
Pityriasis versicolor

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Background

Definition

Pityriasis versicolor (also known as tinea versicolor) is an infection of the skin caused by the yeast *Malassezia furfur* (also known as *pityrosporum orbiculare* or *pityrosporum ovale*). The disease is manifested by very thin, scaly plaques that can be hyperpigmented, hypopigmented or erythematous. Lesions are generally asymptomatic. The rash may be accompanied by hyper- or hypopigmentation that often persists long after the organism is eradicated. The eruption most commonly affects the torso but can be widespread. The face may be affected especially in children.¹

Incidence/prevalence

The incidence of pityriasis versicolor is not well studied. As the organism grows best in warm and wet conditions, it is more common and more extensive in tropical climates. The prevalence was 2.1% (22/1024) among a representative sample of young Italian sailors.² The prevalence was 1.8% among textile workers in Adana, Turkey, 15.5% (140/902) in a fishing village in Rio Seco, Venezuela, 16.6% among a random sample of adults in the Central African Republic and 3.1% among 4267 people in Sao Paulo, Brazil.³⁻⁶ In a total population survey in Karonga district, Malawi, 8% (4915/61735) were found to have extensive pityriasis versicolor and an additional 9.9% (6085 people) had mild disease.⁷

Etiology

Pityriasis versicolor is caused by the yeast *Malassezia furfur*.

Prognosis

Untreated, the disease may lessen or remit in colder weather but almost invariably reappears in hot weather. Annual recurrences during hot weather are common in treated and untreated patients.

Diagnosis

The diagnosis can be established by KOH staining of scales obtained from affected scaly plaques. On microscopy, the organism is easily recognized as spores and hyphae that resemble "spaghetti and meatballs" (Figure 1). Identification is enhanced by the addition of blue-black ink and a wetting agent to the KOH preparation. Under Wood's light examination pityriasis versicolor fluoresces a light yellow or golden color. The organism can also be cultured but the culture technique is difficult and not readily available.

Aims of treatment

The aim of treatment is the eradication of the organism which can be verified by negative KOH preparations, and resolution of the rash. The hyper- or hypopigmentation may persist after the organism has been eradicated. The aim of interventions for prevention is to prevent annual recurrences during hot weather.

Relevant outcomes

The primary outcomes of treatment are eradication of the organism verified by KOH preparations and resolution of the rash. The primary outcome of prevention is to prevent recurrences in hot weather.

Methods of search

We searched the Cochrane Library (Issue 2, 2006) and Medline and Embase from inception until December 2006.

Questions

What are the effects of topical treatments used for the treatment of pityriasis versicolor?

Efficacy

Randomized controlled trials of topical treatments for

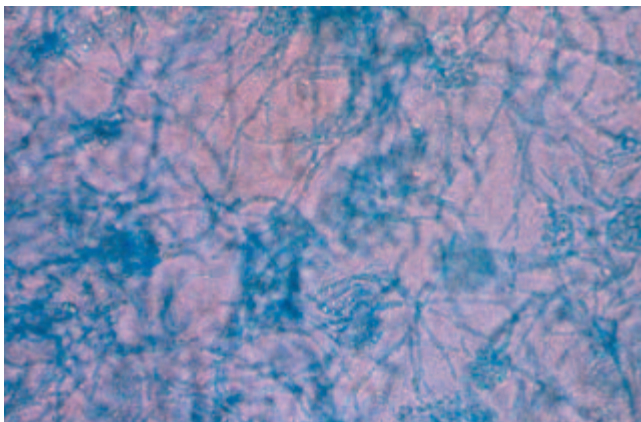
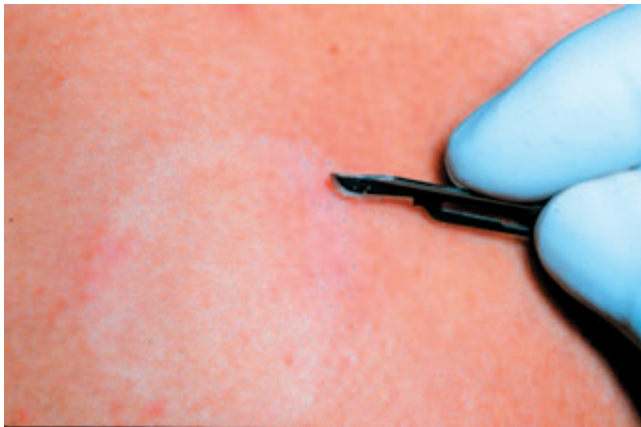
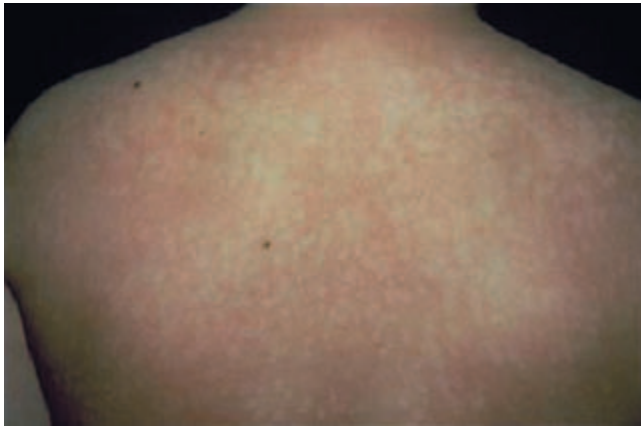


Figure 1 Tinea versicolor most commonly affects the torso but can be widespread. The diagnosis can be established by potassium hydroxide staining of scales obtained from affected scaly macules. On microscopy, the organism is easily recognized as spores and hyphae that resemble “spaghetti and meatballs.”

pityriasis versicolor are generally of low quality and involved small numbers of patients (Table 1). Most topical treatments used to treat pityriasis versicolor (including imidazole antifungal cream or shampoos, zinc pyrithione shampoo, selenium sulfide shampoo, and sulfur/salicylic acid shampoo) are effective when compared to placebo with NNTs of 1–2.

