Overview

- Atopic Dermatitis
- Contact Dermatitis
  - Allergic contact dermatitis
  - Irritant contact dermatitis
- Urticaria and Angioedema
- Drug Eruptions
  - Steven Johnson syndrome
  - Erythema multiforme
- Mastocytosis
- Serum sickness

Case

- 4 mon old infant sent by the pediatrician for itchy, red rash on the trunk, arms, and legs
- Not responding to moisturizers, and pediatrician concerned about using topical steroids in this age
- Child is thriving well, no diarrhea
- Child is breastfed with cow’s milk formula supplementation, no solids yet
- Both parents have a hx of seasonal allergies

Atopic Dermatitis

- Highly pruritic chronic inflammatory skin disease often associated with atopy and elevated IgE levels
  - Commonly presents during early infancy
  - Can persist or start in adulthood
  - 50% present by age 1 yr; 80% by age 5
- Affects 5-20% children worldwide
- Prevalence in US is 11%
- Often precedes development of asthma and/or allergic rhinitis
  - Beginning of the Atopic March
Diagnosis – Essential Features

- Pruritus
- Facial and extensor eczema in infants and children
- Flexural eczema in adults
- Chronic or relapsing dermatitis

Typical Morphology

Acute
Oozing, crusting, eroded vesicles on erythematous skin

Diagnosis – Associated Features

- Personal or family history of atopic disease
- Xerosis
- Cutaneous infections
- Nonspecific dermatitis of the hands or feet
- Elevated serum IgE levels
- Positive immediate-type allergy skin tests
- Early age of onset

Diagnosis – Other Features

- Ichthyosis, palmar hyperlinearity, keratosis pilaris
- Pityriasis alba
- White dermatographism and delayed blanch response
- Anterior subcapsular cataracts, keratoconus
- Dennie-Morgan infraorbital folds, orbital darkening
- Facial erythema or pallor
- Perifollicular accentuation
Palmar Hyperlinearity

Keratosis pilaris
Small, rough follicular papules on the upper arms and anterior thigh

Dennie-Morgan folds

Differential Diagnosis - Common

• Seborrheic dermatitis
• Contact dermatitis (allergic & irritant)
• Psoriasis
• Scabies
• Tinea Corporis
• Ichthyosis vulgaris
• Miliaria (“heat rash”)
Seborrheic Dermatitis

- Chronic inflammatory disease with characteristic patterns in different age groups
- The yeast *Malassezia ovalis* causative factor

Psoriasis

- Typical oval plaques with well defined borders and silvery

Miliaria ("heat rash")

Pityriasis Rosea

- Common, benign, self-limiting eruption
- Incidence higher in colder months
- Preceding viral like symptoms are common
- Initial lesion is the herald patch
- Within 7-14 days numerous papular salmon-pink lesion usually on the trunk and lower abdomen
Pityriasis Rosea

Lesions tend to orient along skin lines, giving the "Christmas tree" distribution

Case (continued)

- Infant was sent for allergy evaluation
- Skin test positive for milk
- Both mom and child went on milk free diet and within 1 month lesions cleared significantly
- Milk was reintroduced at 15 mon with no problems

Case 2

- 17 yr old female who developed an itchy red rash on her waistband area 2 hours into a lacrosse game
- Rash persisted despite showering with soap after the game

Contact Dermatitis

- Eczematous dermatitis caused by exposure to substances in the environment
- These substances can act as irritants or allergens
- Distribution patterns can give clues to an external stimulus
- Affects up to 20% of pediatric population
Regional Sites of Predilection

Eyelid
Lips/Oral Mucosa
Axillae
Umbilicus
Genitalia
Hands
Lower Extremities
Face with eyelid accentuation
Neck
Scalp
Ears
Wrists and Arms
Fingers
Hands
Lower Extremities
Feet

Eyelid Dermatitis

- Fragrances (cosmetics, facial tissues)
- Preservatives (contact lens solutions)
- Nickel (eyelash curlers)
- Thiuram (rubber sponges, masks, balloons, toys, goggles)
- Cocamidopropyl betaine and amidoamine (shampoos)
- Tosylamide formaldehyde resin (nail polish)
- Gold

