Common Pediatric Skin Conditions and Other Interesting Tidbits

Joyce B. Farah, MD FAAD
Assistant Professor of Medicine and ENT
SUNY Upstate Medical University
Farah Dermatology and Cosmetics
Climate Change and Dermatology
UN Intergovernmental Panel on Climate Change

- 91 authors from over 40 countries
- Irreversible consequence of 1.0 C rise since industrial revolution
- Call to limit rise to 1.5 C
- 20 warmest years occurred since 1995
- 5 warmest occurred since 2010
- We need to educate public about health hazards of climate change
Figure 1.1. Variations in Earth's average surface temperature, over the past 20,000 years
Infections
Ocean levels

- Glacial retreat
- Changes glacial fed water systems use for food and water security
- Escalating hurricane strength and severe storm surges
- Billions of dollars and large scale human displacement
Wildfires
Skin and Climate Change

- **Coccidiomycosis**
  - Endemic to Southwest
  - 12 cases reported in Washington State

- **Cutaneous leishmaniasis**
  - Now endemic in Texas

- **Lyme disease, murine typhus**

- **Vectors transmitted by Aedes aegyptii**
Skin and Climate Change

- Atopic dermatitis - triggers
  - Fossil fuel emission
  - Wild fires
  - Heat

- Skin cancer and aging
  - Pollutants potentiate oxidative damage
  - Sunlight exposure
  - UV protective behavior
  - Rising incidence of melanoma worldwide
Consequences

Refugee crisis
Urban crowding
Poor hygiene
Impaired clean water supplies
Disrupted health care systems
Hampered vaccination efforts
Spread of communicable diseases
Poverty

World Bank estimates by 2030, 100 million people could be dragged into poverty as a direct consequence of climate change.
Climate Change and Environmental Affairs Expert Resource Group
PHYSICAL SUNSCREENS:
Acts by reflecting the light

CHEMICAL SUNSCREENS:
Acts by absorbing the light
FDA Issues New Sunscreen Regulation

- Broad spectrum with SPF of at least 15
- Only 2 of 16 active ingredients are considered safe and effective
- PABA and trolamine salicylate are not considered safe
- 12 other ingredients have insufficient data
- Wipes, towelettes and body washed or shampoos should be considered new drugs and go through approval
FDA Proposal

- Active ingredients of sunscreens listed on front of package
- Products not proven to reduce skin cancer should have that listed on package
- Combination sunscreen and insect repellant are not considered safe and effective
- Maximum SPF should be raised from 50+ to 60+
- Sunscreen with 15+ should also be broad spectrum
- Degree of UVA protection should increase with increasing SPF
Sunscreen and Coral Reefs

- Estimates of sunscreen that enter oceans ranges from 6,000-20,000 tons yearly
- Starting in 2008 experiments show that within 96 hour have bleaching of coral reefs
- Culprits: butylparaben, ethylhexyl methoxycinnamate, oxybenzone, and 4-MBC
- Oxybenzone of most concern
Sunscreen and Coral Reefs

- Bleaching
- Damage and deformation of coral larva
- Damage to coral DNA and reproductive success
- Change in the bacterial environment of reefs
BANS

States

- Hawaii 2018
  - Oxybenzone
  - Octinoxate

- Key West
  - Oxybenzone
  - Octinoxate

Countries

- Palau
  - Oxybenzone
  - Octinoxate
  - Octylmethoxycinnamate
  - Octocrylene 4-methylbenzyldene camphor
  - Triclosan
  - Methyl paraben
  - Erthyl paraben
  - Butyl paraben
  - Benzyl paraben
  - Phenxyxthanol
Follicular Occlusion Triad

Severe acne
Dissecting cellulitis of the scalp
Hidradenitis suppurativa
Acne Conglobata
Dissecting Cellulitis of the Scalp
Hidradenitis Suppurativa
Hidradenitis Suppurativa

AKA Acne Inversa
HS(acne inversa)

- Chronic inflammatory disease of hair follicles
- Androgen responsive-apocrine gland bearing areas
- Recurrent nodules, sinus tracts and scarring
- Intertriginous areas
- 1-4% in European population
1. Perifollicular Inflammation

2. Hyperkeratinization of follicular epithelium with occlusion and dilation of the follicle

3. Follicular rupture and release of intrafollicular debris into the dermis with increased inflammation

4. Formation of tunnels (sinus tracts and fistulas) filled with debris and/or fluid that connect to the surface of the skin and to the base of other ruptured follicles
HS

Start out as boils
Can see paired open comedones
Pain and tenderness
Arthralgias
Hurley Staging System

- **Stage I (mild)**
  - Abscess without sinus tract/scarring

- **Stage II (moderate)**
  - Recurrent abscess with sinus tract
  - Scarring, widely spaced

- **Stage III (severe)**
  - Multiple interconnected sinus tract
  - Abscessed with diffuse involvement of an affected area
Different microbiomes were investigated using next generation sequencing targeting 16S and 18S ribosomal RNA.

