Atopic Dermatitis

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Atopic Dermatitis

- Pruritus
- Eczema
  - Typical morphology and age-specific patterns
    - Face, neck and extensor involvement in infancy
    - Flexural involvement in children and adults
    - Spares groin and axillae

Atopic Dermatitis

- Early age at onset
  - 80-90% diagnosed by age 5
- Atopy
  - Personal and/or family history
  - IgE reactivity (20-30% normal)
- Xerosis
Differential Diagnosis includes:
- Irritant and allergic contact dermatitis
- Seborrheic dermatitis
- Psoriasis
- Nummular eczema
- Scabies
- In infants: immunodeficiency, Langerhans cell histiocytosis

Hand dermatitis
- Vast majority of individuals with hand dermatitis are atopic

Atopic Dermatitis: Epidemiology
- Increasing prevalence in industrialized countries
  - 10-15% of population
  - Children more than adults
- Increasing prevalence mimics rise in asthma
  - Several theories, including hygiene hypothesis
Clinical Course

- Remissions and exacerbations with frequency of exacerbations decreasing with age
- 80% clear or markedly improved by age 20, 20% same or worse
- More severe childhood disease generally portends higher risk of persistence
- Asthma develops in 30%, hayfever in 60%

The Atopic March

Etiology of Atopic Dermatitis

- Impaired barrier function
- Immune dysregulation: Th2 response
Impaired barrier function
- Loss of function mutations in filaggrin and other mutations
- Inflammation impairs function of filaggrin and other barrier proteins

Etiology
- Impaired barrier allows more penetration of allergens and irritants, leading to more inflammation further decreasing barrier
- Epidermal dendritic cells recognize pathogens and allergen, go to nodes triggering Th2 T cell response and B cells to produce IgE
- Th2 cytokines further diminish barrier

Microbes as Stimulators of Dermatitis
- 80% staphylococcal colonization in AD
- Th2 cytokines block production of antimicrobial peptides
- Staph further impairs the barrier and trigger immune responses which perpetuate inflammation
Genetics

- 60-70% of patients with AD have a first degree relative with atopy, compared with 30% of controls
- 50% concordance in monozygotic twins
- Barrier function proteins mutations: Filaggrin

Filaggrin

- Important component of granular layer of the epidermis contributing to barrier function
- Filaggrin mutations are associated with AD – 50% of white Europeans have null mutations
- IL-4, IL-13 and IL-17A downregulate filaggrin expression, so altered immune response may lead to filaggrin dysfunction

Environmental factors

- Environmental tobacco smoke doubles risk of AD
- Dry air
- Chronic exposures to protein antigens (like house dust mites) may induce AD
Exacerbating factors
- Over bathing
- Heat
- Contact and ingested allergies
- Emotional Stress
- Rapid worsening - INFECTION

Atopic Dermatitis Comorbidities
- Atopic diathesis: asthma, allergic rhinitis, contact dermatitis, food allergies
- Obesity
- ADHD
- Anxiety, depression and suicidality

Food Allergy and Atopic Dermatitis
- 10-20% have relevant food allergies (50-80% have positive skin or RAST tests)
- Most food reactions develop within 2 hours of ingestion and usually appear morbilliform or urticarial
- 90% will react to only 1 or 2 foods
- 90% of all food allergies are due to egg, peanut, milk, wheat, or soy
Exclusive breast feeding has not been shown to be protective.

Delayed introduction of solid foods beyond 4-6 months may paradoxically increase food allergies. (Proven in the case of peanut allergy.)

Treatment

- Emollients critical
  - Begin at birth in high risk infants
- Education of utmost importance
- Topical steroids mainstay of treatment

Bathing Recommendations

- Bathe daily for 5-15 minutes in warm, not hot, water
- Use a moisturizing cleanser (minimally, just where needed)
- After bathing, pat dry and immediately apply topical medication followed by an emollient, or emollient alone
“Swimming pool baths”
- ½ cup of bleach per full (40 gallon) bath tub twice weekly
- Combine with intranasal mupirocin

Use of topical steroids
- Lowest effective strength
- Apply only once to twice daily
- May use higher potency topical steroids in “pulses”
- Soak and smear
- Optimize adjunctive therapies
  - Skin hydration
  - Avoidance of irritants

Wet Dressings
- Layered process done BID or at HS
  - Mild to mid-potency corticosteroid Cream to involved areas
  - Then emollient
  - Damp (tepid) wrap or cotton PJ’s
  - Then dry cotton layer
Topical calcineurin inhibitors

- Protopic (tacrolimus) 0.03%, 0.1% ointment
- Elidel (pimecrolimus) 1% cream
- Used more for maintenance therapy than acute flares

Advantages
- No HPA axis suppression
- No atrophy

Disadvantages
- Stinging with application
- Cost
- Not FDA approved under age 2
- Black Box warning

New Topicals

- Phosphodiesterase 4 inhibitor Crisaborole (Eucrisa)
  - Moderately effective
  - Can sting on application
  - Expensive >$600/ tube on Good RX
Other treatments

- Antibiotics: Use for evidence of secondary infection. Agents should cover staph aureus and streptococci
- Antihistamines: Data regarding efficacy conflicting
- House dust mite elimination helpful in selected patients (enclosing mattresses, frequent vacuuming, removing carpet)

Other treatments

- Systemic steroids not indicated in vast majority of patients and are not appropriate for chronic use
- Other systemic immuno modulators (methotrexate, azathioprine, mycophenolate mofetil) limited to severe AD

Dupilumab (Dupixent)

- Human monoclonal antibody to the IL4α subunit in IL4 and IL13.
- Adult dose 300mgSC q 2 week (prefilled syringe)
- Common side effects: injection site reactions, non-infectious conjunctivitis
- Wholesale price: $37,000/year
Other agents on horizon

- Monoclonal antibodies to IL-13, IL-22 and IL31 in trials
- Janus kinase (JAK) inhibitors orally and topically