Lip and Perioral Dermatitis

- Lip licking, thumb sucking, drooling
- Juices of foods
- Chewing gum ingredients
- Cinnamon flavoring, peppermint from toothpastes and mouthwashes
- Orthodontic materials
Lip Licking Dermatitis

Neck and Axillary Dermatitis
- Necklaces or zippers (nickel)
- Airborne allergens
- Perfumes, aftershave or nail polish
- Cosmetics
- Textiles (dyes, formaldehyde resins in clothing)
- Deodorants, shaving agents
- Sweat

Umbilicus and Waistline Dermatitis
- Metal belt buckles (nickel)
- Elasticized waist bands, spandex (rubber)
- Textiles (dyes, formaldehyde)

Waistband Dermatitis
- Allergy to the rubber band of underwear
- Nickel allergy from belt buckle
Waistband Dermatitis

Hand, Wrist and Arm Dermatitis
- Watch, watchband, bracelets
- Soap, moisturizing creams
- Photosensitive process (sun exposed areas of arm)
- Foods, spices
- Rubber gloves in healthcare providers
- Poison Ivy

Wrist Dermatitis

Finger and Fingertip Dermatitis
- Rings (metal)
- Hairdressers (glyceryl monothioglycolate in perm solutions or p-phenylenediamine in hair dyes)
- Nurses – glutaraldehyde in disinfectants
- Dental and orthopedia personnel – glue (methylmethacrylate)
- Chemicals (many penetrate standard gloves)
Leg Dermatitis

- Shaving agents
- Moisturizers
- Elastic socks (rubber), dyes in pantyhose
- Textiles
- Topical medications
  - topical diphenhydramine
  - benzocaine
  - lanolin
  - neomycin
  - parabens
  - topical steroids

Contact Dermatitis from Topical Medications

Foot Dermatitis

- Shoes
  - P-tert-butylphenol formaldehyde resin (a component of shoe glues)
  - Rubber components
  - Cements
  - Chromate (used to tan leather)
- Sweat
- Topical medications

Foot Dermatitis

Chronic dermatitis caused by potassium dichromate in leather tennis shoes

Shoe contact dermatitis from shoe lining impregnated with rubber cement
Scalp and Ear Dermatitis

- Shampoos
- Hair dyes
- Topical medication
- Metal earrings
- Eyeglasses
- Rubber ear plugs

Patch Testing

- Gold standard for confirming or detecting contact allergens
- Only 10-20% of patients with ACD can be accurately diagnosed without patch testing
- Can be done at home, in Allergy or Dermatology clinic

Patch Testing

- Open patch test
  - Suspected allergen is applied to skin of upper arm, left uncovered. Repeat application x 2d
- Use test
  - Suspected cream or cosmetic is applied to site distant from original eruption. Apply BID x 7d.
- Closed patch test
  - T.R.U.E. test (standardized)
  - Specialized contact dermatitis clinics

T.R.U.E. Testing
Patch Test Interpretation

A 1+ positive patch test reaction with erythema
A 2+ positive patch test reaction with erythema and vesicles
A 3+ positive patch test reaction with vesicles and bullae

Irritant Reaction

Poison Ivy (Rhus dermatitis)

- In the US poison ivy, poison oak, and poison sumac collectively are the most common cause of ACD
- Allergens contained within the resinous sap material called urushiol
- Other plants in the same family, cashew tree, mango, Japanese laquer trees, and ginkgo contain related or identical allergens

Case 3

- 42 yr old woman with 3 month history of generalized itchy, raised, red welts on her torso and extremities
- Worse after showers, exposure to heat and alcohol
- 2 episodes of lip swelling
- Only partially responsive to Benadryl
Presentation of Urticaria

- Patients typically present with pruritic and elevated papular to plaque-like (plateau) elevations of skin.
- The duration of each lesion can help in defining the type of urticaria and therapy:
  - Less than 24 hours (each) suggestive of an IgE mediated process and usually respond better with antihistamines.
  - Longer than 24 hours (each) implies:
    - Cell mediated process (contact dermatitis, eczema).
    - IgG/IgM antibody associated (serum sickness).
    - Vasculitis that usually require steroids or other immunosuppressants.