Topical terbinafine is less effective than other available topical treatments. No trials could be found for topical sodium thiosulfate solution or propylene glycol which are sometimes used for treatment.

Trials comparing different active agents or different treatment regimens are underpowered to detect clinically meaningful differences. (Table 1). However, the data suggest that longer durations of treatment and higher concentrations of active agents produce greater cure rates. In individual studies, the differences often do not reach statistical significance and studies cannot be combined in a meta-analysis because of heterogeneity in design.

Although optimal regimens have not been established, the data suggest that 1–4 weeks of treatment can be recommended. Ketoconazole shampoo is applied to affected areas, left on for 5–10 minutes and then washed off. Treatment is repeated daily for 1–4 weeks. The imidazole creams are applied daily for 1–4 weeks. Creams are more costly than shampoos and therefore are less cost-effective. Selenium sulfide or zinc pyrithione shampoo is applied to affected areas for 5–10 minutes and then showered off. Treatment is repeated daily for 1–4 weeks.

Drawbacks

Topical treatments for pityriasis versicolor are generally well tolerated. They may cause skin irritation or contact allergy. Selenium sulfide is more likely to cause skin dryness and irritation than other available treatments and has a strong odor.

Comment

The topical treatment of pityriasis versicolor is an area in which evidence and experience coincide.

Implications for clinical practice

Most topical treatments used to treat pityriasis versicolor (including imidazole antifungal cream or shampoos, zinc pyrithione shampoo, selenium sulfide shampoo, and salicylic/salicylic acid shampoo) are effective when compared to placebo with NNTs of 1–2. Data suggest that longer durations of treatment and higher concentrations of active agents produce greater cure rates. Terbinafine is less effective than other available topical treatments. Selenium sulfide is more likely to cause skin dryness and irritation than other available treatments.

What are the effects of systemic treatments used for pityriasis versicolor?

Efficacy

Randomized controlled trials of systemic treatments for pityriasis versicolor are generally of low quality and involved small numbers of patients (Table 1). Most systemic treatments used to treat pityriasis versicolor (including

oral imidazole antifungals) are effective when compared to placebo with NNTs of 1–2. Oral terbinafine is less effective than other available oral treatments.

Trials comparing different active agents or different treatment regimens are underpowered to detect clinically meaningful differences. (Table 1). However, the data suggest that longer durations of treatment and higher doses produce greater cure rates. In individual studies, the differences often do not reach statistical significance and studies cannot be combined in a meta-analysis because of heterogeneity in design.

Although optimal regimens have not been established, the data suggest that ketoconazole 200 or 400 mg daily for 1 week, itraconazole 200 mg daily for 5–7 days, or fluconazole 300 mg weekly for 4 weeks can be recommended. Single-dose regimens (e.g., ketoconazole 400 mg or fluconazole 450 mg) are less effective. However, the NNTs are large and the confidence intervals wide in individual studies (Table 1).

Drawbacks

All of the imidazoles inhibit the cytochrome system and therefore have many drug–drug interactions. Concomitant administration with cisapride is contraindicated because of rare cases of serious cardiovascular adverse events (including death, ventricular tachycardia, and torsade de pointes).

Ketoconazole carries a **Black Boxed Warning** issued by the US Food and Drug Administration (FDA) because it has been associated with hepatotoxicity, including some fatalities. The frequency is low (134 cases per 100 000 person-months (95% CI 37–488) in one study) but it is the highest among the oral imidazole antifungals.⁸ Liver function tests should be checked if the duration of treatment exceeds 1 week. Ketoconazole also carries a Black Boxed Warning issued by the FDA contraindicating concomitant use with cisapride due to the occurrence of ventricular arrhythmias. High doses of ketoconazole may suppress adrenocortical function. In clinical trials, nausea/vomiting (3–10%), pruritus (2%) and abdominal pain (1%) were reported.⁹ Diarrhea, dizziness, fever, gynecomastia, and headache occur less frequently. Ketoconazole inhibits the cytochrome P-450 system and therefore has many drug interactions.

