Dermatology – Dr. Muhammad – Lecture 3 – Fungal Infections

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**Dermatophyte infection (ringworm)**

Three genera cause tinea infections:

I. **Trichophyton**: skin, hair, nail
II. **Microsporum**: skin, hair
III. **Epidermophyton**: skin, nail

Dermatophytes invade keratin only, & the inflammation they cause is due to metabolic products of fungus or delay hypersensitivity

In general zoophilic fungi cause more severe inflammation than anthropophilic ones

**Tinea pedis (athletes foot)**

- Most common fungal infection in human
- Predisposing factors: sharing of wash places & swimming pools, occlusive footwear
- Most cases caused by: Trichophyton rubrum (most common, most stubborn), Trichophyton mentagrophytes var. interdigitale, Epidermophyton floccosum
- 3 common clinical patterns:
  i. Soggy interdigital scaling esp. in 4th & 5th interspace
  ii. A diffuse dry scaling of the soles
  iii. Recurrent episodes of vesication

**Tinea of nails**

- Toenail infection usually associated with tinea pedis, usually few nails infected
- Initial changes occur in free edge of nail which become yellow & crumbly
- May follow by subungual hyperkeratosis, separation of nail from bed, & thickening
- In finger nail its less common & associated with chronic T. rubrum infection of hands

**Tinea of hands**

- Usually asymmetrical & associated with tinea pedis
- T. rubrum cause erythema of one palm with powdery scale in creases

**Tinea of groin**

- More common in males, may be unilateral asymmetrical involve upper inner thigh form sharply demarcated plaques with peripheral scaling
- In contrast to Candidiasis scrotum spared
- Few vesicles or pastules seen within the lesion

**Tinea of trunk & limbs**

- Tinea corporis chara. by plaques with scaling & erythema
- Few small vesicles & pastules seen within it
- Lesions expand slowly & heal centrally leaves ring like pattern
Tinea of scalp (Tinea capitis)

- Usually disease of children, causative organism vary from country to another
- Zoophilic type cause more inflammation, acquired from cattles
- Kerion: is a boggy swelling with inflammation, pustulation, lymphadenopathy, hair loss is permanent
- Anthropophilic organisms cause bald rather scaly areas with minimal inflammation & hair broken off 3-4mm from scalp
- Favus: caused by Trichophyton schoenleini, foul smelling yellowish crusts surrounding many scalp hairs

Complications

1. Fierce animal ringworm of scalp cause permanent scarring alopecia
2. A florid fungal infection anywhere can induce vesication on sides of fingers & palms
3. Epidemics of ringworm occur in schools
4. The usual appearance of fungal infection can be masked by mistreatment with topical steroid (tinea incognito)

DDx

- Scalp: alopecia areata, psoriasis, seborrhea, carbuncle, abscess, trichotillomania
- Feet: erythrasma, interdigital, intertrigo, eczema
- Trunk: discoid eczema, psoriasis, candidiasis, P. rosea
- Nails: psoriasis, paronychia, trauma, ageing changes
- Hand: chronic eczema, granuloma annulare, xerosis, dyshidrotic eczema

Investigations

1. Microscopic exam. of skin scraping, nail clipping or hair plucked is a simple procedure
2. Scraping taken from scaly margin
3. Specimens cleared in potassium hydroxide, branching hyphae seen
4. Culture should carried out in a mycology lab., transpot media not necessary
5. Wood’s light examination of scalp reveal a green fluorescene of hair in M. audouini & M. canis

Treatment

Local:

- This is all that is needed for minor skin infection
- Imidazole group: miconazole, clotrimazole
- Allylamines: terbinafine
- They should be applied twice daily
- Magenta paint helpful for exudative macerated areas in body folds
Systemic:

- Is needed for:
  i. Tinea of scalp & nail
  ii. Chronic or widespread infection not respond to topical therapy
- Terbinafine: is fungicidal inhibit squalene epoxidase, not interact with cytochrome P-450 system, largely replaced grisofulvin, not effective against pityriasis versicolor or candida. 4 weeks for hair, 6 weeks for fingernail, 3 months for toenails
- Griseofulvin: fungistatic its safe but may cause headache, nausea, vomiting, skin eruption Should not be given in pregnancy, porphyria, liver failure. Interact with cumarin anticoagulants. Its effect falls with barbiturates. 8 weeks for hair, 12 months for fingernails, 18 months for toenails
- Itraconazole: fungistatic, cause less liver damage than ketoconazole. alternative to other agents, if there is contraindications. interfer with cytochrome P-450. effective in P.versicolor, candida

