Plantar Verruca

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Disclosures

- No relevant disclosures for this topic
Why I love treating warts

- Personal experience as a professional dancer
- Therapeutic challenge
- Satisfying to treat
Who develops warts?

- Peak age is during childhood/young adult, but I have seen...
- But can happen to anyone, at any age, male and female incidence equal
- Immunocompromised
- Infected fomites or skin to skin
The cause: Human Papillomavirus

- ds DNA virus, multiplies in basal layer keratinocytes, induces skin tumors
  - Subtypes: HPV 1, 2, 4, 10, 63
- Strictly intraepithelial, slow growing
- Viral gene expression in keratinocytes
  - Most viral genes are not activated until the infected keratinocyte leaves the basal layer
  - Production of virus particles occurs only at the epithelial surface where the cells are ultimately sloughed into the environment
  - HPV infections have not been shown to be cytolytic; rather, viral particles are released as a result of degeneration of desquamating cells.
*an individual with plantar warts can spread the virus by walking barefoot*
Histology

- Viral multiplication is confined to the nucleus
- Koilocytosis (from Greek *koilos* “empty”) describes a combination of perinuclear clearing (halo) with a pyknotic or shrunken (raisinoid) nucleus
  - characteristic feature of productive papillomavirus infection
No completely effective therapy exists

- Cosmetic or pain

- Goal: restore the skin appearance and clear the visual appearance of the lesion

- Spontaneous regression: 67% within 2 years, but...!

- Must discuss risks/benefits of therapy with patient before therapy; ie **SCAR**
Preaching to the Choir...

- There is no cure or magic bullet
- No therapy is uniformly effective
- Most therapies will come out of your overhead
- Patience and time which your patient doesn’t have
Latent infections stem from HPV DNA in morphologically normal epithelium
- Derived from warts that have regressed or persistent infection: transmitted silently from cell to cell
Another barrier to resolution

- Koebnerization—new lesions in areas of trauma
Describing it...

- Hyperkeratotic covering
  - Callus vs wart?
- Thrombosed capillaries
- Lack of skin lines throughout
- Well defined, geographic
- Mosaic or individual
  - Anatomic location
- Pain on lateral compression
- Bleeding upon debridement
The “mother” wart

- The original (or sometimes largest)
- “baby” or satellite lesions grow up around the original lesion or on opposite foot
- Can be difficult to control due to viral shedding and/or koebner phenom
Differential Diagnosis

- Spitz Nevus
- Epidermal Nevus
- Amelanotic melanoma
- Non-melanoma skin cancer
- Verrucous carcinoma
- Pyogenic granuloma
- Seborrheic keratosis
- Actinic keratosis
- Corns/calluses
- Pitted Keratolysis
- Molluscum Contagiosum
Wart into SCC......HPV’s role?

Coates, Boehm, Leonheart, Vlahovic; Adv Skin Wound Care Sep 2006
Verrucous Carcinoma

Gary Bauer, DPM

Vlahovic et al, Adv Skin Wound Care, 2009
Dermoscopy to differentiate wart vs callus
Dermoscopy to differentiate wart vs callus

JM Bae, BJD 2009 pg 220-222
What do we have, really?

- Debride
- Freeze
- Blister
- Burn
- Laser
- Excise
- Dry
- Torture
Debride it

- Remove that hyperkeratotic covering to enhance further treatment
  - Could we be causing Koebnerization?

- If debriding prior to intralesional injection; **don’t debride** to bleeding! (fluid will escape)

- If debriding prior to pulsed dye or YAG laser, **DO NOT DEBRIDE** to bleeding!
  - Oxyhemoglobin is the target chromophore
Salicylic acid

- First line of treatment for most docs
- Cochrane review
  - 6 RCTs 75% cure
- Does NOT affect the virus, simply breaks up the stratum corneum
- 10–40% at home, higher % compounds for office
- **Advantage**: inexpensive, OTC, EBM support
- **Disadvantage**: time, certain techniques require keeping foot dry
What about trichloroacetic acid?