Itraconazole carries a **Black Boxed Warning** from the FDA for association with development of congestive heart failure (CHF), especially in patients with a history of CHF. Rare cases of serious cardiovascular adverse events (including death, ventricular tachycardia, and torsade de pointes) have been observed due to increased cisapride, pimozide, quinidine, dofetilide or levomethadyl concentrations induced by itraconazole. Concurrent use of these drugs is contraindicated. Itraconazole has been associated with rare cases of serious hepatotoxicity (including fatal cases and cases within the first week of treatment). It is, therefore, not recommended

for use in patients with active liver disease, elevated liver enzymes or prior hepatotoxic reactions to other drugs.⁹

In clinical trials with itraconazole, nausea (11%), edema (4%), hypertension (3%), headache (4%), fatigue (2–3%), malaise (1%), fever (3%), rash (9%), pruritus (3%), decreased libido (1%), hypertriglyceridemia, hypokalemia (2%), abdominal pain (2%), anorexia (1%), vomiting (5%), diarrhea (3%), abnormal liver function tests (3%), albuminuria (1%) and dizziness (2%) were reported.⁹

In clinical trials with fluconazole, headache (2–13%), rash (2%), nausea (4–7%), vomiting (2%), abdominal pain (2–6%), and diarrhea (2–3%) were reported. Hepatitis and liver function test elevations are rare and less common than with other imidazoles. Serious adverse reactions are rare.⁹

Comment

Treatment with oral imidazoles is an area in which evidence and experience coincide.

Implications for clinical practice

Extensive tinea versicolor can be successively and safely treated with the oral imidazole antifungals. Concomitant administration with cisapride is contraindicated. Data suggest that ketoconazole 200 or 400 mg daily for 1 week, itraconazole 200 mg daily for 5–7 days, or fluconazole 300 mg weekly for 2–4 weeks can be recommended.

What are the effects of topical and systemic regimens used to prevent recurrences of pityriasis versicolor?

Efficacy

We found no systematic review. There is limited evidence from clinical trials (Table 1).

Itraconazole 200 bid once per month for 6 months was effective in preventing recurrences compared to placebo (response difference 32%, 95% CI 20–43%; NNT 4, 95% CI 3–5). We found no randomized controlled trials using ketoconazole or fluconazole to prevent recurrences. Case series suggest that ketoconazole weekly or fluconazole monthly may be effective.

We found one randomized controlled clinical trial of topical regimens to prevent recurrences (Table 1). Two different dosing schedules of topical bifonazole were studied. Conclusions could not be drawn from this study.

Drawbacks

See above.

Comment

Weekly or monthly doses of imidazole anti fungals are commonly used to prevent recurrences of pityriasis versicolor. Randomized controlled data to support their use are

Table 1 Randomized controlled trials of systemic treatments for pityriasis versicolor

Reference	Author	Treatment	Description	Quality	End Point	Number Randomized	Success/Totals	RD	CI1	CIH	NNT	CI12	CIH2	Complications	Comments
Topical Treatments															
10	Rigopoulos	Fluconazole	Fluconazole 2% 5 min q5 days vs placebo 5 min q5 days	1 Masking	KOH	32	13/16 vs 0/16	81.3%	62.1%	100.0%	1.2	1.0	1.6	None	No methods section
11	Nassar	Sertaconazole cream	Sertaconazole 1% vs 2% cream bid x 4 weeks	3	KOH/Wood's lamp and clinical assessment	21	11/11 vs 10/10	0.0%	NA	NA					All pt.'s cured
12	Aste	Fenticonazole vs Bifonazole lotion	Fenticonazole 2% vs Bifonazole 1% qd x 3w	2 concealment and blind	KOH and Wood's lamp	46	17/23 vs 16/23	4.3%	-21.6%	30.3%	23.0	3.3	-4.6	Feniconazole-2 patients with mild transient desquamation	Result at 2 weeks. 100% cured at 1 week
13	Katsambas	Econazole vs Selenium	1% Econazole shampoo qhs x 6d vs 2.5% Selenium Sulfide shampoo qhs x 3d+placebo qhs x 3d	2	KOH	150	60/65 vs 58/65	3.1%	-6.9%	13.0%	32.5	7.7	-14.6	2 pt in ss with acute dermatitis, 9 mild irritation	Selenium is better but more toxic
14	Aste	Terbinafine vs Bifonazole	1% Econazole shampoo 1 day per month for 2 months vs 2.5% Selenium Sulfide shampoo 1 day per month for 2 months	2	KOH	40	20/20 vs 19/20	5.0%	-4.6%	14.6%	20.0	6.9	-22.0	Treatment course ranged from 2-4 weeks but did not specify.	
15	Savin	Ketoconazole	Terbinafine 1% cream vs Bifonazole 15 cream	Random allocation and ITT	KOH and Wood's lamp	101	43/51 vs 11/50	62.3%	47.1%	77.5%	1.6	1.3	2.1		Duration of therapy ranged from 11-22 days with a mean of 14 days. Conducted follow up at 1 to 2 years but evaluations were over phone: 2/3 by exam 1/3 by phone

