COMMON SKIN INFECTIONS

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OUTLINE

• ‘EVERYDAY’ INFECTIONS
  – STAPH AND STREP
  – HERPES SIMPLEX AND ZOSTER
  – DERMATOPHYTES, CANDIDA, TINEA VERSICOLOR
• FEW MISCELANEOUS LESS COMMON INFECTIONS
• MIMICKERS OF INFECTION

EVERDAY INFECTIONS...

PART 1
CELLULITIS

- **Superficial Spreading Infection of Skin (without pus)**

- **Key features:**
  - Skin: redness, edema, warmth, pain, +/- hemorrhage into skin
    - Redness has well demarcated, but often irregular border; may spare portions of the skin in unpredictable pattern
  - Edema gives skin a smooth, taut appearance
  - Inflammation disrupts blood vessels, causing petechiae, nonblanching erythema, ecchymoses or hemorrhagic blisters
    - +/- lymphangitic streaking
  - Systemic: fever, chills, tachycardia, hypotension, leukocytosis (35-50%)
    - NOTE: 30-80% of patients are afebrile

- **Predisposing factors:**
  - Advanced age, obesity, past episode of cellulitis (annual recurrence 8-20%)
  - Local predisposing factors: venous insufficiency, edema, disruption of skin surface (ulceration, trauma, eczema, toe-web space maceration)

- **Offending organisms**
  - *Streptococci* groups A, B, C, F and G: 75-90%
  - *Staphylococcus aureus* (typically MSSA): 10%

CELLULITIS: **CULTURE?**

- Blood cultures: positive in <5% of cases
- Needle aspirates: positive in 5-40%
- Punch biopsy culture: positive in ~20%
- Swabs of open lesions: difficult to separate pathogenic organisms from colonizers
  - Culture via aspirate or punch biopsy reasonable in immunocompromised hosts failing to respond to empiric therapy, otherwise cultures typically unnecessary
CELLULITIS: ANTIBIOTICS

- Oral therapy equivalent to IV in most patients who are not seriously ill
- Empiric Strep + MSSA coverage: Penicillinase-resistant penicillin (e.g., dicloxacillin)
- If improved by 5 days of oral ABX, an additional 5 days is not necessary
- When to cover for MRSA: “purulent cellulitis,” seriously ill patients, other sites of MRSA, failure to respond to coverage for MSSA

CELLULITIS: MANAGEMENT

- Address predisposing factors:
  - Tinea pedis, stasis dermatitis, trauma, etc
  - Tinea pedis - Consider chronic topical antifungal to web spaces
- Leg elevation
- Role of antiinflammatory medications?
  - Ibuprofen 400 mg q6hours for 5 days
  - Prednisone 40 mg daily for 7 days
- Frequent recurrences: consider twice daily oral penicillin or erythromycin

STAPH FOLLICULITIS AND FURUNCLES

- Cutaneous abscesses associated with follicles
- Key features: central pustule with surrounding erythema. Often multiple lesions.
- S. aureus is typical offender (MSSA or MRSA)
  - Patients often harbor the offending strain in nares, umbilicus or perineum
STAPH FOLLICULITIS AND FURUNCLES

• Drainage (I&D) is treatment of choice

• Send swab culture from drainage

• Swab nares, umbilicus and perineum to check colonization
  — Consider decolonizing strategies:
    • Mupirocin intranasal TID x 5 days
    • Chlorhexidine (Hibicleans) washes or Dilute bleach baths
      (1/4-1/2 cup bleach in 1/2 tub of bath water)

IMPETIGO and ‘IMPETIGINIZATION’

• Impetigo: superficial skin infection by S. aureus or Group A strep

• ‘Impetiginization’: staph secondarily infecting another primary skin condition (e.g. atopic dermatitis)

• Key features: ‘honey-crusted’ plaques, may see fine scale-crust at periphery

IMPETIGO and ‘IMPETIGINIZATION’

• Management:
  — Swab culture for sensitivities
  — If minor/localized: topical antimicrobials (e.g. mupirocin ointment) or sodium hypochlorite compresses (Dakin’s solution)
  — If more extensive: oral ABX w/ empiric MSSA coverage x 5 days (consider MRSA coverage if past MRSA infection)
PERIANAL STREPTOCOCCAL CELLULITIS

- Localized streptococcal skin infection; children <10 most affected

- Key features: perianal or perineal erythema with sharp demarcation +/- fissures and crust

- Swab culture needed to document Group-A Strep; S. aureus can be causative organism with identical presentation