Urticaria and Angioedema

- Uniform red edematous plaques with white halo
- Typical urticarial lesions with central clearing plaques with white halo
- Lip is a common site for angioedema

Duration of Hives

<table>
<thead>
<tr>
<th>Type of Urticaria</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ordinary and delayed pressure</td>
<td>4-36 hours</td>
</tr>
<tr>
<td>Physical (except delayed pressure)</td>
<td>30 min – 2 hours</td>
</tr>
<tr>
<td>Contact (may have a delayed phase)</td>
<td>1-2 hours</td>
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</tbody>
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Acute vs Chronic Urticaria

- Acute Urticaria – lasts 6-8 weeks or less
  - Viral syndromes (especially in young children).
  - Insect bites or stings (fire ants, scabies).
  - Food induced reactions (eat this- get that).
  - Medication related (antibiotics, NSAIDs, narcotics, angioedema due to ACE inhibitors).
  - Environmental (i.e. hives after sitting on grass).

- Chronic Urticaria – lasting longer than 8 weeks
  - Physical urticarias (dermographism, cholinergic, cold).
  - Urticarial vasculitis.
  - Urticaria/angioedema associated with autoimmunity.
  - Autoimmune urticaria.
  - Idiopathic urticaria.
Physical Urticarias

- May occur so intermittently as to appear acute but typically are chronic entities – most idiopathic
- Physical Urticarias
  - Symptomatic Dermatographism
  - Cholinergic
  - Cold Induced (Familial or Acquired)
  - Vibratory (angioedema)
  - Pressure – induced, Solar, Aquagenic

Symptomatic Dermatographism

- Simply scratching the skin promotes linear hives within minutes
- Delayed form described
- Typically is short-lived in duration (1/2 to 3 hours) and responds readily to antihistamines

Cholinergic Urticaria

- Small, punctate wheals with erythematous flare
- Heat (sweating), exertion or emotional upset can trigger

Cold-Induced Urticaria

- Familial (autosomal dominant) vs acquired (usually infection associated)
- Acquired form - positive ice-cube challenge
- Usually responds to cyproheptadine or other antihistamines – High dose may be required
Delayed Pressure Urticaria

- 15 pound weight suspended by thick strap over the shoulder x 15 min

Solar Urticaria

- Hives develop in areas of skin exposed to sunlight
- Phototesting performed with various light sources – sunlamp, blacklight, slide projector lamp


Urticarial Vasculitis

- Uncommon in the pediatric population
- Palpable purpura and bruising/discoloration that persists after the hive disappears
- Hives last >24 hours
- Can be local or associated with other organ involvement
- In children, most cases represent Henoch-Schonlein purpura or hypersensitivity vasculitis

Urticarial Vasculitis
Angioedema

- Asymmetric, nondependent swelling that is not pruritic
  - Often described as “tingling” or “burning”
- Can occur either alone or with urticaria
- Lips, palms, soles, limbs, trunk, and genitalia are most commonly affected

Chronic Urticaria/Angioedema

- % of Patients with Chronic Urticaria
  - Women: 40%
  - Men: 50%
- Urticaria & Angioedema

Isolated Angioedema

- Should prompt evaluation for Hereditary Angioedema (HAE)
- Presentation: attacks of angioedema often lasting ≥ 72 hours triggered by minor trauma or stress
- Attacks are episodic
- Most commonly affects extremities, face, GI tract, or upper airway

Hereditary Angioedema

- Autosomal dominant with incomplete penetrance
  - Spontaneous mutations in 50%
  - Diminished C4 between attacks
  - Very low C4 during attacks
- HAE I
  - Low levels of C1 esterase inhibitor
- HAE II
  - Dysfunctional C1 INH
- HAE III (estrogen-dependent angioedema)
  - Normal C1 INH amount and function
  - Normal complement levels
Case 4

- 3 yr old male with 5 days of rhinorrhea, nasal congestion, low grade fever
- Diagnosed with otitis and started on amoxicillin
- On day 5 of amoxicillin develops a generalized red, slightly raised rash
- Returned to office for evaluation and diagnosed with amoxicillin allergy

Serum Sickness

- Immune complex mediated drug reaction
  - Drugs, monoclonal antibody therapy, blood products, animal-derived vaccines
- Can present with urticarial or morbilliform rash, along with:
  - Fever, chills - Nausea, vomiting
  - Malaise - Occult blood in stool
  - Arthralgias - Lymphadenopathy
- Usually resolves without sequelae