16	Range	Ketoconazole	Ketoconazole 2% shampoo qd x 1d vs 2% qd x 3d vs placebo	4--but did not do an itt for cellophane test	KOH	322	11/105 vs 79/106 vs 89/107	64.1% 53.9% 74.2% 1.6 1.3 1.9	72.7% 63.5% 81.9% 1.4 1.2 1.6	-8.6% -19.6% 2.3% -11.6 44.4 -5.1	3.8% 17.3% -9.7 26.2 5.8 -10.4	Mild pruritus and burning both groups	Chi-square = 135, P < 0.001
17	Alomar	Flutrimazole vs Bifonazole	1% Flutrimazole cream or 1% Bifonazole cream daily for 4 weeks	4	KOH and clinical exam	136	59/72 vs 50/64	3.8% 17.3% -9.7 26.2 5.8 -10.4				Mild pruritus and burning both groups	Difference not clinically or statistically significant. Part of larger study
18	Not listed	Ciclopirox Olamine cream vs vehicle	Ciclopirox Olamine cream 1% bid x 14dvs placebo vs Clotrimazole 1% cream bid x 14d	1 blinding	KOH and clinical exam	153 122	37/76 vs 17/77 44/65 vs 32/57	26.6% 11.6% 12.0% -5.6% 41.2% 28.7% 3.8 2.4 8.3 -17.8					3 in active and 5 in vehicle group did not return for follow up and were excluded from the analysis. Many Patients lost to follow up
19	Sanchez	Selenium Sulfide	Selenium Sulfide 2.5% lotion vs Selenium Sulfide lotion with 0.02% colorant vs vehicle with 0.02% colorant qd for 10 min x 7d SS 2% vs placebo SS 2% colorant vs placebo SS 2% vs SS 2% with color	1 double blind	KOH	177	39/48 vs 27/88 vs 7/46	66.0% 50.9% 81.2% 1.5 1.2 2.0	55.8% 38.5% 73.2% 1.8 1.4 2.6	10.2% -7.7% 28.0% 9.8 3.6 -13.1		No significant difference in side effects	Patients not analyzed: 18 dropouts, 3 failed to use medication. Chi-square = 47, P = 0.001

Table 1 *Cont'd*

Reference	Author	Treatment	Description	Quality	End Point	Number Randomized	Success/Totals	RD	CIL	CIH	NNT	CIL2	CIH2	Complications	Comments
20	Bamford	Sulfur-Salicylic shampoo	Sulfur-Salicylic 2%/2% shampoo vs placebo applied nightly for 1 week	2 random assignment, blinding	KOH	40	20/22 vs 1/17	80.5%	61.4%	99.5%	1.2	1.0	1.6	2 women in active group experienced skin dryness and tenderness after 6 nights of application	
21	Vrck	Econazole Nitrate	Econazole Nitrate 1% cream qd x 21 days vs placebo	1 maybe random allocation	KOH and Wood's lamp	148		21.9%	5.7%	38.0%	4.6	2.6	17.4	2 econazole patients reported pruritis	22 patients did not return for follow up not included in analysis
22	Fredriksson	Zinc Pyrithione shampoo	Zinc Pyrithione shampoo 1% 5 minutes daily for 2 weeks vs placebo (shampoo base)	1 blinding	KOH and Wood's lamp	40	10/10 vs 0/10	100.0%	100.0%	100.0%	1.0	1.0	1.0	No side effects noted	
23	Quinones	Miconazole vs Econazole cream	2% Miconazole vs 1% Econazole cream vs vehicle, daily for 2 weeks	2 blinding and random allocation	KOH, Wood's light	63	10/12 vs 19/22 vs 12/29	43.9%	22.4%	65.4%	2.3	1.5	4.5	No adverse events reported	Chi-square = 13, P = 0.001. No difference between actives. Values are active vs vehicle
24	Tanenbaum	Suconazole vs Miconazole	1% Suconazole cream bid x 3w vs 2% Miconazole cream bid x 3w	1 blinding	KOH	192	74/80 vs 74/85	5.4%	-3.8%	14.7%	18.4	6.8	-26.3	Suconazole 8 pts with pruritis, Miconazole 4 pts with pruritis	results insignificant both drugs have comparable efficacy
25	Clayton	1% Clotrimazole bid x 4w vs Whitfield ointment (3% salicylic acid and 6% benzoic acid preparation) bid x 4w	1% Clotrimazole cream	1 blinding	KOH	45	80% cleared	NA	NA	NA	NA	NA	NA	Burning and irritation was twice as common in the whitfield ointment group (6pts)	FU attendance was low therefore relapse rate analysis was difficult to perform
26	Sperkermann	1% Clotrimazole solution or cream vs respective vehicle	1% Clotrimazole solution or cream vs respective vehicle preparations daily for 2 weeks	2 blinding and concealment of allocation	KOH and Wood's lamp	241									

