Pediatric Dermatology

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Disclosure

I do not have any relevant financial/non-financial relationships with any proprietary interests.

• Pediatric Nevi
• Hemangiomas/Vascular Anomalies
• Vitiligo
• Warts/Molluscum

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Pediatric Nevi

- Congenital melanocytic nevi (CMN) present at birth in 1-2% of children
- Increased risk of melanoma in large CMN
- Acquired nevi develop in childhood, Number of nevi increase until age ~40
- Genetics and sun exposure

- Nevi undergo growth/maturation
- Melanoma most frequently arises de novo
- Can arise within acquired/congenital nevus
- No clear evidence that nevi “transform into” melanoma
• Melanoma in preadolescent children rare, not associated with typical adult risk factors
• May be non-white, arise in sun protected areas, no family history, not associated with dysplastic nevi
• Melanoma in teenagers increasing in incidence, more like adult melanoma
• More likely fair, family history, atypical nevi

Basic Rules

• Small and medium congenital melanocytic nevi (CMN) have low malignant risk but often look “scary”
• Giant CMN (>20 cm as adults) have slightly increased risk of MM (~6% lifetime risk) but a greater risk of neurocutaneous melanosis and spinal dysraphism (when midline)
• Scalp nevi are “dynamic” and often have a targetoid appearance

Basic Rules - continued

• It is normal for adolescents to develop new nevi and darkening of existing ones
• Spitz nevi can be observed but should be biopsied/excised if getting larger
• Family history of melanoma raises suspicion
• Look for the ugly duckling sign
• Halo nevi are a common phenomenon
Small and medium congenital melanocytic nevi (CMN) have low malignant risk but often look “scary”
Evaluation & Management

- Observe and measure nevi
- Refer to pediatric dermatology
Giant CMN (>20 cm as adults) have slightly increased risk of MM (~6% lifetime risk) but a greater risk of neurocutaneous melanosis and spinal dysraphism (when midline)
Evaluation & Management

- Newborns:
  - Spinal ultrasound (if midline)
  - Consider MRI before age 4 months to assess for neurocutaneous melanosis

- Regular skin checks
Scalp nevi are “dynamic” and often have a targetoid appearance

Scalp Nevi: Evaluation and Management

- Observe and measure nevi
- Refer to pediatric dermatology
It is normal for adolescents to develop new nevi and darkening of existing ones.

Look for the ugly duckling sign.
Spitz nevi can be observed but should be biopsied/excised if getting larger.
Evaluation & Management

- Observe and measure nevi
- Refer to pediatric dermatology

Halo nevi are a common phenomenon
When to Worry

• Nevus inside halo is irregular
• Nevus is itchy or bleeds easily
• Multiple halo nevi are reassuring
• Often seen with vitiligo

Evaluation & Management

• Observe and measure nevi
• Refer to pediatric dermatology

The ABCDEs

One half of the lesion is unlike the other half.

An irregular, scalloped or poorly defined border.

Varies from one area to another; has multiple shades, usually tan, brown or black; but also pink and sometimes white, red or blue.

Melanomas usually are greater than 6 mm (the size of a pencil eraser) when diagnosed, but they can be smaller.

A mole or skin lesion that looks different from the rest or is changing in size, shape or color.

Patients can download the AAD’s body mole map to document their self-examinations.
Vascular Lesions

- Proliferative lesions
- Malformations

Proliferative Vascular Lesions

- Infantile hemangioma
- Pyogenic granuloma
- Tufted angioma
- Kaposiform hemangioendothelioma
- Rapidly involuting congenital hemangioma (RICH)
- Non‐involuting congenital hemangioma (NICH)

Infantile Hemangioma

- Not present at birth
- Appears as a red macule within first few weeks of life
- Rapid proliferation during first 4-6 months of life
- Slow involution after 1 year of age
- GLUT1 positive
Ulcerated Hemangioma
Ulcerated Hemangioma

Pilomatrixoma

Spitz Nevus
Pyogenic Granuloma

Infantile Hemangioma: Treatment

- Active Non-Intervention
- Topical Steroids
- Intraläsional steroids
- Imiquimod
- Surgery
- Laser (when flat)
- Prednisolone 3mg/kg/day
- Propranolol 2mg/kg/day
- Timolol 0.5% gel-forming solution

Propranolol x 1-month
Propranolol x 1-month

PHACE Syndrome

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PELVIS Syndrome

- Perineal hemangioma
- External genitalia malformations
- Lipomyelomeningocele
- Vesicorenal abnormalities
- Imperforate anus
- Skin tag


SACRAL Syndrome

- Spinal dysraphism,
- Anogenital anomalies,
- Cutaneous anomalies,
- Renal and urologic anomalies,
- associated with Angioma of
- Lumbosacral localization.


