Contact Dermatitis

Basic Dermatology Curriculum

Last updated January 2016
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 the learner develop a clinical approach to the evaluation and initial management of patients presenting with contact dermatitis.

- By completing this module, the learner will be able to:
  - Identify and describe the morphology for contact dermatitis
  - Distinguish allergic contact dermatitis from irritant contact dermatitis
  - Recommend an initial treatment plan for a patient with allergic or irritant contact dermatitis
  - Determine when to refer a patient with contact dermatitis to a dermatologist
Dermatitis in General

- Dermatitis or eczema is a pattern of cutaneous inflammation that presents with erythema, vesiculation, and pruritus in its acute phase.
- The chronic phase is characterized by dryness, scaling, lichenification, fissuring, and pruritus.
- There are multiple types of dermatitis:
  - Atopic, dyshidrotic, nummular, seborrheic.
- This module will focus on contact dermatitis.
Contact Dermatitis

- **Contact dermatitis** is a skin condition created by a reaction to an externally applied substance.
- There are two types of contact dermatitis:
  - Irritant Contact Dermatitis (ICD)
  - Allergic Contact Dermatitis (ACD)
Case One

Dr. Gary Richardson
Case One: History

- HPI: Dr. Richardson is a 43-year-old neonatologist who presents with 3 days of intense itching and blisters on his neck, arms and legs. He noticed the eruption 2 days after a hike. Clobetasol 0.05% ointment and oral diphenhydramine have been ineffective in controlling his symptoms.
- PMH: no chronic medical conditions
- Allergies: no known drug allergies
- Medications: clobetasol 0.05% ointment, diphenhydramine
- Family history: noncontributory
- Social history: neonatologist, married, has a daughter
- ROS: difficulty sleeping due to itching
Case One: Skin Exam
Case One: Question 1

Dr. Richardson’s exam shows erythematous plaques, consisting of confluent papules and weeping vesicles on his arms, legs, and neck bilaterally. Some of the plaques are in a linear configuration. What is the most likely diagnosis?

a. Allergic contact dermatitis
b. Bullous insect bites
c. Cellulitis
d. Herpes zoster
e. Urticaria
Answer: a
Dr. Richardson’s exam shows erythematous plaques, consisting of confluent papules and weeping vesicles on his arms, legs, and neck bilaterally. Some of the plaques are in a linear configuration. What is the most likely diagnosis?

a. **Allergic contact dermatitis**
b. Bullous insect bites (usually scattered, no history of multiple bites)
c. Cellulitis (presents as a spreading erythematous, non-fluctuant tender plaque, often with fever)
d. Herpes Zoster (presents as a painful eruption of grouped vesicles in a dermatomal distribution)
e. Urticaria (presents as edematous papules or plaques, not vesicles. The early lesions of ACD could be mistaken for urticaria)
Allergic Contact Dermatitis

- ACD occurs when contact with a particular substance elicits a delayed hypersensitivity reaction.
- The sensitization process requires 10-14 days.
  - Upon re-exposure, dermatitis appears within 12-48 hrs.
- The most common cause is Rhus dermatitis, from poison ivy, poison oak, or poison sumac (all contain the resin – urushiol).
- Other common causes include:
  - Fragrances
  - Formaldehyde
  - Preservatives
  - Topical antibiotics
  - Benzocaine
  - Vitamin E
  - Rubber compounds
  - Nickel
The main symptom of ACD is **pruritus** (itching)

- Presents as erythematous, scaly edematous plaques with vesiculation distributed in areas of exposure
- ACD is bilateral if the exposure is bilateral (e.g., shoes, gloves, ingredients in creams, etc.)
Dr. Richardson was diagnosed with Rhus allergic contact dermatitis
Poison Oak & Poison Ivy
“Leaves of three- let them be”

Poison oak leaves usually:
• Are 3-7cm in length
• Lobulated notched edges
• Groups of 3, 5, or 7
• Grows on bush-like plants
• Turn colors in autumn

