Childhood Atopic Dermatitis

Basic Dermatology Curriculum
Module Instructions

- The following module contains a number of blue, underlined terms which are hyperlinked to the dermatology glossary, an illustrated interactive guide to clinical dermatology and dermatopathology.
- We encourage the learner to read all the hyperlinked information.
Goals and Objectives

- The purpose of this module is to help develop a clinical approach to the evaluation and initial management of patients presenting with atopic dermatitis.

- After completing this module, the learner will be able to:
  - Identify and describe the morphology of atopic dermatitis
  - Recognize the role of superficial infection in atopic dermatitis.
  - Recommend an initial treatment plan for a child with atopic dermatitis
  - Provide patient/parent education about daily skin care for a child with atopic dermatitis
  - Determine when to refer to a patient with atopic dermatitis to a dermatologist
Case One

Carolyn
Case One: History

- **HPI:** Carolyn is a 10 month-old girl who was brought to the pediatric clinic by her mother for an “itchy red rash” for the last 7 months. The rash waxes and wanes, involving Carolyn’s face. Her mother reports Carolyn is bathed daily using a “normal” soap. Sometimes they use moisturizing lotion if her skin appears dry. They recently introduced peas into her diet and wonder whether this may be contributing to the rash.

- **PMH:** Normal birth history. She is healthy aside from an episode of wheezing at 5 months of age. No hospitalizations or surgeries.

- **Medications:** none

- **Allergies:** none

- **Family history:** Mother has asthma and allergic rhinitis

- **Social history:** Lives in a house with her parents, no pets or recent travel

- **ROS:** “itches all night”
Case One: Skin Exam

How would you describe her skin exam?
Case One: Skin Exam

Erythematous ill-defined plaques with overlying scale and erosions on her cheeks
Case One, Question 1

What elements in the history are important to ask in this case?

a. Does she scratch or rub her skin?
b. Does the rash keep her awake at night?
c. Which moisturizers are used and where?
d. All of the above
Case One, Question 1

Answer: d
What elements in the history are important to ask in this case?

a. Does she scratch or rub her skin? (Provides information about associated pruritus, which will impact treatment)

b. Does the rash keep her awake at night? (Provides information about severity, which will impact treatment)

c. Which moisturizers are used and where? (May provide information about the distribution. Also, lack of using a moisturizer may be exacerbating the problem)

d. All of the above
Case One, Question 2

What is the most likely diagnosis given the history and skin exam findings?

a. Atopic dermatitis
b. Contact dermatitis
c. Psoriasis
d. Scabies
e. Seborrheic dermatitis
Answer: a
What is the most likely diagnosis given the history and skin exam findings?

a. **Atopic dermatitis**
b. **Contact dermatitis** (would expect history of contact with allergen and erythema with superimposed vesicles or bullae)
c. **Psoriasis** (presents as erythematous plaques with an adherent silvery scale)
d. **Scabies** (intensely pruritic papules, often with excoriations, burrows may be present)
e. **Seborrheic dermatitis** (would expect erythematous patches and plaques with greasy, yellowish scale)
Case One, Question 3

Which of the following statements supports the diagnosis of atopic dermatitis:

a. Chronic nature of the rash
b. Distribution of the rash
c. Family history of atopic disease
d. Symptom of pruritus
e. All of the above
Answer: e
Which of the following statements supports the diagnosis of atopic dermatitis:

a. Chronic nature of the rash (present x 7 months)
b. Distribution of the rash (predominantly on the cheeks)
c. Family history of atopic disease
d. Symptom of pruritus (itching)
e. All of the above
Atopic Dermatitis: The Basics

- Atopic dermatitis (AD) is a chronic, pruritic, inflammatory skin disease with a wide range of severity.
- AD is one of the most common skin disorders in developed countries, affecting up to 20% of children & 1-3% of adults.
  - In most patients, AD develops before the age of 5 and typically clears by adolescence.
- Primary symptom is pruritus (itch).
  - AD is often called “the itch that rashes”.
  - Scratching to relieve AD-associated itch gives rise to the ‘itch-scratch’ cycle and can exacerbate the disease.
- Patients experience periods of remission and exacerbation.
AD: Clinical Findings

