



Pediatric Telehealth Rounds

Today's topic:
Tinea Capitis

Speaker:

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PGY-4 Pediatric
Resident



Nov.21, 2014

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Objectives

- Review clinical features of tinea capitis
- Discuss diagnostic testing for tinea capitis
- Review recommended treatment for tinea capitis

Case

- A set of brothers ages 3 and 6 years present to CHEO ER with itchy scalps and hair loss



Case

- They had seen multiple doctors
- Told they had fungal infection, no sample sent
- Tried multiple topical treatments
- Most recent treatment was ketoconazole shampoo
- Not getting better



Case- Physical Exam

- Vitals within normal limits
- Scratching their scalps during exam
- Cervical lymphadenopathy
- Circular patch of hair loss with yellow scaling



What is the differential diagnosis?

Differential Diagnosis

- Tinea capitis
- Scalp psoriasis
- Seborrhoeic dermatitis
- Atopic dermatitis
- Alopecia areata
- Trichotillomania



Why aren't they getting better?

What is tinea capitis?

- tinea= superficial fungal infection of the skin, scalp, nails or hair
- capitis= location for this infection is the scalp

What is tinea capitis?

- Fungal infection of the scalp
- Most common pediatric superficial dermatophyte infection

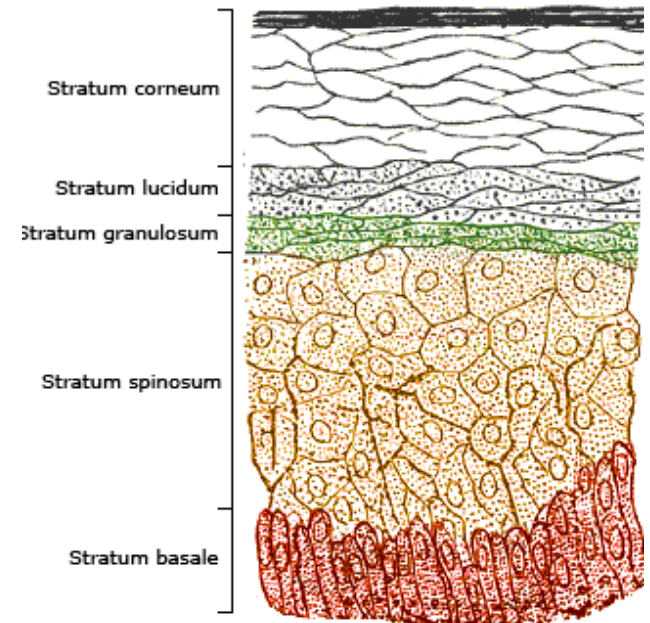


Epidemiology

- Most common in pre-pubertal children
- Peak occurrence age 3-7 years
- African American children more susceptible and also more difficult to treat
- Cause varies geographically
- *Microsporum canis* most common in Europe
- *Trichophyton tonsurans* most common in North America

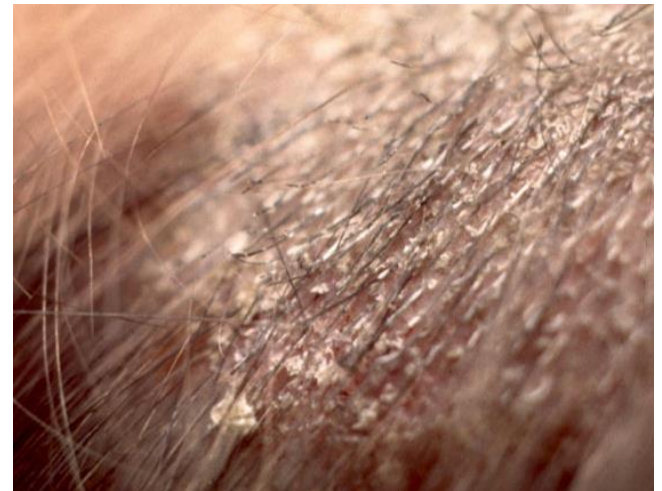
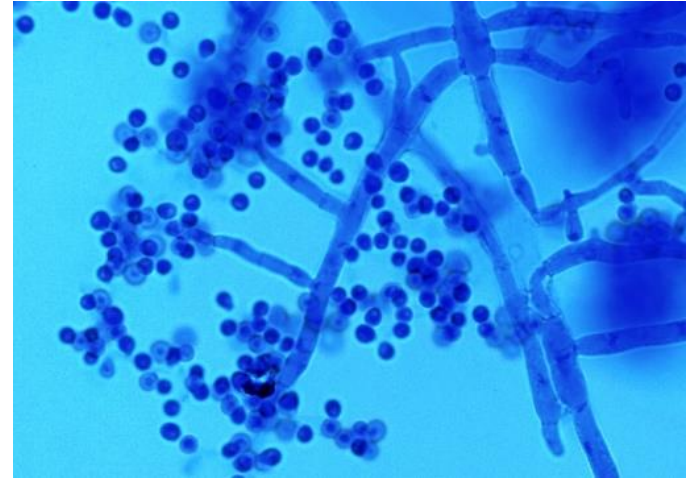
Dermatophytes