- EPA in 2011 considered it a complete carcinogen—lab mice & liver cancer, but no human studies
- Dermatologists continue to use TCA for facial peels.
- Not well regulated or studied
Freeze it: Cryotherapy

- Liquid Nitrogen
  - Second line therapy for plantar warts
    - HPV can survive in Liquid Nitrogen, so not virucidal at all
    - Necrotic destruction of infected keratinocytes
  - The other freezers: dimethyl ether (higher temp)

- Spray gun vs cotton bud: no difference
- Technique: halo and double application
  - Hyperkeratosis acts as a thermal insulator!!
  - Using local anesthesia and double: 83% one treatment
  - Buckley, Ir Med J, 2000, pg 140

- Disadvantage: pain, scarring, hyper/hypopigmentation
Cryotherapy

- Risk: “Ring Wart”
Blister it: Cantharidin (Cantharone)

- From *Cantharis vesicatoria*
  - acantholysis; should leave basal layer intact
- Keep occluded for 4 (up to 8) hrs, then wash
  - No need to poke or prod with a needle, etc!!!
  - Use cotton tipped applicator, wooden side
  - Other derms only have it on 45 min
  - Within 24 hrs, may be painful blister (don’t de-roof)
- FDA issue—why you have to buy from Canada
- Disadvantage/Advantage: Pain, blister, No randomized controlled studies, only anecdotal evidence:
  - 80% success rate, Baumbach in Wolverton’s Drug Therapy Book, p 524
Cantharone Plus

- Dormer labs
- CP = 1% cantharidin, 5% podophyllotoxin, 30% salicylic acid combo
- Kacar et al in JEADV 2012 compared to cryotherapy
  - Q 2 weeks for 5 visits
- CP all resolved
- Cryo subjects switched to CP when warts did not resolve
Burn it:
Thermosurgery/Electrosurgery

- Controlled localized heating with a radiofrequency heat generator
- FDA approved for actinic keratoses, keloids, seb kers, warts
- Also used in the derm world for basal and squamous
- Very few pubs on warts:
  - Stern et al Arch Dermatol, vol 128, July 1992, pg 945
  - Tosti et al Derm Surg 2001
Other ways of heating them up

- Hot water (natural springs)
- Exothermic patches
- Ultrasound hyperthermia
- Infrared coagulation
Laser it

- **Ablative**
  - CO₂
    - Targets water, so vaporizes, rates no different than excision
    - **Disadvantage**: SCAR!!!!!!

- **Non-ablative**
  - Pulsed dye, Nd:YAG lasers
  - Target chromophore: oxyhemoglobin
  - **Advantage**: absence of wound/bleeding, fewer treatments, no scar if done properly
  - **Disadvantage**: painful
Pulse Dye Laser

- 585 nm absorbed by oxyhemoglobin
  - Candela, 14–15 J/cm²
- Painful—especially on Fitzpatrick type IV
- Purpura end point!!
- Plantar warts respond less, but less scarring than CO₂
Excise/Curettage it

- **Excision**: The oldest approach, but significant recurrence rate
- Some texts consider it contraindicated due to the scarring and possible cyst formation plantarly
- **Curettage**: under local anesthesia, lesion is curetted and hemostasis is achieved.
Dermal–epidermal interface

- AKA Basement Membrane

- YOU CAN’T SEE THE BASEMENT MEMBRANE!!!

- GO PAST THE BASAL LAYER OF EPIDERMIS (ie into the dermis) AND IT WILL SCAR. The superficial fascia that has been described blends into the reticular layer of the dermis! That has potential for scar, atrophy, etc.
Excision/Curettage case gone awry
Dry it

- **Formaldehyde (Formalin 2–3%)**
  - Dryness of skin
  - Beware in eczema patients due to possible ACD

- **Glutaraldehyde 10%**
  - Beware in sensitive skin
  - Similar to formalin: dryness, dermatitis
Torture it:

- **Podophyllin**
  - Mandrake plant, anti-mitotic agent, causes erythema, swelling, tenderness