Study suggests a link between a dysbiotic cutaneous microbiome and HS.

Skin microbiome in HS differs significantly than in normal.

Significant differences at the genus and species.

The number of overall species was the same.

Sebaceous glands are less and less active.

P. acnes numbers are less.

Have bactericidal properties against other pathogens.
Conclusion

- Microbiome in HS lesional and non-lesional skin differ significantly from healthy control.
- Mostly anaerobic bacteria.
- Microbiome varied with disease severity.
- More studies are warranted.
Hidradenitis Suppurativa

- Patients with HS and psoriasis more impacted by skin disease than obesity
- Patients with HS would rather trade a significant proportion of their life to live without skin disease than to live at a normal weight
- Obesity more severe in HS than psoriasis
Pediatric HS

- Very real and increased risk of somatic and psychiatric comorbidities
- Mental disorders - rapid increase during young adulthood
- Finish Care Registry of Health Care compared age matched controls with HS and melanocytic nevi
- HS arm 34% had >1 comorbidity vs 4.9% control
- >15% before age 18
- At age 23 psychiatric comorbidity recognized in 23.5% of HS patients vs 8.7% of controls
Comorbidities

- Increased risk of Crohn’s disease
- Total of 51,340 patients with HS
- Prevalence of CD in patients with HS significantly higher than in patients without HS (25 [1025 of 51,340] vs 0.6% [113,360 of 18,404,260] P<0.001)
- CD highest in patients who were caucasian, 45-64 y.o., not obese but smokers
Treatment

- Oral and topical antibiotics
- Anti-androgen therapy
- Isotretinoin
- TNF alpha inhibitors
- Weight loss
- Smoking cessation
- Surgical excision
Mycoplasma Pneumonia Induced Rash and Mucositis (MIRM)
MIRM

- Most infections asymptomatic or
- Fever, malaise, cough
- Respiratory tract disease
- Extrapulmonary disease
Mucocutaneous Disease

- Mild to severe
- Maculopapular to vesicular rash
- Can have severe mucositis
- Limited to children and young adults
- Males 2:1
MIRM

- Pathogenesis poorly understood
- Immune mediated vascular injury
- Genetic predisposition
- Typical prodrome is mild
MIRM

- Hematmesis
- Epiglottitis
- Subcomeal pustulosis
- Hepatitis
- Ocular sequelae
- Urogenital adhesions
MIRM

- Rarely fatal
- Different than SJS
Workup

- Mycoplasma PCR
- Antigen detection enzyme immunoassay
- CBC
- ESR
- CXR
- Biopsy if needed
Management
Contact Dermatitis
Slime Dermatitis
Toilet Seat Dermatitis

Harsh cleaners
Polyporpylene in plastic
Polyurethane in foam
Rosin in wooden seats
ATOPIC DERMATITIS
Atopic dermatitis

- Mainstay of disease is pruritus
- Onset in early infancy (adult variant)
- Primary physical findings:
  - Xerosis
  - Lichenification
  - Eczematous lesions
  - Secondary lesions
Diagnostic Criteria for Severe AD

- 10% BSA
- Regardless of BSA - individual lesions with severe features
- Highly visible areas - face, neck, palms/soles, genitals
- Significantly affected quality of life
PATHOPHYSIOLOGY
Dysrupted skin barrier, TH2 inflammation and bacterial colonization
Climate

- Heat
- Cold
- Dry atmosphere
- Sun exposure improves lesions
- Sweating aggravates pruritus
Early Exposure

- Early exposure to peanuts decreases peanut allergies
- Was not linked to a decrease in atopic dermatitis
- Further studies needed for other allergens
Acute vs Chronic AD

