Common Dermatologic Infections

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Disclosures

- No disclosures
Case 1

- 50 year-old male presents with “itchiest rash ever” on his hands, wrists, axilla, periumbilical region, and groin
What would you do next?

A. Skin biopsy
B. Scabies preparation
C. Empiric topical steroids + antihistamine
D. Empiric topical antifungal
What would you do next?

A. Skin biopsy
B. Scabies preparation
C. Empiric topical steroids + antihistamine
D. Empiric topical antifungal

Scabies prep - negative

This does not exclude scabies

Image courtesy of Dr. Luis Requena
Scabies infection

Burrowing of mite into skin

- 2-4 weeks

Hypersensitivity reaction

- “Itchiest rash ever”
- Finger webs, wrists, axilla, periumbilical, groin, breasts, spares face

• Asymptomatic
• Typical burden: 10-15 mites

Skin scraping

- Method:
  - Identify burrows
  - Apply a 1-2 drop of mineral oil to burrows and slide
  - Scrape with scalpel
  - Rub contents from scalpel onto glass slide
  - Apply cover slip

https://www.google.com/search?q=scabies+preparation&safe=off&source=l1280&bih=685#q=scabies+preparation+scalpel&safe=0

Positive skin scraping


Skin scraping

- Frequently, testing is negative since
  - Burrows can be difficult to identify
  - Mite burden usually low
Treatment options

- Antiscabetic therapy
  - Permethrin
  - Precipitated sulfur 5-10%
  - Ivermectin (systemic therapy)
  - Lindane
  - Crotamiton
  - Benzyl benzoate

- Symptomatic treatment
  - Topical steroids and antihistamines used liberally

Topical treatment: Permethrin

- FDA approved for treatment of scabies (> 2 mo age)
- Pregnancy category B
- Formulation: 5% topical cream (Elimite)
- Treatment regime
  - Apply from neck down in the evening and leave on overnight
  - Repeat in 1-2 weeks
- Advantages:
  - Every effective
  - Few side effects
- Disadvantages/side effects
  - Erythema, burning upon application, contact dermatitis, requires application

Topical treatments: Sulfur

- 5-10% precipitated sulfur in petrolatum base
- Safe option in infants and pregnant women
- Applied 3 successive nights
- Advantages:
  - Safe with low toxicity
  - Inexpensive
- Disadvantages/side effects:
  - Irritation
  - Messy, malodorous, stains clothing


Oral treatment: Ivermectin

- Used off-label for treatment of scabies
- Treatment regimen: 200 mcg/kg x 1 and repeat in 1-2 weeks
- Advantages
  - Oral
  - Effective
- Disadvantages/side effects
  - Rare report of neurotoxicity
  - Death in 15/47 a long-term care facility residents over 6 months
  - Similar studies did not demonstrate these findings
- Caution when using in the elderly
- Do not use in children < 5 years due to theoretical neurotoxicity
- Avoid in pregnancy

CDC treatment guidelines

- Permethrin: medication of choice
- Ivermectin: failed treatment, cannot tolerate permethrin, permethrin not feasible

http://www.cdc.gov/parasites/scabies/health_professionals/meds.html

Additional clinical pearls

- After treatment, symptoms may worsen due to sensitization, not treatment failure
- Rule of thumb at UCSF: if not better in 3-4 weeks, consider an alternative diagnosis

Differential diagnosis:
Pruritic erythematous papules

- Inflammatory skin disease
  - Dermatitis herpetiformis
  - Prurigo nodularis
  - Lichen planus
- Arthropod bites
  - Fleas, bedbugs, mosquitoes
- Drug reaction

https://expertconsult.inkling.com/
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Delaunay P et al. CID 2011;52:200;
Which of the following is a type of cutaneous lymphoma that can clinically resemble a scabies infestation?

