Atopic Dermatitis... It isn’t just skin deep!

Texas Pediatric Society

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Conflicts of Interest

- Anacor; speaker, consultant, investigator
- Sun Pharmaceuticals; consultant
- Castle Creek Pharmaceuticals; consultant
- Scioderm; investigator
- Up to Date; section editor, author

NONE WILL APPLY TO THIS PRESENTATION
Atopic Dermatitis - The Disease

- **Increasing prevalence**
  15%-30% of general population
  80%-90% diagnosed by 5 years

- **Pathogenesis**
  Genetic; filaggrin*, others*
  Increased transepidermal water loss; ?lipids and barrier
  Biochemical
  Immunologic
  - ?Food hypersensitivity
  - ?Hygiene hypothesis
  - Defective Innate immunity*

- **Management**
# Atopic Dermatitis; Diagnostic Criteria

## TABLE 2 Diagnostic Criteria

<table>
<thead>
<tr>
<th>Essential Features</th>
<th>Important Features</th>
<th>Associated Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Both must be present</td>
<td>Add support to the diagnosis, observed in most cases of AD</td>
<td>Suggestive of AD, but too nonspecific to be used for defining or detecting AD in research or epidemiologic studies</td>
</tr>
<tr>
<td>1. Pruritus</td>
<td>1. Early age of onset</td>
<td>1. Atypical vascular responses (e.g., facial pallor, white dermographism, delayed blanch response)</td>
</tr>
<tr>
<td>2. Eczema (acute, subacute, chronic)</td>
<td>2. Atopy</td>
<td>2. Keratosis pilaris/pityriasis alba/hyperlinear palms/ichthyosis</td>
</tr>
<tr>
<td>a. Typical morphology and age-specific patterns</td>
<td>a. Personal and/or family history</td>
<td>3. Ocular/peri orbital changes</td>
</tr>
<tr>
<td>• Infants/children: facial, neck, and extensor involvement</td>
<td>b. IgE reactivity</td>
<td>4. Other regional findings (e.g., perioral changes/periauricular lesions)</td>
</tr>
<tr>
<td>• Any age group: current or previous flexural lesions</td>
<td>3. Xerosis</td>
<td>5. Perifollicular accentuation/lichenification/prurigo lesions</td>
</tr>
<tr>
<td>• Sparing of the groin and axillary regions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Chronic or relapsing history</td>
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<td></td>
</tr>
</tbody>
</table>

## Exclusionary Conditions

Diagnosis of AD depends on excluding conditions:

- Scabies
- Psoriasis
- Ichthyoses
  - Seborrheic dermatitis
  - Contact dermatitis (irritant or allergic)
  - Cutaneous T-cell lymphoma
  - Photosensitivity dermatoses
  - Immune deficiency diseases
  - Erythroderma of other causes
Atopic Dermatitis - Management Topics

- Skin Care/Bathing
- Emollients, Wraps
- Topical corticosteroids (TCS)
- Topical calcineurin inhibitors (TCI)
- Avoidance of triggers
- Infections
- Systemic therapies: Light, Systemic medications
- Quality of life, Counseling
Atopic Dermatitis - Differential Diagnosis

- Seborrheic dermatitis
- Contact dermatitis
- Drug eruptions
- Immunodeficiencies
  - Hyper IgE (AD [STAT3]/AR [Dock8])
  - Omenn
  - Wiskott-Aldrich
  - Netherton
  - others...
Case History

- Infant seen with 2-3 month hx rash and pruritus; Multiple food allergies
- Family not sleeping, missing work
- Irritable, Adenopathy, Diffuse scaling erythema, Dermatographia
- Recurrent S. aureus & HSV
- Multiple visits w/derm, 2 w/GI, A/I (Feb-Aug)
Case History

- Stopped steroids and antibiotics
- Complementary
- Alb: 1.5; Eos up to 29%; IgE 17K; Low Zn, Vit D
- 25% growth (decreasing)
- Hospitalized: improved greatly on aggressive topicals
- Multiple phone calls; 3 in one day
- Not seen between March & July
Hyper IgE Syndrome