- Lesions typically begin as erythematous papules, which then coalesce to form erythematous plaques that may display weeping, crusting, or scale

- Distribution of involvement varies by age:
  - Infants and toddlers: eczematous plaques appear on the cheeks, forehead, scalp and extensor surfaces
  - Older children and adolescents: lichenified, eczematous plaques in flexural areas of the neck, elbows, wrists, and ankles
  - Adults: lichenification in flexural regions and involvement of the hands, wrists, ankles, feet, and face (particularly the forehead and around the eyes)

- Xerosis is a common characteristic of all stages
Case One, Question 4

What percentage of children with atopic dermatitis also have or will develop asthma or allergic rhinitis?

a. 0-15%
b. 15-30%
c. 30-50%
d. 50-80%
e. 80-100%
Answer: d

What percentage of children with atopic dermatitis also have or will develop asthma or allergic rhinitis?

- 50-80% of children will have another atopic disease

The Atopic Triad

- Asthma
- Atopic dermatitis
- Allergic rhinitis
Typical AD for Infants and Toddlers

Affects the cheeks, forehead, scalp, and extensor surfaces

Erythematous, ill-defined plaques on the cheeks with overlying scale and crusting

Erythematous, ill-defined plaques on the lateral lower leg with overlying scale
More Examples of Atopic Dermatitis

Note the distribution of face and extensor surfaces
Typical AD for Older Children

Affects flexural areas of neck, elbows, knees, wrists, and ankles

Lichenified, erythematous plaques behind the knees

Erythematous, excoriated papules with overlying crust in the antecubital fossa
Atopic Dermatitis ≠ Eczema

- **Eczema** is a nonspecific term that refers to a group of inflammatory skin conditions characterized by pruritus, erythema, and scale.
  - Atopic dermatitis is a specific type of eczematous dermatitis.
Atopic Dermatitis: Pathogenesis

- The cause of AD is multifactorial and not completely understood
- The following factors are thought to play varying roles:
  - Genetics
  - Skin Barrier Dysfunction
  - Impaired Immune Response
  - Environment
Back to Case One

Carolyn
Which of the following recommendations would you provide to Carolyn’s parents?

a. Daily or twice daily application of moisturizing ointment or cream
b. Hydrocortisone 2.5% ointment to the face twice daily for up to 2 weeks or until better
c. Hydroxyzine 1 tsp. (1mg/kg) PO at bedtime
d. Mild cleanser
e. All of the above
Case One, Question 5

Answer: e
Which of the following recommendations would you provide to Carolyn’s parents?

a. Daily or twice daily application of moisturizing ointment or cream
b. Hydrocortisone 2.5% ointment to the face twice daily
c. Hydroxyzine 1 tsp. (1mg/kg) PO at bedtime
d. Mild cleanser, as little as needed to remove dirt
e. All of the above

Carolyn is having an exacerbation of her AD and needs both gentle skin care and treatment of the inflammation in her skin.
Atopic Dermatitis: Treatment

- Combination of short-term treatment to manage flares and longer-term strategies to help control symptoms between flares
- Recommend gentle skin care
  - Tepid baths without washcloths or brushes
  - Mild synthetic detergents (cleansers) instead of soaps
  - Pat dry
  - Emollients: petrolatum and moisturizers
    - Use ointments or thick creams (no watery lotions)
    - Apply once to twice daily to whole body (and immediately after bathing for optimal hydration, so-called “soak and seal”)
- Identification and avoidance of triggers and irritants (such as wool and acrylic fabrics)
Atopic Dermatitis: Treatment

4 Major Components

- Anti-inflammatory
- Anti-pruritic
- Antibacterial
- Moisturizer
AD Treatment: Moisturizers