- A. Mycosis fungoides
- B. Anaplastic large cell lymphoma
- C. Marginal zone lymphoma
- D. Lymphomatoid papulosis
- E. Subcutaneous panniculitis-like T-cell lymphoma
If skin scrapping negative but high index of suspicion, empirically treat
If no improvement, consider skin biopsy to evaluate for other entities on differential diagnosis

Take home points

- Highest-yield place to detect mite is a burrow
- Mites usually not present within papules
- Scabies preparation often negative
- Might worsen before resolution
- Consider skin biopsy to evaluate for alternatives if no improvement
Take home points:
Differential diagnosis:
Pruritic erythematous papules

- Inflammatory skin disease
  - Dermatitis herpetiformis
  - Prurigo nodularis
  - Lichen planus
- Arthropod bites
  - Fleas, bedbugs, mosquitoes, scabies
- Drug reaction
- Neoplastic
  - Lymphomatoid papulosis

Case 2

- 50 year-old HIV-positive male who is homeless gets admitted for pneumonia
- Internal medicine team notices he has widespread erythematous and scaly rash
- Dermatology consult
Diagnosis

A. Psoriasis
B. Eczema
C. Crusted (hyperkeratotic/Norwegian) scabies
D. Pityriasis rosea
E. Allergic contact dermatitis
Diagnosis

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Crusted (Hyperkeratotic) Scabies

- Clinical findings
  - Thick white plaques with fine scale ("white sand stuck on the skin")
  - Widespread

- Risk factors
  - Immunosuppression
  - Elderly
  - Impaired sensation

- Heavy-mite burden
- Easily transmitted
Crusted scabies

- Skin scrapping often positive
- Infection control challenge
- Treat with Ivermectin plus permethrin, more frequently

Differential diagnosis: Papulosquamous

- Inflammatory
  - Psoriasis
  - Eczema
- Infectious
  - Secondary syphilis
  - Pityriasis rosea
  - Erythema migrans
  - Tinea infection
- Neoplastic
  - Mycosis fungoides
Differential diagnosis: Papulosquamous

- Inflammatory
  - Psoriasis
  - Eczema

- Infectious
  - Secondary syphilis
  - Pityriasis rosca
  - Erythema migrans
  - Tinea infection

- Neoplastic
  - Mycosis fungoides

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Differential diagnosis

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<th>Erythrodermic psoriasis</th>
<th>Crusted scabies</th>
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<td><img src="image2.jpg" alt="Crusted scabies" /></td>
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Differential diagnosis

- Erythrodermic eczema
- Crusted scabies

Take home points

- Keep on differential diagnosis of papulosquamous eruption in older, debilitated or immunosuppressed patient
- Easily transmitted due to high mite burden
- Treat with ivermectin plus permethrin
Take home points:
Differential diagnosis: Papulosquamous

- Inflammatory
  - Psoriasis
  - Eczema
- Infectious
  - Secondary syphilis
  - Pityriasis rosea
  - Erythema migrans
  - Tinea infection
- Neoplastic
  - Mycosis fungoides

Case 3

- 35 year-old female presents with “round red circles” on her trunk and extremities
- Self-diagnosed as eczema
- Used husband’s eczema medication (topical steroid), but plaques worsened
What additional information should you seek?

A. Ask about recent tick bites
B. Take a sexual history
C. Perform a KOH preparation
D. All of the above
KOH prep of our patient

Diagnosis

- Tinea corporis
Tinea

- Superficial fungal infection
  - Sites of infection:
    - Upper layer of the epidermis (stratum corneum)

Clinical manifestations

- Annular erythematous scaly papules and plaques
- Central clearing with "advancing border"
Atypical manifestations of tinea

- Dermatophytic folliculitis
  - Also called Majocci granuloma/tinea incognito
  - Often after Rx with topical steroids
  - Invasion of hair shaft
  - Absence of scale

Conventional tinea infection  
Dermatophytic folliculitis
KOH preparation

- Apply alcohol swab to AA
- Scrape scale onto glass slide
- Scrape scalpel onto slide
- Apply 1-2 drops of KOH
- Apply cover slip
- If KOH w/o DMSO, gently heat with alcohol lamp or lighter for 2-3 seconds
- Examine under low-power for hyphae

Treatment of tinea

- Limited superficial infection:
  - Topicals recommended
    - Clotrimazole, econazole, oxiconazole
    - Terbinafine

