic infestations (Hensel *et al.,* 2015; Brement *et al.,* 2019). The dog's skin scraping and faeces were collected for laboratory analysis. Skin scraping was handled by routine procedure to look into mange infestation. Sarcoptic/demodectic mites and parasite eggs could not be found during inspection. An additional skin scraping was cultured on SDA (Sabouraud Dextrose Agar) and yielded negative results. Lactophenol cottonblue for fungus investigation revealed no evidence of fungal infection. An impression smear from the lesions was taken and stained with Giemsa to rule out any immune-mediated/ autoimmune skin disease which showed negative results. A skin swab was taken and sent for an antimicrobial sensitivity test and it showed moderate growth of *Staphylococcus intermedius*. Atopic dermatitis was determined to be the cause of the case after considering the signs and symptoms and ruling out other possibilities.

The dog was treated with Janus kinase inhibitor (JKI) i.e. Tab. Oclacitinib (Apoquel 5.4 mg) @ 0.4-0.6 mg/Kg B.wt PO BD for 14 days and once a day for 8 weeks (Denti *et al.,* 2022). To treat secondary bacterial infection, an antibiotic (Tab. Cefadroxil (Odoxil 250 mg) @ 20 mg/Kg B.wt PO BD) was given for 15 days. For itching, antihistamine (Tab. Fexofenadine (Allegra 120 mg) @5 mg/Kg B.wt PO OD was given (Paterson, 2019). Omega-3 and Omega-6 fatty acids (Syrup. Nutricoat advance) were given for one month as supportive therapy. Bathing with non-irritant shampoo was advised.The owner was requested to provide feedback on the treatment and was instructed to keep the dog in a dust-free environment. After three weeks, the papular eruptions were not present and the oozing of blood from the lesions was also not there (Fig. 2). After three months of treatment, all the lesions, itching and alopecia were fully resolved (Fig. 3).

Atopic dermatitis is an allergic skin condition that affects dogs and is driven by immunological hypersensitivity to common environmental allergens such as pollen, mold spores, storage mites, and house dust mites (Song *et al.,* 2022). The treatment of CAD involves identifying the allergenic causes (treating flea infestations, avoiding food or environmental allergens), improving skin care and hygiene (using non-irritant or antipruritic shampoo), treating secondary infections (using topical or systemic antibiotics) and managing pruritus with topical/oral glucocorticoids or oclacitinib or cyclosporine.Oclacitinib primarily suppress JKI-1 dependent, pruritogenic and pro-inflammatory cytokines that are responsible for clinical manifestations of CAD. Oclacitinib is safe and effective for management of CAD for dogs >1 year

Fig. 1. Dalmatian dog showing A) erythematous and ulcerative lesions in distal extremities of limbs; B,C) papular lesions over dorsum of body; D) erythematous lesions over paws

Fig. 2. Dalmatian dog showing improvement in condition (A, B) after 3 weeks of treatment with oclacitinib, antihistamines, antimicrobial therapy and dietary supplements

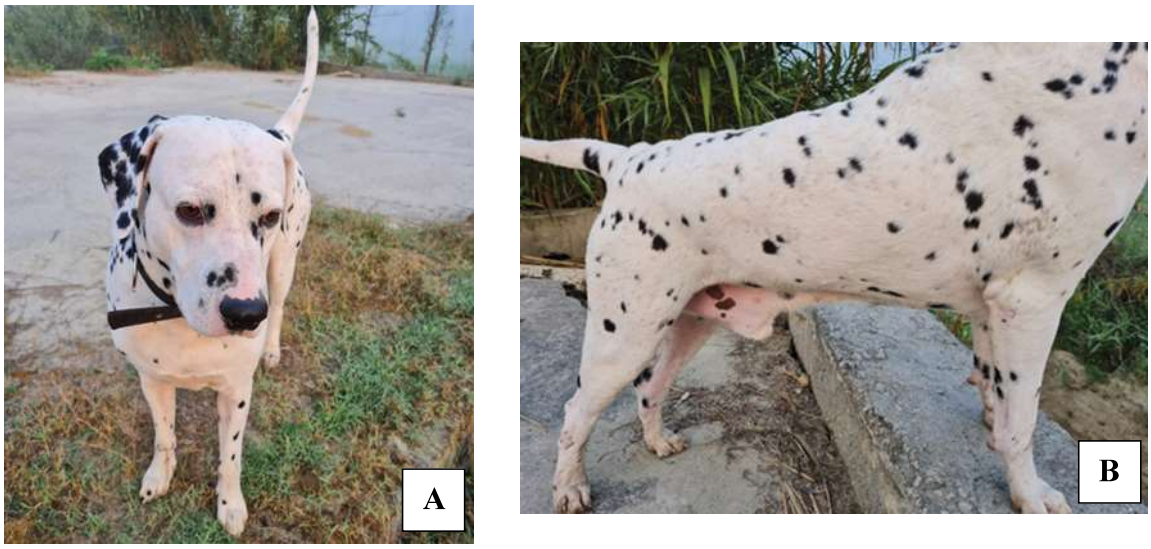

Fig. 3. Dalmatian dog in fully recovered condition after 3 months treatment with complete resolution of clinical signs

age, with fewer side effects compared to glucocorticoids for long term use (Olivry *et al.,* 2015; Denti *et al*., 2022). When compared to other antipruritic medications, the use of oclacitinib is related with a lower use of antibiotics (topical/systemic) in atopic dogs (Rynhoud *et al*., 2021). Additionally, it protects the skin barrier by minimizing trans-epidermal water loss and thereby maintains hydration (Marsella *et al*., 2020). In the present study, the dog had been treated with prednisolone in the past with little improvement and showed good clinical result after oclacitinib therapy. Omega-3 and omega-6 fatty acid supplementation is frequently used as adjunct therapy indermatitis decrease the synthesis of eicosanoids and lower the inflammatory mediator's production (Paterson, 2019). CAD is a complex skin condition. A multiple-modality treatment strategy adapted to the demands of each animal is necessary for the effective management of CAD.

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