- Wide range of moisturization options, from cheap to outrageously expensive
- Greasier ointments are better in general as they:
  - Tend to have less preservatives than creams
  - Tend to act as occlusive agents supplementing barrier function immediately
  - Tend not to sting or burn when applied
- However, greasier preparations can be unpleasant for some patients, and adherence may suffer
  - In such cases, heavier creams are superior to lotions
AD Treatment: Anti-inflammatory

- Treat acute inflammation with topical corticosteroids
  - Ointments are preferred vehicles over creams (as with moisturizers)
  - Low potency is usually effective for the face
  - Body and extremities often require medium potency
  - Using stronger steroid for short periods and milder steroid for maintenance helps reduce risk of steroid atrophy and other side effects
  - Potential local side effects associated with topical corticosteroid therapy use include striae, telangiectasias, atrophy, and acne
AD Treatment: Anti-inflammatory

- **Topical calcineurin inhibitors: 2nd-line therapy**
  - Use when the continued use of topical steroids is ineffective or inadvisable
  - Not great during a severe flare: can sting/burn and are probably comparable to only a mid-potency corticosteroid in terms of clinical effect
  - Have been studied and shown to be effective at preventing flares when used twice weekly to trouble spots once the disease is controlled (proactive treatment)
AD Treatment: Anti-pruritus

- Limited options for itch
- Antihistamines
  - May help break the itch/scratch cycle
  - 1\textsuperscript{st} generation H1 antihistamines (e.g. hydroxyzine) are helpful probably due to sedation effects as much as itch
- Topical anti-pruritics (e.g., camphor/menthol or pramoxine)
  - Minimally effective, short-term relief only; can be allergic sensitizers as well
AD Treatment: Antibacterial

- Treat co-existing skin infection with systemic antibiotics
  - Staphylococcus is most common infection by far; methicillin resistance is rising and must be considered

- Dilute bleach baths (sodium hypochlorite) have been shown to help decrease skin bacteria and AD severity
  - Anecdotally, this has been a powerful treatment that seems to decrease infection risk as well
AD Treatment: Antibacterial

- Topical antibacterial agents such as mupirocin can also be used to treat localized infections such as impetiginized areas
When to Refer

- Patients should be referred to a dermatologist when:
  - Patients have recurrent skin infections
  - Patients have extensive and/or severe disease
  - Symptoms are poorly controlled with topical steroids
Case One, Question 5

What topical corticosteroid would recommend as an initial treatment for Carolyn’s facial lesions?

a. Clobetasol ointment
b. Fluocinonide ointment
c. Hydrocortisone 2.5% cream
d. Hydrocortisone 2.5% ointment
e. Triamcinolone ointment
Case One, Question 5

**Answer:** d

What topical corticosteroid would recommend as an initial treatment for Carolyn’s facial lesions?

- a. Clobetasol ointment
- b. Fluocinonide ointment
- c. Hydrocortisone 2.5% cream
- d. **Hydrocortisone 2.5% ointment**
- e. Triamcinolone ointment
# Topical Steroid Strength

<table>
<thead>
<tr>
<th>Potency</th>
<th>Class</th>
<th>Example Agent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Super high</td>
<td>I</td>
<td>Clobetasol propionate 0.05%</td>
</tr>
<tr>
<td>High</td>
<td>II</td>
<td>Fluocinonide 0.05%</td>
</tr>
<tr>
<td>Medium</td>
<td>III – V</td>
<td>Triamcinolone acetonide ointment 0.1%  &lt;br&gt;Triamcinolone acetonide cream 0.1%  &lt;br&gt;Triamcinolone acetonide lotion 0.1%</td>
</tr>
<tr>
<td>Low</td>
<td>VI – VII</td>
<td>Fluocinolone acetonide 0.01%  &lt;br&gt;Desonide 0.05%  &lt;br&gt;Hydrocortisone 1%</td>
</tr>
</tbody>
</table>
Topical Steroid Strength