Disseminated Neonatal Hemangiomatosis

- Multiple small hemangiomas all over the body
- When > 5, need to image for intrahepatic hemangiomas
- Large intrahepatic hemangioma
  - high output heart failure
  - hypothyroidism (type 3 iodothyronine deiodinase)
Danger Zones for Infantile Hemangioma

- Periocular
- Nasal tip
- Lips
- “Beard” distribution
- Diaper area
- Any area prone to ulceration

Management of Ulceration

- Propranolol
- Comfort care: acetaminophen +/- codeine, topical lidocaine
- Mupirocin ointment
- Metronidazole Gel when in the diaper area
- Petrolatum
- Consider systemic antibiotics
- Laser
Vascular Malformations

- Hamartomas
- Capillary
- Venous
- Lymphatic
- Arterial venous malformations

Capillary Malformation

- Collections of capillaries in the dermis
- Nevus simplex (salmon patch, angel's kiss, stork bite)
- Port-Wine Stain
Vitiligo

- Autoimmune-induced depigmentation of skin
- More obvious in darker skin types
- Can have a few affected areas or be widespread
- Caution must be taken due to risk of sunburn
- Treatment: topical steroids, phototherapy
Warts and Molluscum

Background

- Warts are caused by HPV
- ~100 HPV strains exist
  - HPV 1/3: palmar and plantar warts
  - HPV 6/11: genital warts
  - HPV 2: common warts
- Infect epithelia of skin and mucous membranes

Epidemiology

- Spread via personal contact or fomites (e.g. shower floor, swimming pool, etc)
- High rate of recurrence
- Prevalence of 20% in school children
- Spontaneous regression often occurs
Genital HPV

- 20-45% occurrence in women, probably same in men
- Risk factors:
  - Sexual intercourse at an early age
  - High number of lifetime sexual partners
  - Partner with a high number of sexual partners
  - Men who have sex with men: high risk for anogenital HPV infection

Pathogenesis

- dsDNA virus, non-enveloped
- Spherical capsid
  - 2 proteins: L1 and L2

Warts
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From: Disfiguring Generalized Verrucosis in an Indonesian Man With Idiopathic CD4 Lymphopenia Verrucosis Associated With CD4 Lymphopenia

Clinical appearance of the patient's warts in June 2007 before treatment. A, Chest; B, arm and hand; and C, lower extremities.

Figure Legend:
Clinical appearance of the patient's warts in June 2007 before treatment. A, Chest; B, arm and hand; and C, lower extremities.

Evaluation

• History / Physical
• If atypical:
  – Check CBC with differential
  – Quantitative immunoglobulin's
  – CD4 level
  – Zinc level
• Consider referral for biopsy of numerous (>100) flat warts to r/o EDV
Treatment

- Cytotoxic/antiviral
  - Podophyllin, Cidofovir, 5-fluoruracil, bleomycin, Veregen®
- Physical destruction
  - Liquid nitrogen, electrodesiccation, cantharadin, salicylic acid, retinoids, laser
- Immunomodulators
  - Imiquimod, candida antigen, cimetidine, zinc, contact sensitizers (squaric acid, DCP)

What about duct tape?


The efficacy of duct tape vs cryotherapy in the treatment of verruca vulgaris (the common wart).

Focht DR 3rd, Spicer C, Fairchok MP
Cytotoxic/antiviral

Podophyllin
- FDA-approved for treatment of genital warts in adults
- Podocon-25®
- 25% solution applied in the doctor’s office
- Works by arresting cells in mitosis, resulting in cytotoxicity

Topical Cidofovir
- Not FDA-approved, not commercially available
- Can be compounded into a cream 1-3%, applied to warts twice a day without occlusion
- Often used in immunocompromised patients as a last resort
- Inhibits viral DNA polymerase
- Risk of nephrotoxicity with IV cidofovir

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Topical 5-Fluorouracil

- FDA-approved to treat actinic keratoses and superficial basal cell carcinoma in adults
- Carac®, Efudex® (Texas Medicaid Formulary)
- Applied to warts once or twice daily
- Often used for plantar warts, can be occluded
- Works as a pyrimidine analog, inhibits DNA and RNA synthesis

Bleomycin

- Not FDA-approved for treating warts
- Injected directly into warts
- Very painful
- Works by inhibiting DNA synthesis

Veregen

- Veregen® (sinecatechins)
- FDA-approved for treating genital warts in adults (Texas Medicaid Formulary)
- Applied directly to warts without occlusion three times a day for a maximum of 16 weeks
- Mechanism of action unknown, thought to have antioxidase activity (derived from green tea)
Physical destruction

Liquid Nitrogen
- Use of a cotton swab or spray canister to apply liquid nitrogen to a wart
- Liquid nitrogen is -196°C, works by causing tissue destruction and blistering
- Blisters usually form and will fill with fluid, takes 7-14 days to resolve
- Can leave a scar and warts may recur

Electrodesiccation
- Use of an electric cautery device to physically burn a wart
- Requires use of lidocaine injection prior to use
- Can leave scar and recurrence is common
Laser

