Part I – Atopic dermatitis: clinical and molecular aspects

Canine atopic dermatitis (cAD)

- Inflammatory and pruritic
- Typical clinical signs
- Immunoglobulin E (IgE)
- Genetic
- Frequent diagnosis
cAD lesions

- Pododermatitis
- Flexural surfaces
- Axillary / Inguinal regions
- Perianal
- Perioral

Pathogenesis of cAD

- Extremely complex
  - Genetics
  - Environment
  - Skin barrier
  - Host-micro-organism interaction
  - Host immunity
    - Innate and acquired

Immunology in cAD

- Complex interactions resulting in activation of both T and B lymphocytes
- Proinflammatory cytokines promote the development of T-helper 2 (Th2) phenotype
- Involvement of T-helper 1 (Th1), Th2, and T-regulatory cytokines
- Other noncytokine factors also play important roles
Stratum corneum

- Specific location of physical barrier
- Major site for TEWL
- Continuous sheet of protein-enriched cells
  - Embedded in an intracellular matrix, enriched in nonpolar lipids, organized as lamellar lipid layers

Lipid layer

- Roles:
  - Surround the corneocytes to form hydrophobic matrix
  - Provide chemical resistance
    - Contains beta-defensins
  - Acts as scaffold for the cornified envelope
  - Though hydrolysis of the lipid layer
    - Ceramides are formed
    - Free fatty acids are formed

Ceramides

- Play an important role in epidermal signaling
  - Proliferation, differentiation, apoptosis
- Important for wound repair
  - Can stimulate proliferation and migration of keratinocytes
- Ceramides helps to maintain normal rates of TEWL
Part II – Atopic dermatitis: treatment aspects of atopic disease

Treatment of cAD

- Key points in managing cAD:
  - Owner must have realistic expectations with therapy
  - Treatment will vary on case by case basis
  - Treatment should:
    - Decrease frequency and severity of flares
    - Decrease use of medications
    - Increase quality of life
    - Better the human-animal bond

“Proactive intermittent therapy”

- Allergen avoidance
- Immunotherapy
- Avoiding flare factors
- Topical therapy
- Anti-inflammatory therapy
- Ectoparasite control
**Allergen avoidance in cAD**

- **House dust mites** (Dermatophagoides sp.)
  - Live in bedding, mattresses, carpets, etc.
  - Feed on human and animal dander
  - Humidity is a key factor
  - Elimination is impossible
- Entire household should be incorporated
- Focus on pet’s living area

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**Allergen avoidance in cAD**

- Wash bedding weekly in hot water (>130 degree F)
- Allergen-proof bed covers
- Change furnace/air conditioner filters regularly
- Vacuum and dust regularly
- Regular grooming to remove debris

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**Allergen-specific immunotherapy**

- Cornerstone of long-term management
- Effective and safe way to reduce clinical signs
- Most studies report at least a moderate improvement with continued use
- Can be very cost-effective for long-term control
Intradermal allergy testing

- Considered the “gold standard” when choosing allergens for IMTX
- Is **NOT** a diagnostic test
  - Used to select allergens for hyporesensitization
- Tests the organ directly affected by the disease
  - Not only IgE-mediated responses
- Can be impacted by several factors
  - Drugs
  - Stress
  - Hormones

Allergen-specific immunotherapy

- Sublingual and subcutaneous forms available
- Customized for the individual patient
- Variable treatment protocols
- Only treatment option available to modify the underlying disease
- Has little to no long-term adverse events
- Efficacy varies depending on many factors
  - 70-80% success as part of comprehensive treatment plan

Avoiding flare factors in cAD

- Used in combination with other forms of therapy
- Often impractical
- Examples:
  - Specific fabrics
  - Storage mites
  - Insects (ie. Vespids)
  - Molds
  - Dietary items
Topical therapy in cAD

- Acute/Chronic therapy
  - Modest effect on skin lesions and pruritus in allergic dogs
  - Bensignor E et al. (2013), Bourdeau P et al. (2007)
  - A product containing phytosphingosine, raspberry oil and lipids (Douxo Calm, Ceva) have been shown to provide modest relief on skin lesions and pruritus
  - Likely best in dogs with mild to moderate cAD

Topical therapy in cAD

- Acute and chronic therapy
  - Topical glucocorticoid therapy
    - Effectively reduces clinical signs of canine AD
    - Treatment duration and frequency should be tailored to the patients' clinical signs
    - Risk of skin atrophy with prolonged use
    - Be conscious of vehicle and potency

Topical therapy in cAD

- Chronic therapy
  - Bathing at least once weekly with a mild, non-irritating shampoo and lukewarm water is likely to be beneficial
  - The type of shampoo should be tailored
    - Emollient shampoos are likely to be the most beneficial
    - Antiseptic shampoos and mousse application should be utilized when appropriate
  - Practitioners should also be prepared to change the topicals used if the state of the dog's skin and coat changes
Anti-inflammatory therapy in cAD

- Usually adjunctive therapy for treatment of acute flares
- May be more practical for patients with specific seasonality
- Examples:
  - Corticosteroids
  - Antihistamines
  - Antidepressants
  - Fatty acids
  - Calcineurin inhibitors
  - Janus kinase inhibitors

Ectoparasite control in cAD

- Can be substantial flare factors in sensitized individuals
- Very prevalent in certain areas of the country
- Common to never observe a flea on a patient
- Owners can be in “flea-nial”

- Help the owner to understand the situation
- Patient’s best interest
- Always practice good flea control measures!
- Topical flea control is paramount
  - Helps more in preventing the bite
  - Vectra 3D
  - Isoxazoline
Summary

• Treatment of this disease is clearly multifaceted
• Interventions should be combined for a proven benefit
• Treatment should be tailored to each patient depending upon the stage of the disease, its severity and the distribution of lesions
• Veterinarians should remember to evaluate and then discuss with the pet owners the benefit of each recommended intervention, its side effects, its ease of administration, and its cost as a single or combined modality