- Remember to look at the **class** not the percentage
  - Note that clobetasol 0.05% is stronger than hydrocortisone 1%
- When several are listed, they are listed in order of strength
  - Note that triamcinolone ointment is stronger than triamcinolone cream or lotion because of the nature of the vehicle

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| Medium  | III – V | Triamcinolone ointment 0.1%  
                      | Triamcinolone cream 0.1%  
                      | Triamcinolone lotion 0.1% |
| Low     | VI – VII | Fluocinolone 0.01%  
                      | Desonide 0.05%  
                      | Hydrocortisone 1% |
Case One, Question 6

Carolyn has developed AD on her wrists and ankles and has been using hydrocortisone 2.5% cream twice daily for 2 months with minimal improvement. What’s the next best step?

- a. Increase potency to Triamcinolone 0.1% ointment bid for one week
- b. Decrease potency to Hydrocortisone 1% cream bid for 1 month
- c. Continue with the Hydrocortisone 2.5% cream for another few months to see if she will improve
- d. Decrease potency to Hydrocortisone 1% ointment qd for 1 month
Answer: a
Carolyn has developed AD on her wrists and ankles and has been using hydrocortisone 2.5% cream twice daily for 2 months with minimal improvement. What’s the next best step?

a. Increase potency to Triamcinolone 0.1% ointment bid for one week
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c. Continue with the Hydrocortisone 2.5% cream for another few months to see if she will improve
d. Decrease potency to Hydrocortisone 1% ointment qd for 1 month
Topical Steroid Dosing in Children

- Topical corticosteroids are safe when used for short intervals with intermittent rest periods
  - Can cause side effects when used for extended durations, even if low potency
- If symptoms not improving despite prolonged use of low potency steroid, it is frequently necessary to increase potency to treat the inflammation, then stop all corticosteroids to give the skin a rest period
- High potency steroids must be used with caution and vigilant clinical monitoring for side effects in children
- Potent steroids should be avoided in high risk areas such as the face, folds, or occluded areas such as under the diaper
Parent education and written instruction are key to success.

“Action Plans” provide parents and caregivers with easy to follow treatment recommendations and guidance.

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**Eczema Action Plan**

A simple way to remember what medications & creams to use for your/your child’s skin:

1. **Green** means **Go**: Use preventative measures.
2. **Yellow** means **Caution**: Use lower strength medications.
3. **Red** means **Flaring**: Use higher strength medications and get help from the doctor.

### Green = Go

**Regular Daily Care**

- Bathe with lukewarm water, 5-10 minutes. Avoid scrubbing and rubbing the skin as this can cause flare-ups.
- Use mild soap, if any, such as Dove for sensitive skin, Cetaphil cleanser, or Aveeno for dry skin. If not too dirty, use soap only on hands, feet, armpits, and genital area, not all over.
- Apply moisturizer at least 2 times a day (even if no bath is taken) and after every bath. After the bath, pat dry and apply the moisturizer RIGHTAWAY, within 3 minutes, all over the body.
- Keep fingernails short, and avoid irritating clothing such as wool or other scratchy fabrics.

### Yellow = Caution

**Mild Symptoms of Rash and Itching = Use Lower Strength Medications**

- Continue Regular Daily Care (Green Zone) as above.
- To the red, itchy, rashy areas on the **BODY** apply ___________ 2 times per day **BEFORE** you apply moisturizer.
- To the red, itchy, rashy areas on the **FACE** apply ___________ 2 times per day **BEFORE** you apply moisturizer.
- If the scalp is affected, apply ___________ 1-2 times per day.
- For **night-time** itching take ___________ tsp/cc/pills of ___________ before bed.
- For **day-time** itching take ___________ tsp/cc/pills of ___________ in the morning.
- If using **Yellow zone** medications regularly (for more than 1-2 weeks), you need to see a doctor every few months.