- AD/STAT 3: Eczema, Abscess (S. aureus), Pneumonia, Pneumatocele, IgE, Skeletal
- AR/DOCK8: Eczema, Recurrent viral, CNS, NO bone/connective tissue probs.
- Study designed to attempt distinguish severe AD from HIES

J Allergy Clin Immunol 2010;126:611
Atopic Dermatitis vs AD-HIES

- Eczema, IgE, eosinophilia in both
- Pneumonia, Abscess, Oral/Nail candidiasis (combination) in 3/30 wild-type STAT3 (AD)
- Internal infections, Sepsis ONLY in HIES
  - Bone fx, Scoliosis highly specific
- Asthma, Rhinitis, Severe food allergy more with wild-type STAT3 (AD)

J Allergy Clin Immunol 2010:126:611
Inflammatory Diaper Area Eruptions

- Psoriasis
- 1% < 1 y/o
- Scalp, intertriginous

← Seborrheic dermatitis
Filaggrin and the Great Epidermal Barrier Grief*

- Natural moisturizer; hydrophilic amino ac.
- Reduction FLG in AD skin c/w Controls
  - TEWL seen before clinical disease in pts with FLG mutations by 3 months**
- Common mutations
  - 20 in European; 6 prevalent
  - 17 in Asian; 8 prevalent
  - almost 10% carrier rate in Europeans
- Findings of AD in heterozygotes
  - 60% penetrance vs 90% in homozygotes

*McGrath; Austral J Dermatol 2008; 49:67
J Allergy Clin Immunol 2008;122:689
Br J Dermatol 2010;163:1333
Filaggrin and AD

- Decreased expression seen with increased IL-4 and -13 (TH2; Acute disease)
- Associated with increased severity and persistence of AD into adulthood
- Associated with asthma in AD and of severity of asthma
- ? Targeted therapies to restore FLG

Filaggrin; Defect as “Precursor”? 

- 88 infants @ 3 months; SCORAD and TEWL 
  - 4 most common FLG mutations 

- 29/88 w/ clinical dz (median SCORAD 10.6/[3.5-31]) 
  - Higher TEWL = worse 

- Dry skin w/ ↑ TEWL even w/o eczema 

Br J Dermatol 2010;163:1333
Filaggrin; Defect as “Precursor”

- 15/88 (17%) w/ at least one FLG mutation

- Carriers more likely to have dry skin & incr TEWL even w/o eczema

- Also more likely to have eczema by 3 mo

Br J Dermatol 2010;163:1333
Atopic Dermatitis

- Food allergy; approx 1/3 children w AD (clinically)

- Testing for relevant allergens;
  - consider if persistent AD with good Rx or with reliable hx of rxn or both

J Allergy Clin Immunol 2013;131:295 & 299e1
**Atopic Dermatitis; Rx Guidelines**

### Mild Disease

**Basic Management for All patients at All times** (add Maintenance and/or Acute Treatment as needed)

1. **Skin Care**
   - a. Moisturizer (choice dependent on patient preference) liberal and frequent
   - b. Warm baths or showers using non-soap cleansers or mild soaps generally once daily followed by application of moisturizer (even to ‘uninvolved’ skin)

2. **Antiseptic Measures**
   - Dilute bleach baths (or equivalent) twice weekly or more (daily for more severely affected children), especially for patients with recurrent skin infections

3. **Trigger Avoidance**
   - Avoid common irritants (eg, soaps, wool), temperature extremes, and proven allergens

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### Moderate-to-Severe Disease

**Maintenance TCI**
- (pimecrolimus or tacrolimus)
- TCI two- to three-times weekly\(^{15-22}\)
- OR (if patient is non-responsive)
- TCI once to twice daily\(^{22,24,25}\)

**Maintenance Topical Corticosteroids**
- Medium potency topical corticosteroids (Class III-IV, see Table 3) once to twice weekly (except for face/eyes)\(^{23}\)
- AND/OR (depending on patient/physician preference and lesion location)
- Low potency topical corticosteroids (Class V-VII, see Table 3) once to twice daily (including face and eyes)