EVERYDAY INFECTIONS... PART 2

HERPES SIMPLEX VIRUS

- Key features:
  - Grouped vesicles or vesiculopustules (cloudy vesicles) on an erythematous base
  - Recurrent episodes affecting the same anatomic area

- Diagnostic tests:
  - Tzanck prep:
    - Scrape base of ulcer after un-roofing vesicle, dab lightly onto slide, stain with methylene blue or giemsa (nuclear stain), evaluate under 40x for multinucleated keratinocytes
  - Viral culture, PCR or Direct Fluorescent Antigen Testing:
    - Un-roof vesicle and vigorously scrape or swab base
  - If no intact vesicles, scrape or swab base of ulcer
  - Serum HSV1 or 2 Antibody screening? Not for dx active disease
    - Majority of population is HSV2 Ab positive, so not a good diagnostic test for whether a skin ulcer, blister, skin finding is due to HSV1
HERPES SIMPLEX VIRUS

• Primary infection
  – Signs develop 3-7 days after exposure
  – Findings often more dramatic clinically
  – May have associated fever, lymphadenopathy, malaise, dysuria (genital)
  – Recovery takes 2-6 weeks

• Recurrence
  – Itching, burning or pain typically precedes active lesions
  – Typically lacks systemic symptoms

HERPES SIMPLEX VIRUS: Treatment

• Primary infection
  – Immunocompetent
    • Oral/or genital: valacyclovir 1000 mg PO q12h x 7-10 days, or Acyclovir 400 mg 5-6 times/day
  – Immunosuppressed
    • Same as above; if severe consider IV acyclovir 5-10 mg/kg q8h

• Recurrence
  – Immunocompetent
    • Oral/or genital: valacyclovir 1000 mg PO q12h x 5-10 days, or Acyclovir 400 mg 5-6 times/day
  – Immunosuppressed
    • Same as above; if severe consider IV acyclovir 5-10 mg/kg q8h

• Suppression
  – Oral/or genital: valacyclovir 500-1000 mg qd (1000 mg daily if >10 episodes per year)

ECZEMA HERPETICUM

• Aka Kaposi’s Varicelliform Eruption

• Key features:
  – multiple discrete 2-3 mm punched out ulcerations, vesicles and hemorrhagic crusts over area of skin affected by another disease process
  » Pustules may be present due to staph superinfection
  » Pain typically pronounced
ECZEMA HERPETICUM

- Reflects disseminated cutaneous HSV affecting a region of damaged skin
- Can complicate:
  - Atopic dermatitis (most common)
  - Burns
  - Sézary Syndrome
  - Darier’s disease
  - Pemphigus Vulgaris
  - Laser resurfacing

ECZEMA HERPETICUM: MGMT

- IV Acyclovir 10 mg/kg q8hrs
- Consider ABX for impetiginized lesions
- Ophthalmology evaluation if lesions near eyes

SHINGLES / ZOSTER

- Key features:
  - Grouped vesicles on an erythematous base in a dermatomal distribution
  - Evolves: macules and papules → vesicles → pustules
  - New lesions develop over 3-5 days
  - Crusting typically occurs in 7 days
  - Pain variable but typically present; itch common.

- Diagnostic tests
  - Diagnosis typically can be made clinically
  - PCR (from base of unroofed vesicle) more sensitive than DFA for VZV
SHINGLES / ZOSTER

- Risk increases with age
  - patients living to age 85 y/o have a 50% lifetime risk of shingles
- Patients with impaired T-cell immunity (HIV, iatrogenic) at particular risk

COMPLICATIONS OF ZOSTER

POST-HERPETIC NEURALGIA

- Pain persisting >90 days after rash has resolved
- Affects 10-50% of patients
- Risk increases with age and shingles severity
- Antiviral agents do not reduce risk of post-herpetic neuralgia
- Risk is lower in patients who have received Zoster vaccine who develop shingles
ANTIVIRAL THERAPY FOR ZOSTER

• Indications for treatment:
  – Age >50
  – Moderate to severe pain
  – Severe Rash
  – Involvement of face or eye
  – Complications of herpes zoster present
  – Immunocompromised state

ANTIVIRAL THERAPY FOR ZOSTER

• Benefits of Antiviral Tx (when dosed within 72 hrs of onset):
  – speeds resolution of lesions
  – reduces formation of new lesions
  – reduces viral shedding
  – decreases severity of acute pain