### Red = Flaring

**Severe Symptoms of Rash and Itching = Use Higher Strength Medications**

- Continue Regular Daily Care (Green Zone) as above and **Yellow zone** medications for mild rash.
- To the red, itchy, rashy areas on the **BODY** apply ___________ 2 times per day **BEFORE** you apply moisturizer.
- To the red, itchy, rashy areas on the **FACE** apply ___________ 2 times per day **BEFORE** you apply moisturizer.
- If the scalp is affected, apply ___________ 1-2 times per day.
- For **night-time** itching take ___________ tsp/cc/pills of ___________ before bed.
- For **day-time** itching take ___________ tsp/cc/pills of ___________ in the morning.
- **Other**: Take ___________ tsp/cc/pills of ___________ times per day for ___________ days/weeks.
- **Call or see a doctor**: if the above treatments are not working, severe itching continues, there is fever, or pus bumps are present. You can see your primary medical provider, an urgent care doctor, or your skin doctor.
- If using **Red Zone** medications regularly (for more than 1-2 weeks), you need to see a doctor at least every 2-4 months.
Case One, Question 7

Carolyn’s parents would also like more information regarding the association between food allergies and atopic dermatitis. What can you tell them?

a. A positive allergen test proves that the allergy is clinically relevant
b. Elimination of food allergens in patients with AD and confirmed food allergy will not lead to clinical improvement
c. Food allergy is a more likely trigger if the onset or worsening of the AD correlates with exposure to the food
d. There is no correlation between AD and food allergies
Answer: c
Carolyn’s parents would also like more information regarding the association between food allergies and atopic dermatitis. What can you tell them?

- a. A positive allergen test proves that the allergy is clinically relevant (not true)
- b. Elimination of food allergens in patients with AD and confirmed food allergy will not lead to clinical improvement (not true. If the food allergy is clinically relevant, then the elimination of the food allergen will lead to improvement)
- c. Food allergy is a more likely trigger if the onset or worsening of the AD correlates with exposure to the food
- d. There is no correlation between AD and food allergies (not true)
The role of allergy in AD remains controversial

Many patients with AD have sensitization to food and environmental allergens
  • However, evidence of allergen sensitization is not proof of a clinically relevant allergy

Food allergy as a cause of, or exacerbating factor for, AD is uncommon
  • Identification of true food allergies should be reserved for refractory AD in children in whom the suspicion for a food allergy is high
  • Infants with AD and food allergy may have additional findings that suggest the presence of food allergy, such as vomiting, diarrhea, and failure to thrive

Elimination of food allergens in patients with AD and confirmed food allergy can lead to clinical improvement
Case Two

Joanna
Case Two: History

- **HPI:** Joanna is a 10-year-old girl with a history of atopic dermatitis, normally well-controlled with emollients and occasional topical steroids who was brought in by her mother with an itchy red rash on the back of her thighs.
- **PMH:** atopic dermatitis
- **Medications:** hydrocortisone 2.5% ointment
- **Allergies:** none
- **Family history:** little sister with atopic dermatitis
- **Social history:** Lives in a house with parents and sister. Attends 4th grade, favorite subject in school is spelling.
- **ROS:** no fevers
Case Two: Skin Exam

Multiple erythematous papules and plaques with erosions
Case Two, Question 1

What is your next step in the evaluation of Joanna’s skin condition?

a. Apply a potent topical corticosteroid
b. Obtain a skin bacterial culture
c. Skin biopsy
d. Start topical antibiotics
e. None of the above
Case Two, Question 1

Answer: b

What is your next step in the evaluation of Joanna’s skin condition?

