**Childhood Skin Infections**

**Evidence Updates**

Brian Z. Rayala, MD  
Associate Professor, UNC Family Medicine  
Director of Procedural Training, UNC FM Residency  
Staff Physician, UNC Wound Center

---

**Objectives**

- At the end of lecture, learner will be able to:
  - Diagnose common viral, bacterial, fungal, and parasitic skin infections in children
  - Apply best evidence to manage common childhood skin infections
  - Differentiate benign versus serious skin diseases associated with international travel

---

**Case #1**

- 6 year-old girl
- 5-month hx of 5mm hyperkeratotic papule w/ capillary loops (black dots)
- Location: finger

**Diagnosis:**  
*Verruca vulgaris (common wart)*

---

**Verruca vulgaris**

- Etiology: HPV type 2
- Location: hands and feet
- Transmission: self-inoculation, vertical, sexual
- Prevalence: highest in childhood; rare in infancy

**Natural history:**
- 65% resolve in 2 yrs, 80% resolve in 4 yrs
- 1 and 2
- 2 and 4
- 3 and 6
- Factors associated with duration of >2yrs:
  - Hx of infections
  - >1 anatomic site involved

---

**Management**

- Salicylic acid (SA)  
  - Only modestly effective
- Cryo = placebo
- SA = cryo
- For hand warts,  
  - Cryo better than SA and observation
- Aggressive better than gentle cryo
  - >10-15 seconds
  - 2 cycles

- Treatment interval:
  - Q2wks = Q3 = Q4
- Other tx:
  - Silver nitrate may be effective
  - Other tx no more effective than placebo
  - Duct tape, 5FU, laser, imiquimod, intralesional antigen
  - No RCT for surgery, podophyllotoxin, cantharidin

---

**Faculty Disclosure**

It is the policy of the NDAFP that all individuals in a position to control content disclose any relationships with commercial interests upon nomination/invitation of participation. Disclosure documents are reviewed for potential conflict of interest (COI), and if identified, conflicts are resolved prior to confirmation of participation. Only those participants who had no conflict of interest or who agreed to an identified resolution process prior to their participation were involved in this CME activity.

All faculty in a position to control content for this session have indicated they have no relevant financial relationships to disclose.

The content of my material/presentation in this CME activity will not include discussion of unapproved or investigational uses of products or devices.
**Case #2**
- 5 year-old boy
- 3-week hx of pearly papules w/ central umbilication
- Location: trunk & extremities

**Diagnosis:**  
- *Molluscum contagiosum*

**Molluscum contagiosum**
- Etiology: pox virus
- Location: trunk & extremities
- Variants: genital, perioral
- Incidence: 12-14 per 1000 children; highest among 1-4 yo
- Prevalence: warm climate; rare in infancy, median age 5 yo

**Natural history:**
- 50% resolve in 12 mos, 70% resolve in 18 mos
- 6 and 12
- 12 and 18
- 24 and 36
- Tx did not shorten duration
- Eczema associated with more lesions
- 41% transmission rate among siblings

**Management**
- Lack of efficacy
  - Imiquimod
  - Cantharidin
  - Salicylic acid
  - Phenol, alcohol
  - Benzoyl peroxide
  - Tretinoin
  - Curettage
- Avoid imiquimod
  - Ineffective
  - Adverse outcomes (neutropenia)

**Case #3**
- 2 year-old boy w/ fever
- Erythematous papulo-vesicles
- Location: hand, feet, and oral cavity

**Diagnosis:**  
- *Hand-foot-and-mouth disease (HFMD)*

**Hand-foot-and-mouth disease**
- Etiology: enterovirus (coxsackie A6 and A16)
- Location: hand, foot, mouth
- Beyond bastion areas: buttocks, extremities, trunk, perioral
  - >3 areas in 88% cases
  - ≥5 areas in 42% cases
  - No scalp involvement
- Mean age: 26 mos
- Gender: 1.5:1 (M:F)

**Natural history:**
- A6, A16 – benign course
- EV 71 – 1998 Taiwan epidemic
  - 78 deaths of 129,106 cases
  - Complications: pulmonary hemorrhage, aseptic meningitis, encephalitis, acute flaccid paralysis, myocarditis
- Treatment: supportive
- Return to school when afebrile, even w/ lesions

**Case #4**
- 7 year-old boy
- Prodrome: fever
- Painful vesicles, pustules and erosions w/ crust and erythema
- Location: lips, oral cavity

**Diagnosis:**  
- *Herpes simplex infection (herpetic gingivostomatitis)*
Herpes simplex infection

- Etiology: HSV 1 & 2
- Common forms: gingivostomatitis, herpetic whitlow
- Less common forms:
  - Genital
  - Eczema herpeticum
  - Ocular
  - HSV encephalitis
- Daycare exclusion*: not recommended for common forms