Candidiasis

- Candida albicans is a classical opportunistic pathogen
- Certain predisposing factors to different types of candidiasis are:
  - Systemic candidiasis (rare):
    A. Leucopenia
    B. Immunosuppression
  - Chronic mucocutaneous candidiasis (rare):
    A. Thymic tumor
    B. Inherited defects in immunity
    C. Low serum iron
    D. endocrinopathies
  - Localized transient cutaneous candidiasis (common):
    A. Antibiotics
    B. Obesity
    C. Poor hygiene
    D. High humidity
    E. Conjugal spread
    F. Diabetes
    G. Pregnancy
    H. Cold hands
    I. Immersion in water
    J. Oral contraceptives

Oral candidiasis

- One or more whitish adherent plaques appear on mucous membrane
- If wiped off they leave erythematous base
- Under denture produce sore red area
- Angular stomatitis usually in denture wearer may be candidal
**Candida intertrigo**

- A moist glazed area of erythema & maceration appear in body folds
- Edge show soggy scaling & outlying satellite papulopustules
- Most common under breasts, armpits, groin, & between fingers of those whose hands are often in water

**Genital candida**

- Sore itchy vulvovaginitis with white crudy plaques adherent to inflamed mucous membrane, with white discharge
- May extend to groin
- Conjugal spread is common
- In male similar changes occur under foreskin & in groin

**Paronychia**

- The acute usually bacterial but in chronic Candida may be the sole pathogen or may found with others as Proteus, Pseudomonas
- Proximal & lateral nail folds of one or more fingers become bolstered & red
- Cuticle is lost, small amount of puss expressed, adjacent nail plate is ridged & discolored

**Investigations**

1. Swab from suspected area for culture
2. Urine test for sugar
3. In chronic mucocutaneous candida a detailed immunological work up needed focusing on cell mediated immunity

**Treatment**

- Predisposing factors should be eliminated
- Topical amphotrecin, nystatin, imidazole group, oral gels, suspensions & lozenges for mouth
- False teeth should removed at night & washed with nystatin solution
- Magenta paint

**Pityriasis versicolor**

Old name is tinea versicolor should be dropped because it caused by a commensal yeast Pityrosporum orbiculare & not a fungi

The yeast overgrow in hot humid climate

Carboxylic acid released by yeast inhibit pigment production by melanocytes that occur normally after sun exposure

Versicolor refers to the way in which the superficial scaly patches fawn or pink on non tanned skin become paler than surrounding after sun exposure

The condition is non infectious
Presentation & Course

- Depigmented areas with their slightly branny scaling & fine wrinkling look ugly otherwise they are symptom free or only slightly itchy
- Common on upper trunk, but may be wide spread
- Untreated lesions persist
- Recurrence is common

DDx

1. Vitiligo
2. Seborrhoeic eczema
3. Pityriasis alba
4. Pityriasis rosea
5. Tinea corporis
6. Secondary syphilis

Investigations

Scraping for examination show mixture of short branched hyphae & spors (spaghetti & meat balls appearance)

Culture is not helpful

Treatment

- Topical imidazole group 2-4 weeks
- 2.5% selenium sulphide mixture 3 times / week
- Ketoconazole shampoo
- For wide spread infection oral itraconazole 200mg daily for 7 days

Deep Fungal Infections

Histoplasmosis

- Histoplasma capsulatum found in soil in dropping of animals
- Airborne spores inhaled cause lung lesions like TB, granulomatous skin lesions esp. in immunosuppressed
- Rx: amphotrecin B, itraconazole

Coccidioidomycosis

- Coccidioides immitis found in soil
- Inhaled spores cause pulmonary infection with fever
- Erythema nodosum may seen
- Desiminated infection cause skin ulcers & abscesses
- Rx: amphotrecin B & itraconazole
Blastomycosis

- Blastomyces dermatitidis found in rural areas
- Inhaled & spread to skin
- Wart like hyperkeratotic nodules which clear with scarring
- Rx: amphotreicin B, itraconazole

Sporotrichosis

- Sporothrichum schencki live saprophytically in soil or on wood of warm humid areas
- Infection as through a wound, later a boil will arise & nodules along draining lymphatics
- Rx: potassium iodide, itraconazole

Actinomycosis

- Actinomyces israeli is bacteria but traditionally considered with fungi It has long branching hyphae & is a part of normal flora of mouth & bowel
- Lumpy induration & scarring with multiple sinuses discharging puss contain sulphur granules
- Common on jaw, chest & abdominal wall
- Rx: Long term penicillin