27	Mora	Bifonazole cream vs vehicle	1% Bifonazole cream qd x 2w vs vehicle qd x 2w	2 blinding and concealment of allocation	KOH	61	21/31 vs 4/30	51.9%	20.8%	83.0%	1.9	1.2	4.8	No adverse events
28	Chu	Bifonazole solution vs Selenium Sulfide shampoo	1% Bifonazole solution qd x 2w vs 2.5% Selenium Sulfide shampoo qd x 6d and qw x 6	2 randomization and concealment of allocation	KOH	61	21/31 vs 4/30	17.2%	-3.6%	38.0%	5.8	2.6	-27.8	Bifonazole group: 2pts with increase erythema, SSS; pts complained of smell
29	Faergemann	Terbinafine DermGel vs placebo	1% Terbinafine emulsion gel qd x 7 days	2 blinding and ITT and blinding	KOH	61	21/31 vs 4/30	54.4%	33.9%	74.9%	1.8	1.3	2.9	No adverse events were seen in either group
30	Savin	Terbinafine	Terbinafine 1% solution bid x 7d vs placebo	2 blinding and ITT and blinding	KOH	152	69/85 vs 13/43	50.9%	34.9%	67.0%	2.0	1.5 to 2.9	NA	KOH at 8 weeks; PP
31	Vermeer	Terbinafine	1% Terbinafine solution qbid x 7 days	2 blinding and ITT	KOH and clinical exam	152	69/85 vs 13/43	18.0%	-1.7%	37.6%	5.6	2.7	-58.6	8 possible drug related events- did not list what they were
32	Hull	Sodium Sulfacetamide lotion vs Selenium Sulfide lotion	10% Sodium Sulfacetamide lotion vs 2.5% Selenium Sulfide lotion qd x 28d or until negative KOH	2 blinding and ITT	KOH	44	11/23 vs 16/21	-28.0%	-1.0%	-55.7%	-3.5	-1.8	-99.7	One patient complained of odor of selenium sulfide per-protocol patients were cured respectively
33	Barnford	Sulfur-Salicylic shampoo	Sulfur-Salicylic 2%/2% shampoo vs placebo daily application for 1 week	2 random assignment, blinding	KOH	39	20/22 vs 1/17	85.0%	68.6%	100.0%	1.2	1.0	1.6	2 women in active group experienced skin dryness and tenderness after 6 nights of application
Systemic Treatments														
34	Bhogal	Ketoconazole vs Fluconazole	Ketoconazole 400 mg single dose, Ketoconazole 200 mg daily for 10 days, Fluconazole 400 mg single dose or Fluconazole 140 mg weekly for 4 weeks	1ITT	KOH	180	18/37 vs 17/38 vs 27/39 vs 8/39	31.5%	14.5%	48.5%	3.2	2.1	6.9	No adverse events were seen in any group

Table 1 *Cont'd*

Reference	Author	Treatment	Description	Quality	End Point	Number Randomized	Success/Totals	RD	CIL	CIH	NNT	CIL2	CIH2	Complications	Comments
35	Fernandez-Nava	Ketoconazole	Single dose Ketoconazole 400 mg vs 200 mg qd x 10days	0	KOH	120	25/60 vs 31/60	-10.0%	-28.0%	7.8%	-15.0	9.0	-4.1		Study with high rate of reinfection. Also, -NNT 400 relative to 200 qd x 10
36	Estrada	Itraconazole	Itraconazole 200 mg poqd x 5d vs Itraconazole 100 mg poqd x 5d	1 ITT	KOH and Wood's lamp	42	21/22 vs 15/20	20.5%	0.2%	40.7%	4.9	2.5	-235.0	difference not significant	
37	Morales-Doria	Itraconazole	Itraconazole 100 mg bid poqd x 5d vs 100 mg poqd x 5d	1 ITT	Koh and clinical exam	47	23/24 vs 23/23	-4.2%	-12.3%	3.8%	-24.0	25.0	-8.1	six patient had an adverse reaction. 5 headaches, 2 pyrosis, 1 vomiting	
38	Galimberti	Itraconazole	Itraconazole 200 mg poqd x 5d vs 100 mg poqd x 5d	1 ITT	KOH	28	10/13 vs 13/15	-9.7%	-38.0%	18.5%	-10.3	5.4	-2.6	1 patient with nausea	
39	Del Palacio Hernanz	Itraconazole	Itraconazole 200 mg poqd x 5d vs 100 mg poqd x 10d	1 ITT	Clinical exam, KOH and Wood's lamp	30	13/15 vs 12/15	6.7%	-26.6%	39.9%	15.0	2.5	-3.8	1 dyspepsia, 1 stomach ache, 1 elevated GOT GPT	
40	Hickman	Itraconazole	Itraconazole 200 mg poqd x 7 vs placebo	1 ITT	KOH and clinical exam	36	16/18 vs 1/18	83.3%	65.4%	101.3%	1.2	1.0	1.5	1 patient in Itra group reported dyspepsia and flatulance, 1 patient in the placebo with nausea and flatulance	
41	Zayas	Ketoconazole	200 mg daily for 5 days, 200 mg daily for 10 days vs placebo	2 DB	KOH and clinical exam	61	not provided	73.0%	NP	NP	1.4	NP	NP	elevated LFTs one patient	reported result is of both treatment groups vs placebo. Cure rate 10 day 90% vs 84% for 5 days