- Extensive infection, immunocompromised, or failed topicals:
  - Systemic therapy recommended (See Appendix A dosing regimens)
Additional clinical pearls

- Empiric treatment of a “rash” with a combination topical steroid/antifungal combination
  - Treatment failure
  - Alteration in clinical appearance, including dermatophytic folliculitis
- Skin biopsy useful if KOH difficult to interpret/negative but still high index of suspicion for disease/dermatophytic folliculitis possible


Differential diagnosis: Papulosquamous

- Inflammatory
  - Psoriasis
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Psoriasis

Tinea
Eczema

Tinea

Differential diagnosis: Papulosquamous

- Inflammatory
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  - Eczema
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Secondary syphilis  Tinea

Pityriasis rosea  Tinea
Erythema migrans

Crusted scabies

Tinea
Differential diagnosis: Papulosquamous

- Inflammatory
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Mycosis fungoides

Tinea
Take-home points

- If it scales, scrape it!!
- Consider skin biopsy
- If misdiagnosed as an inflammatory condition and treated with topical steroids, may present in atypical fashion as dermatophytic folliculitis
- Localized disease, treat with topical therapy
- Widespread disease, treat with systemic therapy

Take home points
Differential diagnosis: Papulosquamous

- Inflammatory
  - Psoriasis
  - Eczema
- Infectious
  - Secondary syphilis
  - Pityriasis rosea
  - Erythema migrans
  - Tinea infection
  - Crusted scabies
- Neoplastic
  - Mycosis fungoides
Case 4

- 50 year-old patient concerned about appearance of toe nails
- Read about laser treatment and some new topical treatments, and wants to know your opinion about them
Laser treatment for onychomyosis:

A. Is effective for every patient and works quickly  
B. Has been shown to have a limited beneficial effect in a small number of patients  
C. Is superior to terbinafine  
D. Covered by most insurance carriers

Laser treatment for onychomyosis is

A. Is effective for every patient and works quickly  
B. Has been shown to have a limited beneficial effect in a small number of patients  
C. Is superior to terbinafine  
D. Covered by most insurance carriers
Onychomycosis: Laser treatment buzz

- Noveon®
- ALA-PDT
- Cost $750-1500
- Treatment not covered by most insurance carriers
- MOA: selectively damage fungi without harming adjacent tissue


Noveon®

- FDA cleared for other indications, not onychomycosis
- n=26

Treatment vs. Control

- Unchanged or worse: 23% vs. 55%
- Slight or moderate improvement: 69% vs. 27%
- Marked improvement or cleared: 8% vs. 18%

Limitations

- Nail debridement was not controlled for

Figure 6. Representative treated case with mild disease at baseline (A) and with, at most, minimal residual disease after 180 days (B).


Efinaconazole (Jublia)

- 10% topical solution
- Applied once daily for 48 weeks
- No debridement

Efinaconazole

- Complete cure rates (in study)
  - Efinaconazole: 17.8% and 15.2% (2 trials)
- Package insert: Complete or almost complete cure, 23-26%
- Oral itraconazole 14%
- Oral terbinafine 38%

Onychomycosis: standard treatment

- Oral terbinafine 250 mg PO QD
  - x 6 weeks for fingernails
  - x 12 weeks for toenails
- Alternative: itraconazole (See Appendix B for dosing regimens)

Who to treat?
- Consider no treatment in otherwise healthy patients
- Consider treatment for diabetic patients with recurrent cellulitis

Take home points

- Laser treatment
  - Cost is high
  - Not covered by insurance carriers
  - Studies available not particularly impressive
- New topical treatment: Efinaconazole
  - Inferior complete cure compared to oral terbinafine
- Oral terbinafine still most effective treatment
Case 5

- 55-year old male presents with “red, itchy bumps” on his face, arms, and legs
- He and his wife returned from a weekend vacation to New York City 5 days prior to presentation
- Rash began the day he returned
- Based on news reports he was concerned about bedbugs
- Wife without symptoms