Serum Sickness

Maculopapular Drug Eruptions

- Most frequent type
- Often indistinguishable from viral exanthems
- Classic drugs are amoxicillin and ampicillin, but virtually any drug can trigger
- Onset usu. 7-10 after start of drug
- Lasts 1-2 weeks
- Lesion clear rapidly following withdrawal of agent
Widespread, symmetric, confluent erythematous macules and papules

**Fixed Drug Eruptions**
- Unique form of drug allergy that produces red plaques or blisters that recur at the same site upon re-exposure
- Lesions are intensely pruritic
- Acute stage is followed by blistering, desquamation, and brown pigmentation
- Lips, hands, genitalia, and trunk are common sites
- Trimethoprim-sulfamethoxazole most often implicated

**Urticarial Drug Eruptions**
- Penicillins, cephalosporins
- Serum Sickness
- Opiates
- ASA and NSAIDs
- Radiocontrast Media
  - No association between iodine or shellfish allergy
Photosensitivity Drug Eruptions

- These represent 8% of all cutaneous drug reactions
- Both systemic and topical drugs
- 2 types, phototoxic and photoallergic
- Phototoxic
  - Nonimmunologic, dose-dependent
  - Rash occurs within hours of 1st exposure to drug in sun exposed areas
- Photoallergic
  - Less common, occurs in sensitized individuals
  - Rash is more delayed, can spread to non-sun exposed areas

Exposure to sunlight after taking hydrochlorothiazide resulted in phototoxic rash in sun exposed areas

Serious Drug Eruptions

- Drug Reaction with Eosinophilia and Systemic Symptoms (DRESS)
- Erythema Multiforme (EM)
- Stevens-Johnson Syndrome (SJS)
- Toxic Epidermal Necrolysis (TEN)

Erythema Multiforme

- Occurs over 12-24 hours and usu. Is self-limiting and benign
- Often there is a prodrome, URI-like illness
- Rash is often urticarial or target lesions:
  - Hands, palms, soles, extremities
  - If any mucosal involvement, usu. Oral
- Most commonly associated with herpes simplex, *M. pneumoniae*, histoplasmosis, medications (10%)
Erythema Multiforme

Stevens-Johnson Syndrome

- ≥2 sites of mucosal involvement
- Widespread target or macular lesions
- Prodrome is much more intense
  - Fever, malaise, arthralgias, headache, vomiting, diarrhea, myalgias
- Mucosal lesions are many and often severe
  - Conjunctiva, oral, upper airway, GI
- In children, ~50% caused by medications
  - Anticonvulsants, penicillins, sulfonamides

Case 5

- 4 yr old female presents with an itchy rash on her torso, with reddish brown lesions
- Worse after playing outside, especially on a warm day
- Rash becomes very raised after scratching and after bathing
- Only partially responsive to Benadryl
Mastocytosis

- Rare disorder of abnormal mast cell growth in the skin, bone marrow, liver, spleen, and lymph nodes
- Signs and symptoms are related to release of histamine and mast cell mediators
- Cutaneous mastocytosis most common form, affects mostly children
  - Solitary or multiple mastocytoma
  - Urticaria pigmentosa
  - Diffuse cutaneous mastocytosis

Mastocytosis – Solitary Mastocytoma

- Most common type of CM
- Reddish brown macules
- Positive “Darier’s sign”
- Most appear within 1st 3 mon of life
- Lesion usually spontaneously involute

Mastocytosis – Urticaria Pigmentosa

- 2nd most common manifestation of CM
- Well demarcated red-brown macules or plaques, often occur in multiples
- Lesions appear within 1st 6 mos; ~50% resolve by age 10
- Positive “Darier’s sign”

Mastocytosis – Diffuse Cutaneous Type

- Least common
- Skin either appears normal or thickened reddish brown skin with orange peel texture
- Presents by age 3; resolves by age 5
- Highest frequency of systemic involvement
Summary

- Skin manifestations of allergic disease are varied and can be the presenting sign
- Knowledge of the patterns and morphology of lesions is helpful
- Thorough history and physical exam is important; testing rarely indicated