42	Savin	Ketoconazole	Ketoconazole 200 mg poqd x 4 weeks vs placebo	1 blinding	KOH	72	33/36 vs 2/36	87.7%	76.3%	99.1%	1.1	1.0	1.3	No significant difference in tolerability	77 patients csen, 66 efficacy evaluation. 2 placebo no 4 week visit, 2 p, 2k lost to FU
43	Urduyo	Ketoconazole	Ketoconazole 200 mg poqd x 2w vs placebo	1 blinding	KOH	20	9/10 vs 2/10	70.0%	39.0%	101.0%	1.4	1.0	2.6	No adverse events reported	Nicaraguan study conducted in warm/wet climate
44	Montero-Gei	Fluconazole vs Itraconazole	Single dose Fluconazole 450 mg, 300 mg Fluconazole weekly for 2 doses, Itraconazole 200 mg qd x 7 days	0	KOH	90	21/30 vs 29/30 vs 24/30	-26.0%	-44.0%	-9.0%	-3.8	-2.3	-11.0	The study has no methods section. Chi- square = 7.4, p = 0.02. KOH at 1 month elevated ALTs	Fluconazole 450 mg group 1 pt with eosinophilia and 2 with elevated ALTs
			Fluconazole 450 mg single dose vs Fluconazole 300 mg qw x 2 Fluconazole 300 mg qw x 2 vs Itraconazole 200 mg qd x 7d Itraconazole 200 mg qd x 7d vs Fluconazole 450 mg Single Dose					16.7%	-2.4%	35.7%	6.0	-42.4	2.8		
								10.0%	-11.8%	31.8%	10.0	-8.5	3.1		
45	Amer	Fluconazole	Fluconazole 150 mg qw x 4 vs 300 mg qw x 4 vs 300 mg qw x 2	0	KOH	603	mycologic cure in 78% vs 93% vs 87%	-15.0%	NA	NA	-6.5	NA	NA	2.5% of patients reported adverse events- study did not elaborate on what those were	Raw data inadequate
			Fluconazole 150 mg qw x 4vs 300 mg qw x 4 Fluconazole 150 mg qw x 4 vs 300 mg qw x 2 Fluconazole 300 mg qw x 4 vs 300 mg qw x 2					-9.0%	NA	NA	-11.1	NA	NA		
								6.0%	NA	NA	16.6	NA	NA		

Table 1 *Cont'd*

Reference	Author	Treatment	Description	Quality	End Point	Number Randomized	Success/Totals	RD	CI1	CIH	NNT	CI12	CIH2	Complications	Comments
46	Farchian	Fluconazole vs Ketoconazole	Fluconazole 300 mg q weekly x 2 vs Ketoconazole 400 mg q weekly x 2	1 blinding	KOH and Wood's lamp			4.0%	-11.7%	19.7%	25.0	5.1	-8.6	Ketoconazole group: 1 pt with fatigue, 2 with headach and rash. Fluconazole 1 pt with fatigue and diarrhea	12 week follow-up longer than most studies
Systemic v.s. Topical															
47	Del Palacio Hernanz	Itraconazole vs Selenium Sulfide	Itraconazole 200 mg po qd x 5d vs Selenium Sulfide 2.5% shampoo qd x 7d	1 ITT	KOH and Wood's lamp	40	10/20 vs 16/20	-30.0%	-58.1%	-1.9%	-3.3	-51.6	-1.7	1 patient in the selenium sulfide group with severe irritation discontinued drug	Itraconazole patients liked oral treatment
Prevention															
48	Faergemann	Ketoconazole prophylaxis	Ketoconazole 200 mg daily for 3 days each month	1 blinding	KOH and Wood's lamp	30	7 placebo and 1 ketoconazole patients had relapse. Number randomized to each group not given	NA	NA	NA	NA	NA	NA	1 pt with elevated ALT	suggests fewer recurrences in the keto group
49	Faergemann	Itraconazole prophylaxis	Open treatment Itraconazole 200 mg qd x 7 days, prophylactic treatment: Itraconazole 200 mg bid 1 day per month for 6 months vs placebo	4	KOH	223	90/102 vs 56/99	31.7%	20.1%	43.2%	3.2	2.3	5.0	Open phase: 26 pts- GI complaints most common. 1 pt with severe uticaria	
50	Hernandez-Perez	Bifonazole spray	1% Bifonazole spray 1 first day of each month for 4 months vs 1% Bifonazole spray qd 1-3 first 3 days of the first month then first day of each month for 3 months	not sure/ biometrically planned	KOH/Wood's lamp and clinical evaluation	60	23/30 vs 25/50	-6.7%	-26.8%	13.5%	-15.0	7.4	-3.7	None	

RD, risk difference; CI1, lower 95% confidence interval of RD; CIH, upper 95% confidence interval of NNT; CI12, lower 95% confidence interval of RD; CIH2, upper 95% confidence interval of NNT.

scant for itraconazole and were not found for ketoconazole and fluconazole.

Implications for clinical practice

A small randomized clinical trial suggests that itraconazole 200 mg twice daily once a month is effective in preventing recurrences. Optimal regimens for ketoconazole and fluconazole have not been established. Optimal regimens for topical prevention have not been established.

Key points

- The diagnosis of pityriasis versicolor can be easily established by KOH staining of scrapings from affected skin.
- Most topical treatments used to treat pityriasis versicolor (including imidazole antifungal cream or shampoos, zinc pyrithione shampoo, selenium sulfide shampoo, and sulfur/salicylic acid shampoo) are effective when compared to placebo with NNTs of 1–2.
- Postinflammatory hypopigmentation may persist for several months after successful treatment.
- Extensive tinea versicolor can be successively and safely treated with the oral imidazole antifungals.
- Data suggest that ketoconazole 200 or 400 mg daily for 1 week, itraconazole 200 mg daily for 5–7 days, or fluconazole 300 mg weekly for 2–4 weeks can be recommended.
- Optimal regimens for ketoconazole and fluconazole have not been established.
- Concomitant administration of oral imidazole antifungals with cisapride is contraindicated.
- Data on prevention of recurrences are sparse. One study has suggested that itraconazole 200 bid once per month for 6 months was effective in preventing recurrences compared to placebo.
- Optimal regimens for topical prevention have not been established
- Randomized, controlled clinical trials are needed to establish optimal topical and oral regimens to prevent recurrences.