- Fungi that invade the stratum corneum
- Use keratin as nutrient source
- In tinea capitis, conidia (spores) form in and around the hair shaft



Pathophysiology

- Produce enzymes that penetrate the keratinized tissue
- Hyphae spread outward
- Inflammation
- Scaling from increased epidermal replacement





Transmission

- Spreads by infective spores
- Can be transmitted by: direct contact, fallen hair, combs, hats, clothing, bedding, from animal to human
- Can have asymptomatic carriers



Clinical Presentation

- Highly variable
- Inflammatory vs. non-inflammatory
- Presentation:
 - Diffuse scaling
 - Moth-eaten
 - Gray type
 - Diffuse pustular
 - Black dot
 - Kerion
 - Favus



Article

Tinea Corporis and Tinea Capitis

Rosemary Shy, MD*

+ Author Affiliations

PEDIATRICS IN REVIEW Vol. 28 No. 5
May 1, 2007
pp. 164 -174
(doi: 10.1542/pir.28-5-164)

Tinea capitis characterized by gray, patchy scaling with alopecia.



Shy R Pediatrics in Review 2007;28:164-174

Tinea capitis, showing diffuse flaking and scale that resembles seborrhea.



Shy R Pediatrics in Review 2007;28:164-174

Tinea capitis characterized by thick white crusting of scalp.



Shy R Pediatrics in Review 2007;28:164-174

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Tinea capitis, showing black dots from broken hairs in area of hair loss.



Shy R Pediatrics in Review 2007;28:164-174

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Tinea capitis in close up, showing white crusting around hair root and some broken hairs.



Shy R Pediatrics in Review 2007;28:164-174

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Tinea capitis that was resistant to high-dose griseofulvin after 6 weeks of treatment.



Shy R Pediatrics in Review 2007;28:164-174

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Tinea capitis, showing both white scales and yellow, purulent exudates with hair loss that was very pruritic.



Shy R Pediatrics in Review 2007;28:164-174

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Kerion with boggy early lesion and multiple broken hairs.



Shy R Pediatrics in Review 2007;28:164-174

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Kerion

- highly inflammatory form of tinea capitis
- can lead to scarring and permanent hair loss
- can be tender, erythematous and associated with pus

Kerion with boggy lesion, multiple pustules, and hair loss.



Shy R Pediatrics in Review 2007;28:164-174

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Diagnosis

- Scalp scrapings for:
 - Microscopic evaluation
 - Fungal culture



Treatment

Initiating treatment

British Association of Dermatologists' guidelines for the management of tinea capitis 2014

L.C. Fuller,¹ R.C. Barton,² M.F. Mohd Mustapa,³ L.E. Proudfoot,⁴ S.P. Punjabi⁵ and E.M. Higgins⁶

- Start treatment if strong suspicion of tinea capitis based on:
 - Presence of kerion
- OR
- Typical clinical features of scaling, lymphadenopathy or alopecia

Table 3.