Image courtesy of Timothy Berger, MD
Bedbugs in the news

http://www.freebedbugadvice.com/bed-bugs-have-gone-mainstream/
**Bedbugs**

- Ectoparasites: “blood meals”
- Primary host: humans
- Typically feed at night while host sleeps
- After blood meal, seek areas that are warm and dark
- Can travel 100 feet, but usually live within 8 feet of host
- Lifespan: 6-12 months. Can survive for months without feeding
- Transmission: direct between hosts, ventilation ducts, luggage


Clinical manifestations: cutaneous

- No reaction seen in ~ 30%
- Erythematous pruritic papules/nodules, sometimes in linear configuration (breakfast, lunch, dinner)
- Often on exposed body sites, including face
- Bites not felt, lesions 1-2 (up to 14) days after bite
- Blood spots or skin from molting seen on sheets

Clinical manifestations: cutaneous

Differential diagnosis: Pruritic erythematous papules

- Inflammatory skin disease
  - Dermatitis herpetiformis
  - Prurigo nodularis
  - Lichen planus

- Arthropod bites
  - Fleas, bedbugs, mosquitoes, scabies

- Drug reaction

- Neoplastic
  - Lymphomatoid papulosis
How do you make diagnosis?

1. Clinical suspicion
   - Morphology and distribution of clinical lesions
   - Blood spots, skin from molting
2. Identification of bed bugs
   - Licensed pest control operator
3. Confirm clinical resolution after eradication
4. Exclude other possibilities – skin biopsy might be needed

Bedbugs, a vector of infection?

- Bedbugs have been proven to carry 45 pathogens
  - Hepatitis B virus
- No definitive evidence of transmission to host
- However, recent study suggested might be vector of T. Cruzi in animal model

Delaunay P et al. Bedbugs and Infectious Diseases. CID 2011;52:200
Bedbugs management

- Bedbug eradication
- Symptomatic therapy
  - Bites do not require treatment
  - If patient uncomfortable:
    - Oral antihistamines
    - Topical mid-potency corticosteroids


Take home points

- Not all people exposed to bed bugs will develop clinical disease
- Diagnosis is based on clinical suspicion plus identification of bedbugs
- Eradication necessary to eliminate infestation
- Treat if symptomatic
Take home points: Differential diagnosis: Pruritic erythematous papules

- Inflammatory skin disease
  - Dermatitis herpetiformis
  - Prurigo nodularis
  - Lichen planus
- Arthropod bites
  - Fleas, mosquitoes, scabies, bed bugs
- Drug reaction
- Neoplastic
  - Lymphomatoid papulosis

Case 6

- 54 year-old woman with hypertension, status-post knee replacement surgery who developed a prosthetic knee joint infection
- Initially treated with nafcillin x 4 weeks and then transitioned to trimethoprim and sulfamethoxazole (TMP-SMX)
- 2.5 weeks after starting TMP-SMX, develops fevers to 39°C
Case 6, cont.

- Three days later, morbilliform rash
- Rash started on the face, neck and upper arms, then spread to the lower extremities
- Periorbital and mid-facial edema
- Diffuse lymphadenopathy involving cervical, axillary and inguinal nodes
Laboratory values

- CBC with differential:
  - WBC: 25
  - Eosinophil count: 3.0 (normal: 0-0.4)
- AST 125; ALT 110
- Blood cultures x 2: negative
Differential diagnosis

- Infection
- Drug reaction

Drug chart

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The most likely diagnosis is:

A. Sepsis from prosthetic joint infection
B. Simple morbilliform drug eruption
C. Drug-induced hypersensitivity syndrome to Septra
D. Leukemia with cutaneous involvement
E. Drug-induced hypersensitivity syndrome to nafcillin
Drug-induced hypersensitivity syndrome (DIHS)

- Potentially life-threatening adverse drug reaction
- Skin rash AND internal organ involvement
- Initially observed in patients on anticonvulsants
- Previously:
  - Phenytoin hypersensitivity syndrome
  - Anti-convulsant hypersensitivity syndrome
  - Drug reaction w/ eosinophilia and systemic symptoms (DRESS)

DIHS: Cutaneous manifestations

- Primary morphology: maculopapular, morbilliform
- Often preceded days of by fevers
- Starts on face and upper body spreads distally
- Peri-ocular and facial edema
- Skin edema → vesicles, bulla
DIHS: Internal involvement