- Acute phase
- Th2, Th22, Th17
- Cytokine cascade leads to IL-4 and IL-13 secretion
- These increase Th2 response
- Th22 effects
- Promotes hyperplasia, down regulates differentiation
- With IL-17 induces expression of epidermal dendritic cells-differentiation and SC development
Chronic AD

- Th1 mobilized
- Th2 and Th22 cytokines still elevated
Atopic dermatitis

- 10-12% in children
- 0.9% in adults
- Increase work loss is a big financial burden
- Psychological burden for families
Symptoms

- Intractable pruritus
- Children will continuously scratch
- Parents usually become aware of this at about 3 months of age when the itch-scratch cycle matures
- Intermittent course
- Remissions are often unexplained
Physical infancy

- Xerosis is widespread but spares the diaper area
- Antecubial and popliteal fossa-erythema and exudation
- Lesions can localize to the cheeks, the forehead, the scalp
- Lesions are ill-defined, erythematous, scaly, crusted patches and plaques
Physical Infancy
Physical childhood

- Xerosis: skin is flaky and rough
- Lichenification is often present
- Repeated rubbing
- Eczematous and exudative
- Erythema and scaling around eyes
- Dennie-Morgan folds
- Crusting often seen—not to be confused with infection
- Can experience symptoms in teens and beyond
Physical childhood

Stages of Atopic dermatitis
Physical adulthood

- Lesion more diffuse
- Underlying background of erythema
- Skin is dry and scaly
- Lichenification often present
- Also can manifest as eyelid dermatitis
- Or hand dermatitis
physical adulthood
Comorbidities

- Systematic review—significant association between cardiovascular outcomes and AD among cohort studies
- Used MEDLINE, Embase and Global Health database
- Increased risk of MI, stroke, ischemic stroke and heart failure
- These increased with increased AD severity
Comorbidities

Patients with AD may be more likely to have suicidal thoughts and attempts compared to their counterparts.

44% increased odds of suicidal ideation

36% increased odds of suicide attempts
Workup

- No chemical markers
- Lab testing not necessary unless suspect Wiskott-Aldrich syndrome
- Swab of infected skin if present
- Allergy and radioallergosorbent testing of little value
- Testing to rule out immunodeficiencies if suspected
- Scraping to exclude tinea corporis if in the differential
Treatment
Nonpharmacologic Treatment

- Bathe daily-short and lukewarm
- Immediately apply a petrolatum based moisturizer while skin is still damp
- In infants can bathe in lukewarm water 1-3 times per day
- In adults 1-2 times per day is fine
- Wet wraps-these are very helpful
  - Bath infant/child as above
  - Apply moisturizer and/or medicated creams
  - Wear a moist cotton pyjama
  - Follow dry snug cotton pyjama
  - Put child to bed and leave these on overnight
Moisturization

- Prophylactic and therapeutic
- Full body application for 6-8 months in first few weeks of life decreased incidence
- These were in infants with first degree relative with atopy
Ceramides, cholesterol and free fatty acids (palmiatate)

Need at least a 5% concentration of ceramides in a 3:1:1 ratio.

pH <5 - improves barrier function, decreases inflammation, increases anti-microbial function

Triple lipids and petrolatum increase LL-37

Coconut oil

Sunflower oil
Stelatopia Emollient Face Cream

- For extremely dry and eczema prone skin
- With Avocado Perseose
- Restores and protects skin barrier
- Boosting ceramides and hyaluronic acid
- Protects from environmental insults
- Also has Sunflower Oil Distillate-anti inflammatory properties
- Licorice extract-reduces redness and inflammation
- Can you be used on eyelids
Trigger Factors

- Nylon
- Wool
- Unfamiliar pets
- Dust
- Shampoo
- Sweating
Acute Flare

- Topical steroids
- Topical calcineurin inhibitors (tacrolimus and pimecrolimus)
- PDE4 inhibitor - crisaborole
Topical steroids

- Mainstay of treatment
- Ointments are better than creams, lotions or gels
- Hydrocortisone 1-2.5% powder in an ointment base of your choice
- Caution with mid strength steroids in infants and young children
- Use only as needed
- Do not use more than 2 weeks at a time without a break especially in body fold areas
- Contact allergies can be seen to components of creams. Allergy to steroid itself is rare
- One of best bases is acid mantle cream
Immunomodulators

