ARTICLE

Pityrosporum Folliculitis

Diagnosis and Management in 6 Female Adolescents With Acne Vulgaris

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Background: *Pityrosporum* folliculitis is a common inflammatory skin disorder that may mimic acne vulgaris. Some adolescents with recalcitrant follicular pustules or papules may have acne and *Pityrosporum* folliculitis simultaneously. Clinical response is dependent on treating both conditions.

Objectives: To demonstrate the similarity in clinical manifestation between acne vulgaris and *Pityrosporum* folliculitis, the benefit of potassium hydroxide preparation, and the benefit of appropriate antifungal therapy.

Patients: We describe 6 female adolescents with concurrent *Pityrosporum* folliculitis infection and acne vulgaris.

Intervention: A potassium hydroxide examination was performed on all 6 patients from the exudate of follicular pustules exhibiting spores consistent with yeast. All patients were treated with oral antifungals, and 5 of the 6 patients were also treated with topical antifungals.

Results: Six of 6 patients improved with antifungal treatment. All patients also required some ongoing therapy for their acne.

Conclusions: These patients demonstrate that follicular papulopustular inflammation of the face, back, and chest may be due to a combination of acne vulgaris and *Pityrosporum* folliculitis, a common yet less frequently identified disorder. Symptoms often wax and wane depending on the patient's activities, time of the year, current treatment regimens, and other factors. *Pityrosporum* folliculitis will often worsen with traditional acne therapy and dramatically respond to antifungal therapy.

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PITYROSPORUM FOLLICULITIS was first described in 1969 by Weary et al[1] and noted to be an acneiform eruption associated with antibiotic use. It is an infection of the hair follicle thought to be caused by the common cutaneous yeast, *Malassezia furfur* (*Pityrosporum ovale*) and possibly other strains of *Malassezia*.[2-4] *Malassezia* is a dimorphic lipophilic yeast that can be found in small numbers in the stratum corneum and hair follicles of up to 90% of individuals without disease.[2-4] Some individuals colonized with *Malassezia* develop folliculitis, while others develop tinea versicolor and seborrheic dermatitis.[5,6] The papulopustular folliculitis is most commonly found on the chest, back, upper arms, and less frequently on the face. Often it is misdiagnosed as acne.[6,7]

Pityrosporum folliculitis typically appears as 1- to 2-mm pruritic, monomorphic, pink papules and pustules. Positive potassium hydroxide (KOH) examination results showing numerous spores and other yeast forms support the diagnosis. It may be difficult to distinguish clinically from acne vulgaris. Traditional acne therapies, especially antibiotics, worsen *Pityrosporum* folliculitis. We discuss 6 patients with recalcitrant "acne" who had acne vulgaris and *Pityrosporum* folliculitis simultaneously.

METHODS

All patients were seen in the general pediatric dermatology clinics at University of Massachusetts Memorial Health Care, Worcester, as part of routine clinic visits. The University of Massachusetts Medical School institutional review board was notified of this retrospective case review study and granted approval without full committee review.

RESULTS

All 6 of the patients seen at University of Massachusetts Memorial dermatology clinics were adolescent white girls with a his-

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Table. Clinical Characteristics and Treatment of 6 Patients With Concurrent *Pityrosporum* Folliculitis and Acne Vulgaris

Patient/ Age, y	Duration	Areas of Involvement	Previous Treatment	Treatment	Results
1/16	5 y	Monomorphic pink papules and pustules on cheeks and shoulders	Oral TMP/Sulfa; azelaic acid cream; adapalene gel	Discontinued TMP/Sulfa; ketoconazole 200 mg PO once daily for 2 wk then 400 mg PO once per week for 6 wk for flares (during increased activity and hot weather); 2% ketoconazole shampoo daily for 2 wk, then as needed	8-mo F/U: complete resolution of inflammatory papules and pustules; flares during humid weather and increased activity
2/16	4-6 wk	1- to 2-mm Monomorphic papules and pustules on chest and upper back	Erythromycin solution; antibacterial soap	Ketoconazole 200 mg PO BID for 1 d, then daily for 2 wk; 2% ketoconazole shampoo 2-3 times per week as needed; transient improvement; switched to: fluconazole 200 mg PO once per week for 3 wk, then once per month for 5 mo; 2.5% selenium sulfide shampoo 3 times per wk	6-mo F/U: decreased number of comedones; no inflammatory papules or pustules
3/15	3 wk	1- to 2-mm Monomorphic, erythematous papules and pustules on forehead and lateral cheeks (Figures 1 and 2)	Topical 1% clindamycin solution twice daily; cephalexin 500 mg PO twice daily for 2 wk	Discontinued oral cephalexin and topical clindamycin;ketoconazole 200 mg PO daily for 2 wk, repeat for flares in hot weather; 2% ketoconazole cream twice daily as needed; ketoconazole 2% shampoo daily as needed	3-mo F/U: decreased number of papules and pustules; started taking cephalexin again, 500 mg PO twice daily; tretinoin 0.04% microgel at bedtime; benzoyl peroxide 5% wash daily as needed 9-mo F/U: stopped using all oral and topical antibiotics; ketoconazole 2% cream as needed; 20% azelaic acid cream daily as needed 14-mo F/U: increasing number of pruritic pustules and inflammatory papules not responding to oral ketoconazole, oral antibiotics, or topical treatments; started taking 6-mo course of oral isotretinoin (total 120-mg/kg dose); complete resolution of symptoms 3 mo after taking oral isotretinoin
4/12	12 mo	Monomorphic, pink papules, pustules, and closed comedones on cheeks, forehead, shoulders, and back	Minocycline 100 mg PO daily; benzoyl peroxide 2.5% wash; 0.1% tretinoin gel; 20% azelaic acid cream	Discontinued minocycline administration; fluconazole (40 mg/mL) 2.5 mL daily for 2 wk; 2% ketoconazole shampoo 3 times per week as needed	24-mo F/U: rare comedones and inflammatory papules (acne); no pustules
5/9	24 mo	Pruritic, erythematous, monomorphic papules and pustules on face, chest, and back; comedones and pitted scars on face	Oral erythromycin; 0.1% tretinoin gel; 1% clindamycin gel; 5% benzoyl peroxide, 0.5% gel; hydrocortisone lotion	Ketoconazole 200 mg PO daily for 2 wk; 2% ketoconazole shampoo 2-3 per week; 0.04% tretinoin microgel daily; 4% benzoyl peroxide wash daily	1-mo F/U: pruritic inflammatory papules and small pustules resolved; comedones and larger pustules increased in number; cephalexin 500 mg PO twice daily prescribed for acne 1-y F/U: markedly improved
6/15	48 mo	Pruritic 1- to 2-mm erythematous, monomorphic papules and pustules on forehead; larger pustules on cheeks, jawline, and neck	Minocycline 100 mg PO BID for 2 mo	Discontinued minocycline administration; ketoconazole 200 mg PO daily for 3 wk; 2% ketoconazole shampoo daily; 0.4% tretinoin microgel at bedtime; 1% clindamycin lotion daily; 2.5% benzoyl peroxide wash daily	3-wk F/U: greatly reduced number of papules and pustules; pruritus resolved