Case #5

- 1 year-old girl
- Flaccid bullae, followed by erythematous erosions w/ crust and scales
- Location: trunk, extremities

Diagnosis:
- Bulous impetigo

Impetigo

- Etiology: Staph, Strep
- Types: primary, secondary
- Forms:
  - Non-buluous
    - Staph, Strep
    - Face, extremities
  - Buluous
    - Staph only
    - Trunk, extremities

Cellulitis and Abscess

- Etiology: Staph, Strep
- POCUS: improves accuracy:
  - Clinical exam: Sn/Sp 44%/42%
  - Exam w/POCUS: Sn/Sp 78%/61%
- Cellulitis Treatment:
  - Blood cx not recommended
  - Abx monotherapy covering MSSA and beta-hemolytic Strep
- Purulent Cellulitis Treatment:
  - Abx monotherapy initially
  - Add MRSA coverage if not responding
    - TMP-SMX, clindamycin, tetracyclines (>8yo)
- Abscess Treatment:
  - I&D
  - Abx w/ MRSA coverage if persistent or recurrent

Mucocutaneous candidiasis

- Etiology: Candida albicans
- Location: oral (thrush), genital
- Presentation:
  - Erythematous patches or plaques
  - Adherent greyish-white papules or plaques
  - Wetness or maceration
  - Satellite lesions
- Treatment:
  - Any location:
    - Oral triazole (fluconazole)
  - Oral (thrush):
    - Oral nystatin
  - Genital:
    - Topical nystatin
    - Topical imidazoles (e.g., clotrimazole, econazole, miconazole)
Case #7
- 4 year-old boy
- 3-month hx of focal alopecia w/ crust, scale and scarring

Diagnosis:
- Tinea capitis

Tinea capitis
- Etiology:
  - Trichophyton spp.
    - Trichophyton tonsurans (USA)
    - Microsporum spp.
    - Epidermophyton
- Affected age: 3-9 yo
- Presentation:
  - Localized alopecia, pruritus, scale, crust, black dots, occipital adenopathy
  - Microsporum spp.
    - Microsporum audouini

Treatment:
- Similar efficacy and safety for topical terbinafine, naftifine, and imidazoles

Case #8
- 8 year-old girl
- 2-week hx of pruritic, erythematous, annular plaque w/ scales
- Location: L trapezius

Diagnosis:
- Tinea corporis

Tinea corporis
- Etiology:
  - Trichophyton, Microsporum, and Epidermophyton
- Presentation:
  - Solitary erythematous pruritic annular plaque (or few plaques)
- Location:
  - trunk, extremities

Treatment:
- Similar efficacy and safety for topical terbinafine, naftifine, and imidazoles

Case #9
- 8 month-old girl
- 3-week hx of papules, burrows, and excoriations
- Distribution: abdomen, chest, extremities, hands, chin

Diagnosis:
- Scabies

Scabies
- Etiology: Sarcoptes scabiei mite
- Presentation:
  - Intense nocturnal pruritus, papules, burrows, excoriations
    - Infant: vesicles, pustules
- Distribution:
  - Web spaces, periareolar, axillae, buttocks, groin
  - Atypical areas — scalp, palms, soles

Diagnosis:
- Microscopy: mites, eggs, feces
- Oral ivermectin (wt >15kg)
- Topical permethrin has strongest evidence of efficacy and safety
- Oral ivermectin (wt >15kg)
- Return to school: 48 hrs
Skin Conditions Associated with Travel

- Red flags: fever, rash
- 5 common conditions:
  - Cutaneous larva migrans
  - Dog bites
  - Insect bites
  - Cutaneous leishmaniasis
  - Skin abscesses
- Serious conditions:
  - Dengue
  - Meningococemia

Evaluation:
- Guided by disease epidemiology
- Dxtic clue: eosinophilia

Treatment:
- Specific to etiologic agent

Transmission risk: low

Practice Recommendations

- If cryotherapy is chosen for hand warts, recommend monthly intervals between treatments and use aggressive cryotherapy. (SORT A)
- Due to lack of convincing evidence of efficacy, do not treat molluscum contagiosum. Treatment has no effect on duration of disease. (SORT A)
- Use topical mupirocin to treat non-extensive impetigo. (SORT A)
- Use griseofulvin, terbinafine, itraconazole or fluconazole to treat Trichophyton tinea capitis; use terbinafine for confirmed cases of T. tonsurans. For tinea capitis caused by Microsporum, use griseofulvin. (SORT A)