- Tacrolimus and pimecrolimus - calcineurin inhibitors
- Little absorption occurs
- Tacrolimus is an ointment, Pimecrolimus is a cream
- Initial irritation or burning can occur - this lasts about 3 days and can be minimized by applying to dry skin
- Black box warning about increased risk of malignancy - studies have not supported an increased risk - investigations are ongoing
- Narrow band UVB
Crisaborole

- Good efficacy
- FDA approved in 2016 -> 2 years of age
- Favorable side effect profile
- PDE4 inhibitor
- Decreases cAMP which decreases inflammatory cytokines
- Plan for study in patient 3 months - 2 years
Dupixent (dupilumab)

- Dupilumab
- IL-4/IL-13 monoclonal antibody
- FDA approve March 2017
- Approval for 12 and over expected March 2019
- Exacerbation of AD, injection site reactions, nasopharyngitis, conjunctivitis
- Decreased skin infection with treatment
JAK inhibitors

- Under investigation
- Responsible for signal transduction from IL-4 and other
- Topical tofacitinib (KAK1/3) significantly improved lesions and pruritus
- Other JAK inhibitors in trials
- Novel therapies to modulate the cutaneous microbiome (roseomonas mucosa spary and targeted microbioms transplant lotion containing coagulase negative Stap
Immunomodulators

- In severe cases
  - Methotrexate
  - Azathioprine
  - Cyclosporine
  - Mycophenolate mofetil
  - TNF alpha inhibitors
  - ? New IL-17 blocker for psoriasis - recently IL-17 implicated in atopy (secukinumab/cosentyx)
Biologics in the pipeline

- Thymic stromal lymphopoietin (TSLP)
- IgE
- IL-4 antagonist pitrakinra
- Anti IL-13 tralokinumab and lebrikizumab in phase 2 and 3
- Ustekinumab IL-12/IL-23p40 antagonist regulates Th1 and IL-17
- Anti IL-22 fezakinumab
- Secukinumab IL-17A inhibitor under investigation
Biologics

- IL-31 known pruritogen
- Nemolizumab anti IL-31 receptor A in phase 2 studies - improved pruritus and better sleep
- Anti IgE omalizumab used in asthma in trials for atopy
Diet

- Restriction of maternal diet during pregnancy and lactation did not affect AD development in infants.

- Exclusive breast feeding in infants for 4 months was protective vs cows milk and hydrolyzed formula for at risk infants.

- For infants at normal risk, breast feeding is not protective for AD.

- Pre and post natal probiotics were found to be protective in normal and high risk infants.

- Post natal prebiotics decreases the risk of AD.
Diet

- Elimination diets are only for those patients who have a food allergy proven by oral food challenge.
- Vitamin D supplementation—some studies show benefit and some do not.
- Primrose and borage oil—no significant improvement.
- Chinese herbal medications—caution as these often contain prescription ingredients such as steroids.
Molluscum Contagiosum
Molluscum Contagiosum

Molluscum bumps are usually small, dome-shaped, and shiny. The bumps usually have a central dimple.

The bumps can become red, swollen, or pus-filled. Scratching may cause the bumps to spread.

Eczema-like skin may develop around the molluscum.
Molluscum Contagiosum

- Self limited viral infection
- Human specific poxvirus
- Usually in 2-5 year age group
- Autoinoculation
- Incubation is between 2 weeks to 6 months
- Can persist for several months
Molluscum Contagiosum

- Inflammation precedes resolution
- Uncomplicated lesions heal without scarring or dyspigmentation
Treatment

- Controversial
- Typically self resolve
- Intervention can speed resolution and prevent spread and scarring
- Parental concern and pressure
Janus Kinase Inhibitors

- Currently tofacitinib approved for psoriatic arthritis
- In studies:
  - Alopecia areata
  - Atopic dermatitis
  - Vitiligo
  - Lupus
  - Granuloma annulare
  - Sarcoidosis
References


- High BMI or Skin Disease? Which Would You Choose? Dermatologist on line.


References

- FDA Issues New Sunscreen Regulations: The-dermatologist.com Feb 22, 2019
- Impact of Sunscreens on Coral Reefs-funded with the support of the government of Sweden and the Foundation Pour la Recherche sur la Biodeveriste
- Palaugov.pw
- Arnold, K Lio PA Update on Atopic Dermatitis 2018 Practical Dermatology, practicaldermatology.com
- Ring HC et al The Follicular Skin Microbiome in Patients with Hidradenitis Suppurativa and Healthy Controls JAMA Dermatol 153(9) May 2017