• Valacyclovir > Acyclovir
  – better bioavailability and higher serum levels are needed to treat VZV vs. HSV
  – More efficacious at reducing acute pain
  – Dose: 1000 mg TID PO x 7 days

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SHINGLES / ZOSTER VACCINE

• Vaccine approved >50 y/o
  – Efficacy at preventing zoster:
    • 70% in 50-59 y/o
    • 64% in 60-69 y/o
    • 38% in >70 y/o
  – Reduces incidence of post-herpetic neuralgia by ~2/3rds (including >70 y/o)
  – Safe in patients w/ hx of Zoster
    • Likely best to wait 3 years after shingles to administer

DISSEMINATED HSV/VZV

• Typically restricted to immunosuppressed hosts with defective cell-mediated immunity
• Disseminated cutaneous zoster:
  – >20 vesicles outside the area of primary or adjacent dermatomes
• Admission > IV acyclovir 5-10 mg/kg q8hours (higher dose for VZV)
• Warrants work-up for visceral involvement
  – e.g. hepatic, pulmonary, CNS, et

EVERDAY INFECTIONS...

PART 3
DERMATOPHYTOSIS

• TINEA PEDIS, CORPORIS, CRURIS, MANNUM, FACIEI
  – Key features: annular erythematous patches/thin plaques with peripheral scale (at leading edge of erythema)

• MAJOCCHI’S GRANULOMA
  – Key features: above, plus pustules and indurated follicular-based papules and nodules

DERMATOPHYTOSIS

• TINEA CAPITIS:
  – Key features: Alopetic patches w/ associated scale
    • Pustules, edema, lymphadenopathy may be present
  – Children age 3-7 y/o most affected
  – Trichophyton tonsurans (#1 in U.S.), Microsporum canis (#1 worldwide)

DERMATOPHYTOSIS

• DIAGNOSTIC TESTS—nothing 100%:
  – KOH prep:
    • scrape scale from leading edge onto a glass slide using a 15-blade or second glass slide, add cover slip, place drop of KOH at edge of cover slip
    • evaluate under 10x magnification for branching longitudinal hyphae which cross over keratinocyte cell walls
  – Fungal culture: apply scrapings to fungal culture media — results take 2-4 weeks
  – Punch Biopsy for H&E/PAS staining
  – T. capitis: send scrapings and plucked hairs for culture
DERMATOPHYTOSIS: Treatment

• **TINEA PEDIS, CORPORIS, CRURIS, MANNUM, FACIEI**
  - **Localized / minor—topical therapy:**
    - Clotrimazole cream BID x 2-4 weeks
    - Terbinafine cream BID x 2-4 weeks
  - **Widespread / severe—consider systemic therapy:**
    - Oral terbinafine 250 mg qd x 2 weeks
    - Oral fluconazole 150 mg qweek x 2-4 weeks

• **MAJOCCHI’S GRANULOMA**
  - Topical therapy often fails
  - Oral terbinafine or fluconazole x 2-4 weeks

DERMATOPHYTOSIS: Treatment

• **TINEA CAPITIS**
  - **Systemic therapy required**
    - Griseofulvin
      - Microsized: 20-25 mg/kg/d x 8 weeks minimum
      - Ultra-microsized: 10-15 mg/kg/d x 8 weeks minimum
    - Terbinafine
      - 10-20 kg: 62.5 mg/d
      - 20-40 kg: 125 mg/d
      - >40 kg: 250 mg/d

CANDIDIASIS

• **Key features:**
  - Groin/urogenital skin/skin folds: erythematous patch w/ scale and ‘satellite’ papules and pustules
  - Thrush: ‘curd-like’ white to yellow papules or plaques in mucosa that can be wiped off

  *KOH prep shows budding yeast forms and non-septate hyphae (pseudohyphae)*
CANDIDIASIS: TREATMENT

• TOPICAL CARE (MILD DISEASE)
  – Clotrimazole cream bid x 10-14 days

• SYSTEMIC Tx (MORE EXTENSIVE DISEASE)
  – Fluconazole 150 mg qweek (one dose may suffice)

• PREVENTATIVE CARE:
  – Dry, dry, dry: towel dry, blow dry skin folds without heat (air only), cotton or linen cloth tucked between skin folds
  – Barrier: Desitin, Triple Paste, Vaseline
  – Absorbent powders: e.g. Zeasorb, Talc powder
    • Rinse off daily to avoid irritation