Poison ivy leaves usually:
• Are 3-15cm in length
• Notched edges
• Groups of 3s
• Grows on hairy-stemmed vines or low shrubs
• Turn colors in autumn
Rhus Allergy

- The initial episode occurs 7-10 days after exposure
- On subsequent outbreaks the rash may appear within hours of exposure and usually within 2 days
- Individual sensitivity is variable so the eruption may be mild to severe
- Rhus dermatitis lasts from 10-21 days depending on the severity
- Initial episode is the longest (up to 6 weeks!)
Rhus Allergy

- Lesions begin as erythematous macules that become papules or plaques
- Blisters often form over one to two days
Pediatric Pearl: Children often get Rhus allergy on the face as they play lower to the ground where the plants are located. This exuberant facial dermatitis is often misdiagnosed as cellulitis. Cellulitis should be more painful, potentially associated with fever or elevated inflammatory markers and cellulitis is rarely bilateral and widespread as is often seen in Rhus dermatitis.
Rhus Dermatitis

- Linear streaks aid in diagnosis (from the linear contact of the plant)
- Fomites can be contaminated by the plant oil and lead to recurrent eruptions
Dr. Richardson can’t sleep due to itching and has had no improvement with clobetasol ointment. What treatment do you recommend?

a. Oral cephalexin
b. 1% hydrocortisone lotion
c. Silver sulfadiazine cream
d. Six days of methylprednisolone (Medrol dose pack)
e. Two-week taper of oral prednisolone
Case One: Question 2

Answer: e

Dr. Richardson can’t sleep due to itching and has had no improvement with clobetasol ointment. What treatment do you recommend?

a. Oral cephalexin (for gram positive bacterial infections)
b. 1% hydrocortisone lotion (not strong enough)
c. Silver sulfadiazine cream (for burns)
d. Six days of methylprednisolone (Medrol dose pack) (symptoms will likely rebound after withdrawal)
e. Two-week taper of oral prednisone
Rhus Dermatitis Treatment

★ Most patients need minor supportive care
  • Topical steroids for localized involvement
  • Topical or oral antihistamines may improve pruritus
  • Oatmeal soaks/calamine lotion may soothe weeping erosions

★ Severe involvement may require oral steroids
  • In cases of failing potent topical steroids, or if eruptions is widespread
  • If given for less than 2-3 weeks, patients may relapse
  • Do not give short bursts of steroids for this reason
Rhus Allergy Prevention

- Avoid the plants
- Wash clothing, shoes, and objects after exposure (within 10 minutes if possible)
- Repeated exposures may be due to pets bringing the allergen in on their fur after walking in the woods
- Apply a barrier: clothing, OTC products which bind resin more than skin
Case Two

Barbara Myers
Case Two: History

- **HPI:** Barbara Myers is a 32-year-old woman who presents to the dermatology clinic with three months of itching, redness, and scaling on her eyelids. She has tried aloe vera and tea tree oil products, but they haven’t helped.
- **PMH:** no chronic medical conditions
- **Allergies:** shellfish
- **Medications:** birth control pills
- **Family history:** noncontributory
- **Social history:** single; works as a bank teller
- **ROS:** negative
Case Two: Skin Exam

- On further questioning, Ms. Myers informs you she recently changed her eye shadow and moisturizer.
Case Two: Question 1

Ms. Myers has bilaterally-symmetric, erythematous, scaly, slightly lichenified plaques on her eyelids. What is the most likely diagnosis?

a. Allergic contact dermatitis
b. Atopic dermatitis
c. Rosacea
d. Seborrheic dermatitis
Ms. Myers has bilaterally-symmetric, erythematous, scaly, slightly lichenified plaques on her eyelids. What is the most likely diagnosis?

a. **Allergic contact dermatitis**
   
b. **Atopic dermatitis** (does commonly involve the eyelid in adults and can be difficult to distinguish from allergic contact dermatitis)
   
c. **Rosacea** (would have papules and pustules, usually not itchy)
   
d. **Seborrheic dermatitis** (affects lid margin and eyebrow, but not eyelid)
Eyelid Allergic Contact Dermatitis