- **DNCB (Dinitrochlorobenzene)**
  - Sensitizing agent, mutagenic (no longer should be used)

- **Interferon Injection; IFN-β**
  - Alters cell metabolism
  - Flu-like symptoms
Intralesional Immunotherapy

- *Candida*
- Trichophyton
- Mumps

- 70% of the population has immunity

- Great for mosaics

- Not for immunocompromised, pregnant, etc
Inject 0.1–0.3 cc intralesionally
C.A.E by Allermed
One per month
Mother wart

My research shows…
JAPMA 2015, accepted for publication
Bleomycin

- Cytotoxic polypeptide that inhibits DNA synthesis
- Intrallesional injections
  - Reconstitute with saline
- Rates 26%–90%
- Salk JAPMA 2006 reconstituted 15 U bleo with 10mL Marcaine/epi 0.5%; keep refrigerated
- Local block, then intradermal injection (don’t go subq!!!!), 87% rate over 6 months
- Blood blister normal
- Non-inject technique
Inject Intradermally...

- Place needle almost flat against skin, bevel up. Insert needle.
- Slowly inject agent; watch for wheal to appear. If it does not, withdraw needle slightly and reinject. Do not aspirate before injecting. Do not massage site after injecting.
- Withdraw needle quickly at the same angle as it was inserted. Dispose of needle without recapping.
5–Fluorouracil

- Anti-proliferative agent
  - Likes abnormal keratinocytes
- Apply under occlusion
- 70% clearance in one single blind placebo controlled randomized study; intrallesional!
  - Iscimen JEADV 2004, p 455
- 5% cream under tape occlusion for 12 weeks vs. tape occlusion alone
  - 70% cure rate of cream + tape
  - Salk et al, AAD poster presentation 2005
Imiquimod

- Rx Aldara, a topical immune response modifier, 5% cream
- No RCT’s for warts, but when applied bid had efficacy (can also be used qd under occlusion)
- Indicated for genital warts
- 12 packet box
- **Advantages**: at home use
- **Disadvantages**: expensive, erythema, pruritus potentially
Duct Tape

- Article in Arch Pediatrics popular due to media attention
- Best bet: use on kids who are just afraid and parents can do at home in between treatments
- Wenner et al Arch Dermatol 2007 showed no difference between tape and moleskin and poor resolution rates

**Advantage:** inexpensive
**Disadvantage:** you are an Expert suggesting a home therapy
Do Orals really work?

- $\text{H}_2$ Antagonists (cimetidine and ranitidine)
  - Open labeled studies showed promise, but
  - In three placebo controlled studies, there was no statistical difference between active and placebo

- Zinc (oral, topical, injectable)
  - Only one shown in random, placebo study

- Vitamin A
  - Not sufficient---oral retinoid has shown mild success
Very Little Evidence

- **HPV Vaccine**
  - Quadrivalent HPV types 6, 11, 16, 18 (Gardasil)
  - Landis et al JAAD 2012

- **Injection of Vitamin A**
  - Indian J Dermatology July 1974; 1959, 1961

- **OTC Essential Oils**
  - Nurse Practitioner March 2006

- **Calcipotriol**
  - Pediatric Derm July–Aug 2005

- **Sulfur**
  - J Drugs Dermatol July–Aug 2004
Other non-conventional methods

- Suggestion
- Emu Oil
- Thuja supplement
- Hypnosis
- Garlic
  - Topical not oral
- Distance Healing
How I approach it...

- Location
- Amount
- Pain
- Hyperhidrosis presence
- Fear of needles or extreme pain
- Pregnancy, child, or “adult” child
- Willingness to try a “natural” therapy
- Never treated wart vs The Kitchen Sink
- I generally use combination therapy: laser plus, etc etc
Pulsed dye laser plus candida
HIV+ patient and topical phytotherapy

First shown at AAD 2007, poster session
Phytotherapy in a non-immunocompromised patient

11/05/07

12/11/07
Thank you!