References

- 1 Jena DK, Sengupta S, Dwari BC, Ram MK. Pityriasis versicolor in the pediatric age group. *Indian J Dermatol Venereol Leprol* 2005;71:259–61.
- 2 Ingordo V, Naldi L, Colecchia B, Licci N. Prevalence of pityriasis versicolor in young Italian sailors. *Br J Dermatol* 2003;149:1270–2.
- 3 Sahin I, Kaya D, Parlak AH, Oksuz S, Behcet M. Dermatophytoses in forestry workers and farmers. *Mycoses* 2005;48:260–4.
- 4 Acosta Quintero ME, Cazorla Perfetti DJ. Clinical-epidemiological aspects of pityriasis versicolor (PV) in a fishing community of the semiarid region in Falcon State, Venezuela. *Rev Iberoam Micol* 2004;21:191–4.
- 5 Belec L, Testa J, Bouree P. Pityriasis versicolor in the Central African Republic: a randomized study of 144 cases. *J Med Vet Mycol* 1991;29:323–9.
- 6 Martins EL, Goncalves CA, Mellone FF, et al. Prospective study of pityriasis versicolor incidence in a population of the city of Santo Andre (state of Sao Paulo). *Med Cutan Ibero Lat Am* 1989;17:287–91.
- 7 Ponnighaus JM, Fine PE, Saul J. The epidemiology of pityriasis versicolor in Malawi, Africa. *Mycoses* 1996;39:467–70.
- 8 García Rodríguez LA, Duque A, Castellsague J, Pérez-Gutthann S, Stricker BH. A cohort study on the risk of acute liver injury among users of ketoconazole and other antifungal drugs. *Br J Clin Pharmacol* 1999;48:847–52.
- 9 Up-to-Date Online 15.3 (last accessed 10 Jan 2008).
- 10 Rigopoulos D, Katsambas A, Antoniou C, Polydorou D, Vlachou M, Stratigos J. Tinea versicolor treated with fluconazole shampoo. *Int J Dermatol* 1992;31(9):664–5.
- 11 Nasarre J, Umbert P, Herrero E, et al. Therapeutic efficacy and safety of the new antimycotic sertaconazole in the treatment of Pityriasis versicolor. *Arzneimittelforschung* 1992;42(5A):764–7.
- 12 Aste N, Pau M, Cordaro CI, Biggio P. Double-blind study with fenticonazole or bifonazole lotions in pityriasis versicolor. *Int J Clin Pharmacol Res* 1988;8(4):271–3.
- 13 Katsambas A, Rigopoulos D, Antoniou C, Zachari A, Fragouli E, Stratigos J. Econazole 1% shampoo versus selenium in the treatment of tinea versicolor: a single-blind randomized clinical study. *Int J Dermatol* 1996;35(9):667–8.
- 14 Aste N, Pau M, Pinna AL, Colombo MD, Biggio P. Clinical efficacy and tolerability of terbinafine in patients with pityriasis versicolor. *Mycoses* 1991;34(7–8):353–7.
- 15 Savin RC, Horwitz SN. Double-blind comparison of 2% ketoconazole cream and placebo in the treatment of tinea versicolor. *J Am Acad Dermatol* 1986;15(3):500–3.
- 16 Lange DS, Richards HM, Guarnieri J, et al. Ketoconazole 2% shampoo in the treatment of tinea versicolor: a multicenter, randomized, double-blind, placebo-controlled trial. *J Am Acad Dermatol* 1998;39(6):944–50.
- 17 Alomar A, Videla S, Delgadillo J, Gich I, Izquierdo I, Forn J. Flutrimazole 1% dermal cream in the treatment of dermatomycoses: a multicentre, double-blind, randomized, comparative clinical trial with bifonazole 1% cream. Efficacy of flutrimazole 1% dermal cream in dermatomycoses. Catalan Flutrimazole Study Group. *Dermatology* 1995;190(4):295–300.
- 18 Treatment of tinea versicolor with a new antifungal agent, ciclopirox olamine cream 1%. *Clin Ther* 1985;7(5):574–83.
- 19 Sánchez JL, Torres VM. Double-blind efficacy study of selenium sulfide in tinea versicolor. *J Am Acad Dermatol* 1984;11(2 Pt 1):235–8.
- 20 Bamford JT. Treatment of tinea versicolor with sulfur-salicylic shampoo. *J Am Acad Dermatol* 1983;8(2):211–13.
- 21 Vicik GJ, Mendiones M, Quinones CA, Thorne EG. A new treatment for tinea versicolor using econazole nitrate 1.0 percent cream once a day. *Cutis* 1984;33(6):570–1.
- 22 Fredriksson T, Faergemann J. Double-blind comparison of a zinc pyrithione shampoo and its shampoo base in the treatment of tinea versicolor. *Cutis* 1983;31(4):436–7.
- 23 Quiñones CA. Tinea versicolor: new topical treatments. *Cutis* 1980;25(4):386–8.
- 24 Tanenbaum L, Anderson C, Rosenberg MJ, Akers W. 1% sulconazole cream v 2% miconazole cream in the treatment of tinea versicolor. A double-blind, multicenter study. *Arch Dermatol* 1984;120(2):216–19.