- Intensely pruritic
- Scaling red plaques on upper > lower eyelids
- Allergic contact dermatitis of the eyelid is often caused by transfer from the hands

Common causes:
- Nail adhesive/polish
- Fragrances and preservatives in cosmetics
- Nickel
Evaluation of Dermatitis

- Important to take a comprehensive history
- Complete dermatologic assessment of the patient
- Shape, configuration, and location of the dermatitis are useful clues in identifying the culprit allergen
- Elimination of a suspected trigger may be both diagnostic and therapeutic
- In chronic cases, patch testing is necessary to identify specific allergens
- Children can get ACD by accidental exposure to parental use of fragrances, spray used to cleanse or freshen the house, cosmetics or other allergens
In addition to the dermatitis-specific history (e.g., onset, location, temporal associations, treatment), be sure to ask about:

- Daily skin care routine
- All topical products
- Occupation/hobbies
- Regular and occasional exposures (e.g., lawn care products, animal shampoos)
Case Two: Question 2

Ms. Myers has an allergic contact dermatitis, likely to her new eye shadow. What treatment would you recommend other than avoidance?

a. Clobetasol 0.05% ointment
b. Desonide 0.05% cream
c. Fluocinonide 0.05% gel
d. Ketoconazole 2% cream
Answer: b

Ms. Myers has an allergic contact dermatitis, likely to her new eye shadow. What treatment would you recommend other than avoidance?

a. Clobetasol 0.05% ointment (too potent, class 1)

b. Desonide 0.05% cream (for a limited period: twice daily for 1 week, followed by once daily for 1-2 weeks, then discontinue)

c. Fluocinonide 0.05% gel (too potent, gels have alcohol and may burn on the eyelid, class 2)

d. Ketoconazole 2% cream (treats fungal infection)
Steroid Potency

- Regular use of Class 1, 2, or 3 steroids on thin skin will lead to steroid atrophy (thinning and easy bruising/purpura)
  - Also causes hypopigmentation in darker skin types
- For the face: Class 6, 7 steroids (e.g., desonide) can safely be used intermittently during flares
- If topical steroids are to be used on the eyelid for over 30 days, refer to an ophthalmologist for monitoring of intraocular pressure and the development of cataracts
Case Two: Question 3

Ms. Myers has an allergic contact dermatitis that resolves with topical steroids. What is the best test to confirm the cause of her rash?

a. Indirect immunofluorescent antibody (IIF) test
b. Patch testing
c. Prick skin testing
d. Radioallergosorbent test (RAST)
Case Two: Question 3

Answer: b

Ms. Myers has an allergic contact dermatitis that resolves with topical steroids. What is the best test to confirm the cause of her rash?

a. Indirect immunofluorescent antibody (IIF) test (used for the diagnosis of antibody-mediated diseases, not contact dermatitis)

b. Patch testing

c. Prick skin testing (does not detect cell-mediated allergy)

d. Radioallergosorbent test (RAST) (used to detect type 1 hypersensitivity, not cell-mediated immunity)
Patch Testing

- Patch testing is used to determine which allergens a patient with allergic contact dermatitis reacts against.
- A series of allergens are applied to the back, and then removed after 2 days.
- On day 4 or 5, the patient returns for results.
- Positive reactions show erythema and papules or vesicles.
- Identification of specific allergens helps the patient find products free of those allergens.
Patch Testing

- Example of a patient with patches (allergens) placed on the back
Identifying Allergens

- Not all patients with ACD need patch testing
- Refer patients when the allergen is unclear or the dermatitis is chronic
- A positive reaction on patch testing does not mean that the patient’s rash is due to that specific allergen
- Elimination of the rash with removal of the allergen confirms the clinical relevance of the positive patch test
- Patch testing is often done off-label in children suspected of allergic contact dermatitis but care should be taken to apply only the patches that may be relevant to a particular eruption
Positive Patch Test

- Positive patch test reactions at 96 hour reading
- This patient had three positive reactions
  - Nickel, Balsam of Peru, and Fragrance
ACD Treatment