Frequency of Symptoms and Signs in Patients With Culture-Proved Tinea Capitis

Symptom/Sign	Culture-positive*	Culture-positive †
Scaling	97%	91%
Alopecia	90%	75%
Pruritus	81%	71%
Occipital/posterior auricular lymphadenopathy	90%	0%
Occipital lymphadenopathy	0%	27%
Kerion	0%	18%

* Hubbard 1999 (6)

† Lorch Dauk et al 2010 (2)

Superficial Fungal Infections

Brendan P. Kelly, MD*



Pediatrics in Review

An Official Journal of the American Academy of Pediatrics

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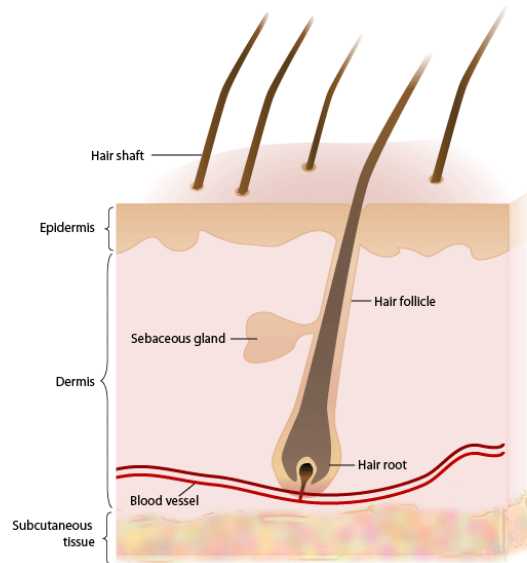
Back to the case

- Why weren't these brothers getting better?



Treatment

- Tinea capitis does NOT respond well to topical therapy alone



Treatment

- Need SYSTEMIC THERAPY for treatment of tinea capitis



Antifungal agents for common outpatient paediatric infections

Robert Bortolussi, Susanna Martin; Canadian Paediatric Society
Infectious Diseases and Immunization Committee



Canadian
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Medications

- 1st choice Terbinafine (Lamisil) unless suspect *Microsporum sp.* or if patient has kerion, then use Griseofulvin
- Use oral agent together with topical



Choice of Medication

GUIDELINES

BJD
British Journal of Dermatology

British Association of Dermatologists' guidelines for the management of tinea capitis 2014

L.C. Fuller,¹ R.C. Barton,² M.F. Mohd Mustapa,³ L.E. Proudfoot,⁴ S.P. Punjabi⁵ and E.M. Higgins⁶

Table 1 Choice of drug according to organism isolated

<i>Trichophyton tonsurans</i>	Terbinafine
<i>Trichophyton violaceum, soudanense</i>	Terbinafine
<i>Microsporum canis</i>	Griseofulvin or itraconazole
<i>Microsporum audouinii</i>	Griseofulvin or itraconazole

Example Treatment Regime for 30 kg child with Tinea capitis

- Terbinafine 125 mg PO daily x 4 weeks

Terbinafine For a child < 20 kg:
62.5 mg/day

For a child 20 to 40 kg: 125 mg /day

For child > 40 kg: 250 mg/day

- While on Terbinafine, use selenium sulfide shampoo 2-3x per week
- After Terbinafine completed, continue selenium sulfide shampoo once weekly until follow-up
- Follow-up 4 weeks after completing Terbinafine

Terbinafine



- Fungicidal agent
- Activity against all dermatophytes, but higher efficacy against *Trichophyton sp.* than *Microsporum sp.*
- Well tolerated in children
- Most common side effects include GI upset and rashes (occur in less than 8% of patients)
- Rare but serious side effect= liver failure
- AAP recommends baseline liver transaminase measurement before starting treatment
- May have loss of sense of taste (resolves once therapy completed)
- Drug interactions: plasma concentration decreased by rifampin and increased by cimetidine