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**For Relapsing Course (frequent/persistent flares despite treatment)**
- Topical Anti-inflammatory Medication Applied at First Signs/Symptoms or to Flare-Prone Areas

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**Acute Treatment**
- Topical Anti-Inflammatory Medication Applied to Inflamed Skin
  - Low potency topical corticosteroids (Class VII, see Table 3) twice daily for up to 3 days beyond clearance

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**Flare** (acute worsening of symptoms necessitating escalation in treatment)

- Consider nonadherence, infection, misdiagnosis, referral

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**Flare not resolved within 7 days**
- Consider nonadherence, infection, misdiagnosis, referral

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Pediatrics 2015;136:554
Bathing

- Bonding, Debridement, Hydration
- Enhances effectiveness of topicals
- Short (<10 mins) vs Long-soaking (wrinkling)
- Warm
- Follow with topicals
Atopic Dermatitis - Wet Wraps

- Apply emollient or topical corticosteroid
- Cover with warm moist pajama, towel, bandage
- Cover with dry clothing, towel, bandage
- Leave until cool (or longer*)
- Remove and apply emollient
- Repeat 2-3 x/daily

J Am Acad Dermatol 2012;67:100
Corticosteroids

- Not to be used as moisturizers
- Excellent control of moderate-severe flares
- Variety of vehicles
- Broad-based mechanism of action

Reviewed in JACI 2013;295&299e1 (also for TCI use)
Topical Calcineurin Inhibitors-Use

- Atopic dermatitis
- 2 years and older
- Short-term (1-3 weeks) or intermittent long-term use
- Second-line agents (after emollients, prescription corticosteroids ???)
- Off-label use as determined by prescribing physician
Atopic Dermatitis - Inpatient Care

- Useful to “cool down”, educate
- “Environmental isolation”
- Wet wraps
- Treat infection
- Psychology
- Putting it all together

Dermatol Ther 2011;24:249
Systemic Therapies in Pediatric Dermatology

- Multiple tx options: CyA, MMF, Azathioprine, MTX
  - Br J Dermatol 2007;157:127 (MMF)

- Condition is severe and of “significance”

- Consider for use after aggressive topical therapies (if indicated) and compliance “assured”

- Use in pediatric patients is generally anecdotal or case series
Effect of AD on Children and Families

- 26 families; Children Birth-6 years
- No co-morbid illness
- **Children:** Dependency, Clinginess, Fearfullness, Scratching, Sleeping
- **Parents:** Social support, Employment probs., Stess re: parenting, Guilt
- Co-sleeping to improve sleep (16/23; 70% vs 13%)

Pediatrics 2004:114:607
Maternal Stress/AD

- Poor quality of life correlated with severity of AD
- Correlation of “demandingness” and EASI scores
- 46% with stress scores c/w need referral
- Lack emotional/physical support spouses
- Higher stress than IDDM, deafness, recurrent OM

Arch Dis Child 2007;92:683
Habit Reversal Treatment for Scratching

- Awareness of prescratching situations
- Use a competing behavior
- Distract
Atopic Dermatitis - Education

- Compliance known to be poor in pediatric AD
- Chronic disease model without cure
- Model of asthma “written action plans” being very useful clinically
- Publications showing utility of education in pediatric AD (particularly if given by nurses) JAAD 2008;59:677
**Eczema Action Plan**

*Specifically for Children Pediatric and Adolescent Dermatology*

**Every Day Care to control eczema—Moisturize and Soak and Seal!**
- Daily warm bath for 10-15 minutes, with mild soaps such as Dove or Cetaphil. Pat dry. Within 3 minutes after bath, apply moisturizer all over.
- Apply moisturizer ______ times daily in addition to after daily bath.
- Other:

  *Symptoms of eczema flares include dryness, scaling, redness, and worsening of itching.*

**Mild Flare**

*Continue Every Day Care*
- Apply ______ to affected areas on BODY once/twice daily
- Apply ______ to affected areas on FACE, UNDERARMS or GROIN once/twice daily
- Other:

**Moderate Flare**

*Continue Every Day Care*
- Apply ______ to affected areas on BODY once/twice daily (avoid face, groin, and underarms)
- Apply ______ to affected areas on FACE once/twice daily
- Take ______ tablets of ______ in the morning as needed for daytime itching
- Take ______ tablets of ______ before bedtime as needed for nighttime itching
- Other:

**Severe Flare**

*Continue Every Day Care and above plan for Moderate Flare*
- Wet Wraps:
  - Apply medication(s) to flared areas and moisturizer everywhere else. Cover flared areas with warm, damp towels or pajamas, wrap your child in a dry towel or a blanket to keep him/her warm. Read to your child for 10 to 15 minutes. Then remove wet towels/pajamas and apply moisturizer all over. Repeat ______ times daily.
  - Other:

**Follow-up**

- as needed
- __________ weeks
- __________ months

If there is no improvement of symptoms with above treatments or signs of infection (such as fever, pus, bumps or boils, and/or foul odor) are present, please contact us or your pediatrician.

**IMPORTANT NOTE:** We recommend that you use the mildest skin prescription appropriate for your child's level of discomfort. If your child does not appear uncomfortable and his/her skin looks fairly good (even if not completely clear), moisturizers alone are fine.
Atopic Dermatitis - Can We Prevent It?

- Exclusive breast feeding x 6 months: NO
  - In high-risk gp; decr risk by 60%, tho not signif beyond 2 yrs

- Omega 3 v Omega 6 FA; NO

- Probiotics v No probiotics; NO
  - In high-risk infants: 58% decr risk
  - One trial w 78% decr risk
  (polydext/galactooligosac/lactose v poly/galact only) in infants not selected for risk of allergic dz)

Evid Based Child Health 2011;6:1322
Atopic Dermatitis - Can We Prevent It?

- (NCT00806221; clinicaltrials.gov)
- Open-label prospective emollient (Cetaphil cream) - Once daily or more w/in 3 mins of bathing
- High risk neonates; tx’d betw 1-7 days
- Examined at 1, 6, 12, 24 months - TEWL and capacitance
  J Am Acad Dermatol 2010;63:587
  J Allergy Clin Immunol 2014;134:818
Atopic Dermatitis - Management

- **Counseling**: What we know; Encourage participation...
  (JAAD 2007;56:211); engage the family/patient (Arch Dermatol 2013;149:229&231)

- **Emollients**
  - Wraps

- **Antihistamines** (?)

- **Dietary ? (other avoidance)**

- **Topical steroids (Topical immunomodulators)**
<table>
<thead>
<tr>
<th>Moisturizer</th>
<th>Size</th>
<th>Cost (Avg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaseline</td>
<td>13 oz</td>
<td>$4.51</td>
</tr>
<tr>
<td>Eucerin Cream</td>
<td>16 oz</td>
<td>$12.88</td>
</tr>
<tr>
<td>Cetaphil Lotion</td>
<td>16 oz</td>
<td>$10.45</td>
</tr>
<tr>
<td>Cetaphil Restoraderm</td>
<td>10 oz</td>
<td>$14.88</td>
</tr>
<tr>
<td>Aquaphor</td>
<td>14 oz</td>
<td>$15.44</td>
</tr>
<tr>
<td>Aveeno Ecz Care</td>
<td>7.3 oz</td>
<td>$12.42</td>
</tr>
<tr>
<td>Cerave Cream</td>
<td>16 oz</td>
<td>$15.10</td>
</tr>
<tr>
<td>Vanicream</td>
<td>16 oz</td>
<td>$13.19</td>
</tr>
<tr>
<td>Epiceram</td>
<td>90 g</td>
<td>$175.30</td>
</tr>
</tbody>
</table>
Atopic Dermatitis - Management

- Antimicrobials*
- Topical calcineurin inhibitors; Tacrolimus, Pimecrolimus
- UV therapy
- Hospitalization
- Systemic immunomodulators; CyA, Mycophenolate, MTX, Azathioprine, ?Biologics
- Psychology referral*
Atopic Dermatitis and Bacterial Skin Infection(s)

- ... what’s a person to do?