- Avoid exposure to the offending substance
- Treatment of the acute phase depends on the severity of the dermatitis
  - In mild to moderate cases, topical steroids of medium to strong potency for a limited course is successful
  - A course of systemic steroids may be required for acute flares
  - Oatmeal baths or soothing lotions can provide further relief in mild cases
  - Wet dressings are helpful when there is extensive oozing and crusting
- Chronic cases or patients with dermatitis involving over 10% of the BSA should be referred to a dermatologist
Can you guess what the following patients are allergic to?
Patient calls 9 days after a skin biopsy, reporting itching at the site.
Medication Allergy
Topical Antibiotic Cream
This 11-year-old girl presents with 3 months of an itchy rash on the sides of her nose and ears.
Nickel Dermatitis

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Another Example of Nickel Dermatitis

- Erythematous plaque with scattered papules above the umbilicus
- Nickel dermatitis is the 2\textsuperscript{nd} most common allergic contact dermatitis next to Rhus dermatitis
- Nickel contact dermatitis is also prevalent at sites of piercing
  - Patients often note that the skin becomes red, inflamed and weeps and thus ACD is often mistaken for infection especially around sites of piercings
- Inexpensive kits that use dimethylglyoxime to test metals for nickel are widely available to consumers online
Pediatric Patterns of ACD

- Children get perineal ACD due to diapering and toilet training
- Baby wipes may contain chemicals such as propylene glycol, methylisothiazolinone or fragrances that can lead to ACD
  - The rash is usually focused in the diaper area but parents use wipes to wipe faces and hands as well
- Children who are toilet training can get irritant or allergic contact dermatitis to toilet seat cleansers. If the seat is cleansed too often or the residue stays on the seat, an irritant dermatitis in the pattern of a ring will affect the buttocks and posterior legs
This respiratory therapist has an intermittent rash that clears when she goes on vacation.
Latex Allergy

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Latex Allergy

- Latex allergy may present as a delayed or immediate hypersensitivity
- Delayed hypersensitivity:
  - Patients develop an allergic contact dermatitis
  - Often presents on the dorsal surface of the hands
- Immediate hypersensitivity:
  - May present with immediate symptoms such as burning, stinging, or itching with or without localized urticaria on contact with latex proteins
  - May include disseminated urticaria, allergic rhinitis, and/or anaphylaxis
Case Three

Deanna Maher
Case Three: History

- **HPI:** Ms. Maher is a 25-year-old nurse who presents to the dermatology clinic with two months of red, chapped, painful hands. She has been washing her hands much more than usual since she transferred to the intensive care unit. No one else at work is experiencing similar symptoms.
- **PMH:** asthma as a child, intermittent hay fever
Case Three: Question 1

- How would you describe her exam findings?
Case Three: Question 1

- Erythema with overlying fine scale and fissuring of the palms and fingers
Case Three: Question 2

Based on her history and exam findings, what is the most likely diagnosis?

a. Allergic contact dermatitis
b. Dyshidrotic dermatitis
c. Irritant contact dermatitis
d. Nummular dermatitis
Case Three: Question 2

Answer: c

Based on her history and exam findings, what is the most likely diagnosis?

- a. Allergic contact dermatitis (presents as erythematous, scaly plaques, which may be acutely vesicular/bullous)
- b. Dyshidrotic dermatitis (presents with tapioca-like blisters and often affects the sides of the fingers)
- c. Irritant contact dermatitis
- d. Nummular dermatitis (presents with coin-shaped, erythematous scaly plaques over trunk and extremities)
Irritant Contact Dermatitis

- ICD is an inflammatory reaction in the skin resulting from exposure to a substance that can cause an eruption in most people who come in contact with it.
- No previous exposure is necessary.
- May occur from a single application with severely toxic substances, however, most commonly results from repeated application from mildly irritating substances (e.g., soaps, detergents).
ICD: Influencing Factors