- Hepatic (70-90%):↑AST/ALT, AlkPhos.
- Lymphadenopathy (75%) –local or general
- Hematologic system
  - Leukocytosis, WBC up to 50, atypical lymphocytes
  - Eosinophilia >2.0 (normal 0.0-0.4)
- Renal (11%): often interstitial nephritis
- Occasional cardiac and thyroid involvement

Standard initial evaluation

- CBC with differential
- LFTs
- BUN/Creatinine
- Depending on symptoms
  - EKG, Echocardiogram (TTE)
  - TSH, T4
Standard monitoring if DIHS confirmed

- Monthly TSH, T4 x 6 months

Most common agents

- Sulfonamides (sulfamethoxazole, etc.)
- Anticonvulsants (phenytoin, carbamazepine)
- Minocycline
- Allopurinol
- Nevirapine
- Abacavir
- Dapsone
DIHS: Timing

- Usually develops within 2-6 weeks after starting on new medication
- Can start sooner on re-challenge

Drug chart

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Rash

Treatment and prognosis

- Discontinue offending medication
- Systemic steroids for internal involvement, usually with starting dose of 1 to 1.5 mg/kg/day
- 10% mortality rate, usually from fulminant hepatitis
Cutaneous drug reactions

- DIHS
- Simple drug rash
- Life-threatening drug rashes
  - Bullous drug reactions - Stevens-Johnson syndrome (SJS)/toxic epidermal necrolysis (TEN)
Simple drug rash

- Clinical morphology can be nearly identical to DISH, although face usually not involved
- No visceral involvement
- Usually develop within first 2 weeks of new med
- Often start in the groin/axilla and then generalize within 1-2 days
- Standard evaluation: CBC with diff, LFTs, BUN/Cr

Simple morbilliform eruption
Cutaneous drug reactions

- DIHS
- Simple drug rash
- Life-threatening bullous drug rashes
  - Bullous drug reactions: Stevens-Johnson syndrome (SJS)/toxic epidermal necrolysis (TEN)
Bullous drug reactions: SJS/TEN

- **Clinical morphology:**
  - Start: erythematous, dusky red or purpuric macules
  - Next: Coalesce to bullae that break easily
    - Large sheets of epidermis slough from underlying dermis
    - Asboe-Hansen sign
    - Angulate regions
- **Timing:**
  - 7-14 days after medication, sooner if re-exposure

Bullous drug reactions: SJS/TEN

- **Definitions arbitrary:**
  - SJS < 10 % BSA w/ ≥ 2 mucosal surfaces
  - SJS/TEN overlap 10-30% BSA
  - TEN > 30% BSA
- **Histopathology helpful:**
  - Lymphocytes along the dermal-epidermal junction
  - Necrotic keratinocytes and full-thickness necrosis
- **Differential diagnosis**
  - Staphococcus scaled scale syndrome
  - Paraneoplastic pemphigus
  - Histopathology can help distinguish
Case 6: Take home points

- Drug chart important
- DIHS - later onset than most other drug reactions
- DIHS involves multiple visceral organs
- Since DIHS clinical morphology can be identical to a simple drug eruption, evaluate for systemic involvement in any drug rash
- Clinical morphology can be helpful in narrowing the type of drug reaction
- Histopathology helpful in some drug reactions
Case 7

- 55 year-old woman with obesity, chronic venous insufficiency and onychomycosis presents for evaluation of erythematous plaques on the lower legs
- Recently developed ulceration over medial malleolus
- Plaques are slightly tender to palpation and warm
- Afebrile
The most likely diagnosis is

A. Bullous pemphigoid
B. Venous stasis dermatitis
C. Eczematous/nummular dermatitis
D. Erythema nodosum
E. Cellulitis
Venous stasis dermatitis

- Bilateral involvement, usually
- Pitting edema
- Varicosities
- Hyperpigmentation
- Cutaneous inflammation - sharply demarcated erythematous papules coalescing into a plaque
  - Secondary hyperkeratosis, vesicles, crusting, ulceration, usually of medial malleolus
- If red, hot or tender, only mildly
Venous stasis dermatitis