  Infection

  Colonization
Recurrent Infection/RX

- Swimming Pool Bath
  - If w/pool: swim 2-3 times weekly
  - If no pool: mix approx ¼ cup sodium hypochlorite into full tub; bathe 2-3 times weekly

- Intranasal mupirocin; BID x 5 days
When All is Lost!

- Is your diagnosis correct?
- Is there infection?
- Is there contact dermatitis?
- Are systemic therapies indicated?
- Is the pt/family compliant/adherent?

- 37 children; 26 completed 8 wks
- triamcinolone BID; 32% mean adherence
- best 2 days before/after visits
- compliance related to improved outcome
JAAD 2007;56:211
Atopic Dermatitis – What We Do

- Extensive education (mention of itch/scratch lag); www.nationaleczema.org; www.undermyskin.com

- Emollients (grease ‘em up!); Wraps

- Topical steroids

- Calcineurin inhibitors

- Antimicrobials (‘Swimming pool bath’)
  Pediatr Infect Dis J 2008;10:934

- ? Patch testing

- Hospitalization, UV, Systemic agents

- Psychology referral
  SEE PEDIATRICS 2014;134:e1735
“... and now for something completely different”
Acne - Clinical Description

- Comedone
- Papule
- Pustule
- Nodule/Cyst
- Scarring
Acne - Management

- Local skin care
- Retinoid; tretinoin, adapalene, tazarotene
- Benzoyl peroxide
- Topical antibiotic; clindamycin, sodium sulfacetamide...
- Combination pdts;
- Oral antibiotics
- Isotretinoin; I Pledge

Pediatrics 2013;131:s163
JAAD 2016;74:945
Acne Classification - Assessment

- Important to consider clinical status and psychological impact

- Sulzberger (1948); no single disease... source of more psychic trauma and more maladjustment between parents and children....

- Clinical depression; higher than in general medical population; even mild-moderate

- Scarring of significant importance
Acne Severity and Classification

Therapeutic Implications

- Let the lesion dictate the therapy
  - Take clinical assessment as baseline evaluation
  - Consider scarring, pigmentation

- Engage the patient in the process
  - What is their assessment of severity?
  - Will they participate in the therapy?

- We favor description of disease and assessment of overall severity to guide ultimate therapy
## Acne Treatment Algorithm

<table>
<thead>
<tr>
<th></th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1st Line Treatment</strong></td>
<td>Benzoyl Peroxide (BP) or Topical Retinoid or Topical Combination Therapy** BP + Antibiotic or Retinoid + BP or Retinoid + BP + Antibiotic</td>
<td>Topical Combination Therapy** BP + Antibiotic or Retinoid + BP or Retinoid + BP + Antibiotic -or- Oral Antibiotic + Topical Retinoid + BP -or- Oral Antibiotic + Topical Retinoid + BP + Topical Antibiotic</td>
<td>Oral Antibiotic + Topical Combination Therapy** BP + Antibiotic or Retinoid + BP or Retinoid + BP + Antibiotic -or- Oral Isotretinoin</td>
</tr>
<tr>
<td><strong>Alternative Treatment</strong></td>
<td>Add Topical Retinoid or BP (if not on already) -or- Consider Alternate Retinoid -or- Consider Topical Dapsone</td>
<td>Consider Alternate Combination Therapy -or- Consider Change in Oral Antibiotic -or- Add Combined Oral Contraceptive or Oral Spironolactone (Females) -or- Consider Oral Isotretinoin</td>
<td>Consider Change in Oral Antibiotic -or- Add Combined Oral Contraceptive or Oral Spironolactone (Females) -or- Consider Oral Isotretinoin</td>
</tr>
</tbody>
</table>

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*J Am Acad Dermatol 2016;74:945*
Acne - When to Refer

- When comedonal/inflammatory disease is unresponsive after 3 months
  - topicals
  - orals

- Endocrine evaluation; consider in pts 1-7 yrs

- If considering isotretinoin and before scarring; nodular/cystic or severe papulopustular

- [https://www.dellchildrens.net/for-healthcare-professionals/referral-recommendations/dermatology-referral-guidelines/](https://www.dellchildrens.net/for-healthcare-professionals/referral-recommendations/dermatology-referral-guidelines/)