- ICD is a multifactorial disease where both exogenous (irritant and environmental) and endogenous (host) elements play a role
  - Most important exogenous factor for ICD is the inherent toxicity of the chemical for human skin
  - There are site differences in barrier function, making the face, neck, scrotum, and dorsal hands more susceptible
  - Atopic dermatitis is a major risk factor for irritant hand dermatitis because of impaired barrier function and lower threshold for skin irritation
ICD: Clinical Findings

- Mild irritants produce erythema, chapped skin, dryness and fissuring after repeated exposures over time
- Pruritus can range from mild to extreme
- Pain is a common symptom when erosions and fissures are present
- Severe cases present with edema, exudate, and tenderness
- Potent irritants produce painful bullae within hours after the exposure
More Examples of ICD

Accidental Exposure to Pepper Spray

Exposure to Liquid Bleach
Case Three: Question 3

Which of the following statements is true about irritant and allergic contact dermatitis?

a. ICD accounts for 80% of all cases of contact dermatitis, and is often occupation-related
b. In contrast to ACD, no previous exposure to the irritant is necessary in ICD
c. In general, ICD remains at the site of contact and resolves in a few days after exposure, opposed to 1-3 weeks with ACD
d. Symptomatically, pain and burning are more common in irritant contact dermatitis, contrasting with the usual itch of allergic contact dermatitis
e. All of the above
Case Three: Question 3

**Answer: e**

Which of the following statements is true about irritant and allergic contact dermatitis?

- a. ICD accounts for 80% of all cases of contact dermatitis, and is often occupation-related
- b. In contrast to ACD, no previous exposure to the irritant is necessary in ICD
- c. In general, ICD remains at the site of contact and resolves in a few days after exposure, opposed to 1-3 weeks with ACD
- d. Symptomatically, pain and burning are more common in irritant dermatitis, contrasting with the usual itch of allergic contact dermatitis
- e. All of the above
ICD Evaluation and Treatment

- Identification and avoidance of the potential irritant is the mainstay of treatment.
- Topical therapy with steroids to reduce inflammation and emollients to improve barrier repair are usually recommended.
- Referral to a dermatologist should be made for patients who are not improving with removal of the irritant or in severe cases.
- Patch testing should be performed in occupational cases with suspected chronic irritant dermatitis to exclude an allergic contact dermatitis.
ICD Prevention

- Once an irritant has been identified as the causal factor, patients should be educated about irritant avoidance, including everyday practices that may cause or contribute to the ICD
- Use personal protective equipment (e.g., protective gloves should be worn for any wet work)
- Instead of soap, use less irritating substances, such as emollients and soap substitutes when washing
ICD Prevention

- Children get hand dermatitis because they are encouraged to wash exuberantly by school officials or parents concerned about infection.
- Over-washing is also more common in patients with OCD, and autism spectrum disorders who do habitual washing.
- Care should be taken for several months after the dermatitis has healed, as the skin remains vulnerable to flares of dermatitis for a prolonged period.
Take Home Points

- Allergic contact dermatitis (ACD) and Irritant contact dermatitis (ICD) are the two types of contact dermatitis.
- ACD occurs when contact with a particular substance elicits a delayed hypersensitivity reaction.
- Most patients need minor supportive care, but some cases will require oral steroids.
- Patch testing is used to determine which allergens a patient with allergic contact dermatitis reacts against.
- Not all patients with ACD need patch testing.
- Latex allergy may present as a delayed or immediate hypersensitivity.

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Take Home Points

- ICD is an inflammatory reaction in the skin resulting from exposure to a substance that can cause an eruption in most people who come in contact with it.
- Identification and avoidance of the potential irritant is the mainstay of treatment.
- Patch testing may be performed in cases with suspected chronic irritant dermatitis to exclude an allergic contact dermatitis.
- If a rash is due to an exposure at work, the medical evaluation may be covered by worker’s compensation. It is always important to ask about the patient’s occupation.
- Referral to a dermatologist should be made for patients with contact dermatitis who are not improving with the removal of the allergen/irritant or severe cases.
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References

To take the quiz, click on the following link:

https://www.aad.org/quiz/contact-dermatitis-learners