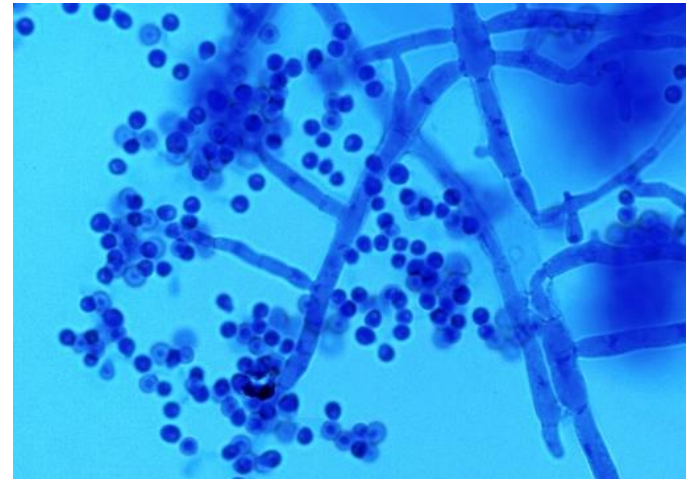
Griseofulvin



- Fungistatic agent
- More effective for *Microsporum sp.*
- Treatment of choice for kerion, regardless of dermatophyte species
- Anti-inflammatory properties that help kerion to heal sooner than other agents
- Side effects in 20% of patients (diarrhea, headache, rashes)
- Prolonged treatment course required (usually 8 weeks)
- Contraindicated in patients with SLE, porphyria and severe liver disease
- Drug interactions with warfarin, cyclosporine, oral contraceptive pills

Topical agents

- Used to reduce transmission of spores
- Selenium sulfide shampoo
- Ketoconazole shampoo



Selenium sulfide shampoo

- Adheres to scalp after rinsing
- No significant difference between 1% and 2.5% selenium sulfide



Ketoconazole shampoo

- Coconut oil base
- Less drying than selenium sulfide
- May not work as well because rinses away more easily
- More effective if left on for 5 minutes
- Use 2% Ketoconazole



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Ongoing care

- Follow-up 4 weeks after completing course of oral therapy



What if infection not resolved after initial therapy?

- Check results of fungal culture
- Assess compliance
- Give another 4 week course of 1st line therapy (Terbinafine in most cases) if some improvement with initial treatment
- If no initial improvement then proceed to 2nd line therapy: Intraconazole 5 mg/kg/day for 2-4 weeks
- Consider referral to dermatology

Treatment of Contacts

- Consider screening family members
 - British Association of Dermatologists recommends taking cultures from household contacts
 - AAP says sampling costly and time-intensive, ok to just examine household contacts for evidence of tinea capitis
- Treat household contacts with antifungal shampoo (ketoconazole or selenium sulfide) 2-3 times weekly
- If patient may have ongoing contact with an untreated case then consider continuing antifungal shampoo treatment on weekly basis to prevent reoccurrence

What about school/daycare?

- Exclusion from school not recommended, but no shared helmets until cured
- Spores can shed for months
- Practice good hygiene: no sharing of combs, brushes or hats



Disinfecting personal items

- Disinfect combs, brushes and hats with bleach solution
- Bedding should be washed in hot water with or without bleach



Back to the case



- Fungal scrapings done
- Started on Terbinafine 125 mg PO daily x 4 weeks
- Selenium sulfide shampoo 2-3 times per week while on Terbinafine then once per week until follow-up
- Household contacts did not have any clinical evidence of tinea capitis
- Household contacts instructed to use Selenium sulfide shampoo 2-3 times per week

Case- 8 week follow-up appointment

- At 8 week follow-up, both patients clinical improved, but not resolved
- Full compliance with medication
- Fungal culture reviewed and was positive for *Trichophyton tonsurans*
- Given another 4 week course of Terbinafine
- Follow-up scheduled for end of 2nd course

Case- 2nd follow-up appointment

- Infection completely resolved at follow-up after 2nd course of Terbinafine
- Neighbourhood friend has unresolved tinea capitis
- Brothers instructed to keep using selenium sulfide shampoo on weekly basis to decrease risk of reinfection



Take Home Points

- Tinea capitis can have wide variety of presentations
- Mainly affects children age 3-7 years, often African American
- *Trichophyton tonsurans* is most common cause
- Do fungal scrapings for diagnosis
- Oral antifungal medication required for treatment of tinea capitis
- Oral Terbinafine x 4 weeks + antifungal shampoo is 1st line in most cases
- Reassess for resolution post-treatment
- Disinfect personal items
- Treat household contacts with anti-fungal shampoo

Resources

GUIDELINES

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Resources

Superficial Fungal Infections

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Dermatophyte (tinea) infections

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Dr. Robinson

Nov.28, 2014



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