- Pulse dye laser (585-595nm) is most commonly used laser
- Works by targeting hemoglobin (red)
- Can curette wart to pinpoint bleeding and then laser the bleeding vessels
- If under general anesthesia, can fully electrodessicate and curette wart, followed by laser of the base

Cantharadin

- Harvested from the blister beetle
- Works by causing a blister upon contact
- Upside: painless
- Downside: often makes warts bigger (ring warts)

Salicylic acid

- Available both OTC and as prescription
- Apply directly to wart once or twice a day
- Works better with occlusion
Topical Retinoids

- FDA-approved for acne
- Tretinoin or adapalene applied once a day (under occlusion) or twice a day (without occlusion) for 1-2 months
- Can apply qHS for flat warts (no occlusion needed)

Immunomodulators

Imiquimod

- FDA-approved for the treatment of genital warts, actinic keratosis, and superficial BCC
- Available as 5% cream (Aldara®) or 3.75% cream (Zyclara®)
- Apply to warts nightly x 1-2 months, cover with duct tape
### Candida Antigen

- Not FDA-approved for treating warts
- Apply 0.1-0.3ml total q month x 3
- Caution on fingers
- Great for older patients who can tolerate the pain

### Cimetidine

- H2 blocker, used for GERD
- Not FDA-approved for warts
- 10mg/kg TID, max 400mg TID
- Thought to increase lymphocyte counts
- Many studies have supported its use while an equal number of studies have denied its efficacy
- Be careful with other drugs (cytochrome p450 inhibitor)

### Zinc

- Zinc Sulfate, not FDA-approved, can get OTC or Texas Medicaid Formulary
- 10mg/kg/day – max of 600mg per day
- Once a day dosing
- Probably most effective in those with zinc deficiency

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Contact Sensitization

- Not FDA-approved
- Squaric acid dibutyl ester 2%
- Diphenylcyclopropenone (DCP) 2%
- Applied to hip and directly to warts for sensitization
- Then lower concentration, usually 0.05%, is applied to warts at home
- Upside: painless, no scarring
- Downside: not covered by insurance, itching can be severe, very unpredictable

My Choice

- First do no harm!
- Salicylic acid under 24 hour occlusion x 1-2 months
- Liquid Nitrogen
- Laser
- Candida antigen
- DCP

Special Situations...
Preadolescent Genital Warts

- Rarely caused by sexual abuse but very important to screen for abuse
- Prenatal, inoculation by care giver, self
- Refer to CPS if story is unusual
- Treat with Aldara 5% cream 5x/week at night, increase to nightly after 1-month
- Can also consider Veregen ointment TID
- Laser is last resort

Nonsexual Transmission of Anogenital Warts in Children: A Retrospective Analysis

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The purpose was to evaluate the prevalence of sexual abuse in patients who were referred to a pediatric gynecologist for evaluation based on the clinical findings of anogenital warts. A retrospective analysis was performed on 121 patients between the ages 6 months and 18 years referred to a pediatric gynecologist after the finding of anogenital warts by a clinical provider, parent or caregiver. A complete physical examination under sedation was performed by a female, trained pediatric gynecologist. Each patient completed a complete medical and family history, including maternal and sibling history for evidence of Human Papillomavirus (HPV) infection. The medical history was reviewed to determine if there were any risk factors suggestive of nonsexual transmission of HPV. Anogenital warts were found in 39 children in this age group with negative maternal or sibling history and no risk factors for nonsexual transmission. Of these 39 patients, 15 (38.5%) were found to have a history of sexual abuse. The prevalence of sexual abuse in this group was 38.5%. The prevalence of sexual abuse in this group with negative maternal or sibling history and no risk factors for nonsexual transmission was 38.5%.

This study also showed the importance of maternal gynecologic history.
Epidermodysplasia Verruciformis

- Inherited (EVER1 or EVER2 mutation) or acquired (via immunodeficiency) propensity to HPV infection of unusual strains such as 5, 8, 9 and others that non-affected people are immune to
- Often looks like flat warts on the arms and hands
- Risk of squamous cell carcinoma

From the Geneva Medical Foundation for Education and Research
Heck’s Disease

- Focal epithelial hyperplasia
- Autosomal dominant
- HPV 13 & 32
- Multiple papules on the buccal, gingival, or labial mucosa
- Rare in Caucasians but common in children of indigenous South Americans or Eskimos
Differential Diagnosis
Molluscum Contagiosum

• Caused by a pox virus
• Common in children, think about STI in adolescents
• Self-limited, average infection lasts about two years
• Treatment: observation, cantharadin, salicylic acid, liquid Band-Aid, imiquimod, liquid nitrogen, home curettage, topical retinoid
Molluscum Dermatitis

- Immune reaction against the molluscum contagiosum virus.
- Can use topical steroids as needed.
- Will resolve once the molluscum infection resolves.
The End

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