- 25 Clayton R, Du Vivier A, Savage M. Double-blind trial of 1% clotrimazole cream and Whitfield ointment in the treatment of pityriasis versicolor. *Arch Dermatol* 1977;113(6):849–50.
- 26 Spiekermann PH, Young MD. Clinical evaluation of clotrimazole. A broad-spectrum antifungal agent. *Arch Dermatol* 1976;112(3):350–2.
- 27 Mora RG, Greer DL. Comparative efficacy and tolerance of 1% bifonazole cream and bifonazole cream vehicle in patients with tinea versicolor. *Dermatologica* 1984;169 Suppl 1:87–92.
- 28 Chu AC. Comparative clinical trial of bifonazole solution versus selenium sulphide shampoo in the treatment of pityriasis versicolor. *Dermatologica* 1984;169 Suppl 1:81–6.
- 29 Faergemann J, Hersle K, Nordin P. Pityriasis versicolor: clinical experience with Lamisil cream and Lamisil DermGel. *Dermatology* 1997;194 Suppl 1:19–21.
- 30 Savin R, Eisen D, Fradin MS, Lebwahl M. Tinea versicolor treated with terbinafine 1% solution. *Int J Dermatol* 1999;38(11):863–5.
- 31 Vermeer BJ, Staats CC. The efficacy of a topical application of terbinafine 1% solution in subjects with pityriasis versicolor: a placebo-controlled study. *Dermatology* 1997;194 Suppl 1:22–4.
- 32 Hull CA, Johnson SM. A double-blind comparative study of sodium sulfacetamide lotion 10% versus selenium sulfide lotion 2.5% in the treatment of pityriasis (tinea) versicolor. *Cutis* 2004;73(6):425–9.
- 33 Bamford JT. Editorial: tinea versicolor treatment. *Arch Dermatol* 1974;110(6):956.
- 34 Bhogal CS, Singal A, Baruah MC. Comparative efficacy of ketoconazole and fluconazole in the treatment of pityriasis versicolor: a one year follow-up study. *J Dermatol* 2001;28(10):535–9.
- 35 Fernandez-Nava HD, Laya-Cuadra B, Tianco EA. Comparison of single dose 400 mg versus 10-day 200 mg daily dose ketoconazole in the treatment of tinea versicolor. *Int J Dermatol* 1997;36(1):64–6.
- 36 Estrada RA. Itraconazole in pityriasis versicolor. *Rev Infect Dis* 1987;9 Suppl 1:S128–30.
- 37 Morales-Doria M. Pityriasis versicolor: efficacy of two five-day regimens of itraconazole. *Rev Infect Dis* 1987;9 Suppl 1:S131–3.
- 38 Galimberti RL, Villalba I, Galarza S, Raimondi A, Flores V. Itraconazole in pityriasis versicolor: ultrastructural changes in *Malassezia furfur* produced during treatment. *Rev Infect Dis* 1987;9 Suppl 1:S134–8.
- 39 del Palacio Hernanz A, Frias-Iniesta J, Gonzalez-Valle O, Borgers M, van Cutsem J, Cauwenbergh G. Itraconazole therapy in pityriasis versicolor. *Br J Dermatol* 1986;115(2):217–25.
- 40 Hickman JG. A double-blind, randomized, placebo-controlled evaluation of short-term treatment with oral itraconazole in patients with tinea versicolor. *J Am Acad Dermatol* 1996;34(5 Pt 1):785–7.
- 41 Zaias N. Pityriasis versicolor with ketoconazole. *J Am Acad Dermatol* 1989;20(4):703–5.
- 42 Savin RC. Systemic ketoconazole in tinea versicolor: a double-blind evaluation and 1-year follow-up. *J Am Acad Dermatol* 1984;10(5 Pt 1):824–30.
- 43 Urcuyo FG, Zaias N. The successful treatment of pityriasis versicolor by systemic ketoconazole. *J Am Acad Dermatol* 1982;6(1):24–5.
- 44 Montero-Gei F, Robles ME, Suchil P. Fluconazole vs. itraconazole in the treatment of tinea versicolor. *Int J Dermatol* 1999;38(8):601–3.
- 45 Amer MA. Fluconazole in the treatment of tinea versicolor. Egyptian Fluconazole Study Group. *Int J Dermatol* 1997;36(12):940–2.
- 46 Farschian M, Yaghoobi R, Samadi K. Fluconazole versus ketoconazole in the treatment of tinea versicolor. *J Dermatolog Treat* 2002;13(2):73–6.
- 47 del Palacio Hernanz A, Delgado Vicente S, Menéndez Ramos F, Rodríguez-Noriega Belaustegui A. Randomized comparative clinical trial of itraconazole and selenium sulfide shampoo for the treatment of pityriasis versicolor. *Rev Infect Dis* 1987;9 Suppl 1:S121–7.
- 48 Faergemann J, Djärv L. Tinea versicolor: treatment and prophylaxis with ketoconazole. *Cutis* 1982;30(4):542–5, 550.
- 49 Faergemann J, Gupta AK, Al Mofadi A, Abanami A, Shareeah AA, Marynissen G. Efficacy of itraconazole in the prophylactic treatment of pityriasis (tinea) versicolor. *Arch Dermatol* 2002;138(1):69–73.
- 50 Hernández-Pérez E. A comparison between two different regimens of monthly application with bifonazole spray 1% in pityriasis versicolor. *Int J Dermatol* 1990;29(6):438–40.