a. Apply a potent topical corticosteroid (will not help with evaluation)

b. **Obtain a skin bacterial culture**

c. Skin biopsy (not necessary for diagnosis)

d. Start topical antibiotics (a large majority of patients with AD are colonized with S. aureus, treating locally with topical antibiotics may not be effective)

e. None of the above
Case Two: Evaluation

- Skin bacterial culture should be considered during acute, weepy flares of AD and when pustules, erosions, or extensive yellow crust are present.
- Patients with AD are susceptible to a variety of secondary infections such as *Staphylococcus aureus* and Group A Streptococcal infections.
- These infections are a common cause of AD flares.
- Systemic antibiotics +/- dilute clorox baths should be used to treat these infections.
Another Example of Infected AD
Case Three

Mark
Case Three: History

- HPI: Mark is a 9-year-old boy who was brought in by his father who is concerned about the “white spots” on Mark’s face
- PMH: mild asthma, no history of hospitalizations
- Medications: albuterol when needed
- Allergies: none
- Family history: mother had a history of childhood atopic dermatitis
- Social history: lives at home with his mother and father
- ROS: negative
How would you describe Mark’s skin exam?
Poorly defined hypopigmented, scaly patches on the face.
Case Three, Question 2

What is the most likely diagnosis?

a. Pityriasis alba
b. Seborrheic dermatitis
c. Tinea versicolor
d. Vitiligo
Case Three, Question 2

Answer: a

What is the most likely diagnosis?

a. **Pityriasis alba**

b. **Vitiligo** (typical lesion is a sharply demarcated, depigmented, round or oval macule or patch)

c. **Tinea versicolor** (generally does not affect the face)

d. **Seborrheic dermatitis** (would expect erythematous patches and plaques with greasy, yellowish scale)
Diagnosis: Pityriasis Alba

- **Pityriasis alba** is a mild, often asymptomatic, form of AD of the face
- Presents as poorly marginated, hypopigmented, slightly scaly patches on the cheeks
- Typically found in young children (with darker skin), often presenting in spring and summer when the normal skin begins to tan
Pityriasis Alba: Treatment

- Reassure patients and parents that it generally fades with time
- Use of sunscreens will minimize tanning, thereby limiting the contrast between diseased and normal skin
- If moisturization and sunscreen do not improve the skin lesions, consider low strength topical steroids or topical calcineurin inhibitor
Take Home Points

- AD is a chronic, pruritic, inflammatory skin disease with a wide range of severity
- AD is one of the most common skin disorders in developed countries, affecting ~ 20% of children and 1-3% of adults
- Distribution and morphology of skin lesions varies by age
- A large percentage of children with AD will develop asthma or allergic rhinitis
- The pathogenesis of AD is multifactorial; genetics, skin barrier dysfunction, impaired immune response, and the environment play a role
- Treatment for AD includes long-term use of emollients and gentle skin care as well as short-term treatment for acute flares
Take Home Points

- Acute inflammation is treated with topical steroids
- Antihistamines may help with pruritus and sleep issues
- Secondary skin infections should be treated with systemic antibiotics
- Identification of true food allergies should be reserved for refractory AD in children in whom the suspicion for a food allergy is high
- Pityriasis alba is a mild form of AD of the face in children
- Sunscreen and emollients are the 1st-line treatments for patients with pityriasis alba
- Reassure patients and parents that pityriasis alba will fade with time
Atopic Dermatitis: Guidelines for Care

• Guidelines for care of patients with AD were published by an expert working group in 2014
• Provide extensive evidence-based literature review
  – There is very little evidence for standard interventions in AD
• Best evidence is for:
  – regular emollients
  – topical steroids
  – topical calcineurin inhibitors
  – good evidence for oral antibiotics in overt infection
• No evidence for non-sedating antihistamines
• Emerging evidence for dilute bleach baths
• Wet wraps can be useful for flares
• Phototherapy and oral immunomodulatory therapies can be recommended for chronic, recalcitrant AD
• No significant differences in efficacy among oral immunosuppressive agents has been clearly demonstrated
• No evidence for food elimination based solely on RAST testing (without corresponding clinical symptoms, etc.)
Acknowledgements

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End of the Module

To take the quiz, click on the following link:

https://www.aad.org/quiz/childhood-atopic-learners