Differential diagnosis

- Cellulitis
- Nummular/eczematous dermatitis
Differential diagnosis

- Cellulitis

- Nummular/eczematous dermatitis

Cellulitis

- Unilateral, usually
- Edematous – fine wrinkling not evident as skin surface appears smooth and taught
- Painful
- Warm
- Irregular border
- Skip areas, sometimes
- Fever, frequently but not always
- Ascending lymphangitis
- Regional LAD
Predisposing factors for cellulitis

- Trauma to skin
- Tinea pedis/onychomycosis
- Underlying lymphatic or vascular compromise
- Obesity
- Edema
Inflammatory dermatoses often mis-diagnosed as cellulitis

- Approx. 33% of cases misdiagnosed of cellulitis reported
  - Other diagnoses “pseudocellulitis” included
    - Eczema
    - Stasis dermatitis

Differential diagnosis

- Cellulitis
- Eczematous/nummular dermatitis

Arakaki RY. JAMA Dermatol 2014;150:1056
David CV Dermatol Online J 2011;17:1
Eczematous/nummular dermatitis

Take home points

- Cellulitis usually unilateral, poorly demarcated, and associated with lymphangitis and LAD
- Venous stasis dermatitis and eczematous/nummular dermatitis often mis-diagnosed as cellulitis
- Consider dermatology consultation if unsure if cellulitis is the correct diagnosis
Case 8

- 45 year-old HIV-positive patient presents for evaluation of a lesion in the groin
- CD4 count 350 cells/µL
- Viral load undetectable
- The lesion has developed over the past 2 months
What would you do to evaluate this lesion?

A. Empiric treatment for genital warts
B. Herpes viral culture and/or direct fluorescent antigen (DFA) test
C. Empiric treatment for condyloma lata
D. Skin biopsy
E. B and/or D
Viral culture/DFA results

- HSV I

Verrucous herpes infection

- Occurs in immunosuppressed patients
- More in number compared with conventional herpes
- Lesions can become vegetative and hypertrophic nodules or plaques
- Slower to heal 2/2 ineffective cell-mediated immunity

Lehloeny R Dermatol Clin 2006;24:549.
Conventional herpes

Verrucous herpes infections


http://www.abstractsonline.com/plan/ViewAbstract.aspx?Key=d110fa2.6400-4c0c-8d1b-0ace2a52e94b&key=0b6a07e-46c4-4cfa-0212-2c26d09c0d
Differential diagnosis:
Hypertrophic genital plaques

- Infection
  - Condyloma acuminata
  - Condyloma lata
- Squamous cell carcinoma

Condyloma acuminata
Verrucous herpes

https://expertconsult.inkling.com/read/dermatology-bologna-jorizzo-schaffer
Herpes in immunocompromised - widespread distribution

Herpetic whitlow
Take home points

- In immunocompromised host, herpes can present with a more verrucous morphology and a more widespread distribution than conventional herpes
- Verrucous herpes often mis-diagnosed as condyloma or squamous cell carcinoma
- Consider skin biopsy if unsure of diagnosis
- Herpetic whitlow is herpes infection on fingers

Acknowledgments

- Timothy Berger, MD – clinical photos
- Raza Aly, MD – clinical photos
- Luis Requena, MD – clinical photos
- Lindy Fox, MD – clinical photos
- Kanade Shinkai, MD – clinical photos
Appendix A:
Treatment of tinea: Oral regimens

- Extensive infection, immunocompromised, or failed topicals: Systemic therapy recommended
  - Terbinafine 250 mg QD x 1-2 week
  - Fluconazole 150 mg Q week x 2-4 weeks
  - Itraconazole 200 mg QD x 1-2 weeks
  - Griseofulvin 250 mg TID x 2 weeks

Appendix B:
Onychomycosis: Itraconazole regimens

- Fixed dose
  - Fingernails – 200 mg PO x 6 weeks
  - Toenails – 200 mg PO x 12 weeks

- Pulse therapy
  - Fingernails – 200 mg PO BID x 1 week/month x 2 months
  - Toenails – 200 mg PO BID x 1 week/month x 3 months