CANDIDIASIS vs. TINEA vs. INTERTRIGO

TINEA VERSICOLOR

• Infection of skin caused by yeast from Malassezia genus

• Key features:
  – Pink, brown or hypopigmented oval patches with subtle scale, coalescing into irregular shaped patches
  – Favors upper trunk, axillae, groin

  – KOH prep: pseudohyphae and spores
TINEA VERSICOLOR: TREATMENT

• TOPICAL (as effective as oral therapy if patients who are compliant):
  – Selenium sulfide shampoo or lotion: leave on affected areas of skin for 10 minutes, then rinse off
  – Repeat daily for 7-10 days, then 3x/week until clear
  – Small areas: clotrimazole cream

• SYSTEMIC:
  – Fluconazole 150-300 mg qweek for 2-4 weeks

• PREVENTION:
  – Recurrence is common in susceptible patients
  – Selenium sulfide 2.5% shampoo 1-2x/week

*** "TREATMENT FAILURE" —pigment changes last weeks to months after yeast is adequately treated

A FEW MISCELANEOUS INFECTIONS ...

ERYTHRASMA

• Corynebacterium infection

• Key features:
  – Red to hyperpigmented patches with minimal scale, sharply margined edges, in groin, axillae, skin folds

  Treatment: topical erythromycin
PITTED KERATOLYSIS

- Bacterial infection of stratum corneum of plantar skin, due to Micrococcus sedentarius, or sp. of corynobacterium or actinomyces
- Key features:
  - Numerous shallow pits on the soles
  - Often associated with hyperhidrosis
- Treatment:
  - Keep feet dry---frequent sock changes
  - Topical erythromycin
  - Consider topical aluminum chloride (Drysol) to address hyperhidrosis

‘HOT TUB’ FOLLICULITIS: PSEUDOMONAS

- Folliculitis due to pseudomonas; occurs following bathing in contaminated hot tubs, pools, spas, etc
- Key features:
  - Follicularly based pustules on trunk, buttocks and intertriginous areas
  - Develop 1-4 days after water exposure
  - +/- fever, malaise
- Treatment:
  - Typically not needed --- resolves in 1-2 weeks without therapy
  - Cipro 500 bid for 10 days if severe or in immunosuppressed patients

MIMICKERS OF INFECTION ...

...EXAMPLES
ERYTHEMA ANNULARE CENTRIFUGUM

--- Erythematous annular thin plaques with trailing scale, expand with central clearing
--- Neg KOH; biopsy c/w eczematous process
--- a “figurate erythema” thought to be hypersensitivity reaction to infection (e.g. distant tinea pedis), medication, other
- most cases idiopathic

SUMMARY

- CELLULITIS: STREP >> STAPH. EMPRIC ORAL THERAPY X 5 DAYS EFFECTIVE IN MOST UNCOMPLICATED CASES
- FOLICULITIS / FURUNCULOSIS:
  - CONSIDER DECOLONIZATION STRATEGIES IN RECURRENT CASES—BLEACH BATH, HIBECLENS, INTRANASAL MUPIROCIN
- HERPES SIMPLEX
  - >6 EPISODES/YEAR CONSIDER SUPPRESSIVE THERAPY
  - ECZEMA HERPETICUM (HSV) CAN COMPLICATE ATOPIC DERMATITIS
- ZOSTER (SHINGLES)
  - TREAT TO REDUCE DURATION, ACUTE PAIN — START EARLY!
  - VACCINATE >50 YD — REDUCES FREQUENCY OF ZOSTER AND INCIDENCE OF POST-HERPETIC NEURALGIA
  - V1 DERMATOME, LESIONS NEAR EYE — URGENT OPHTALMOLOGY EVALUATION

SUMMARY

- DERMATOPHYTES
  - T. CAPITIS, MAJOCCHI’S GRANULOMA (FOLLICLE INVOLVEMENT): SYSTEMIC THERAPY NEEDED
- CANDIDA VS. TINEA CRURIS VS. INTERTRIGO
  - SATELITE PUSTULES: CANDIDA
  - PERIPHERAL SCALE: T. CRURIS
- TINEA VERSICOLOR
  - TOPICALS EQUIVALENT TO ORAL THERAPY, BUT COMPLIANCE OFTEN AN ISSUE
  - DISCOLORATION PERSISTS LONG AFTER YEAST ARE GONE
- MIMICKERS OF INFECTION: CONSIDER WHEN CULTURES ARE NEGATIVE, PRESENTATION ATYPICAL OR TREATMENT IS FAILING
COMMON SKIN INFECTIONS: QUESTIONS?

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