Abbreviations: BID, twice daily; F/U, follow-up; PO, by mouth; TMP/Sulfa, trimethoprim/sulfamethoxazole.

tory of pruritic papules and pustules on the face, chest, and/or back (**Table**). The patients had limited responses to traditional acne therapies and recent exacerbation of their symptoms. In addition to the traditional inflammatory papules, pustules, and comedones of acne vulgaris, these patients also displayed uniform 1- to 2-mm monomorphic, erythematous papules and pustules (**Figure 1** and **Figure 2**) that were pruritic during hot,

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Figure 1. A 15-year-old girl with 1- to 2-mm erythematous papules and pustules of *Pityrosporum* folliculitis.

humid weather and increased activity. A KOH examination on scrapings of the monomorphic pustules revealed spores and budding yeast forms consistent with *Pityrosporum* folliculitis in all 6 patients. They were diagnosed with *Pityrosporum* folliculitis in addition to acne vulgaris. Any oral antibiotics that were being used at the time of diagnosis were discontinued. Six of 6 patients responded well to a combination of topical and oral antifungal treatment. Four of the 6 patients experienced flares of symptoms especially during hot and humid weather requiring intermittent treatment with both oral and topical antifungals. The patients were also treated with topical or oral medications for their acne vulgaris, but antibiotics, especially oral antibiotics, were used sparingly and only when necessary.

COMMENT

Pityrosporum folliculitis may be underdiagnosed because it can mimic acne vulgaris. Typical patients will not respond to or only partially respond to topical and oral antibiotics, topical retinoids, and other acne treatments. A KOH examination is an easy, inexpensive, and accessible method of immediately clarifying the diagnosis.

The pathophysiologic features of *Pityrosporum* folliculitis involve follicular occlusion followed by an overgrowth of yeast that thrives in a sebaceous environment.[3,7] Altered host immunity is also thought to play a role in *Pityrosporum* folliculitis because 90% of people have *Malassezia* as a part of their normal skin flora without signs and symptoms of folliculitis or other disease.[2,4] Furthermore, *Pityrosporum* folliculitis is associated with the use of oral corticosteroids, diabetes mellitus, organ transplantation, chemotherapy, and other immunosuppressed states.[8,9]

Figure 2. Close-up view of the same patient showing multiple tiny pustules.

Pityrosporum folliculitis is commonly found in adolescents presumably because of the increased activity of their sebaceous glands. Some colonized individuals develop tinea versicolor, and others develop *Pityrosporum* folliculitis. Perhaps the density of lipids in the pilosebaceous unit of acne-prone individuals leads to a higher concentration of the organism in hair follicles and thus a folliculitis. All of our patients were female, and some other studies also report increased incidence among girls. However, a predominance in boys and equal sex distribution have also been described.[5,7] In our patients, the female predominance may reflect a referral bias of girls to female physicians. *Pityrosporum* folliculitis is also more common in hot and humid climates.[5,8] Four of our 6 patients had flares during hot, humid weather and with increased episodes of sweating.

Given the role of follicular plugging, it is no surprise that our patients had a combination of acne and *Pityrosporum* folliculitis. Treatment regimens that address both of these conditions are necessary for improvement. Antibiotics commonly used to treat acne may suppress normal bacterial flora and allow overgrowth of *Malassezia*. This may explain some cases of what appears to be persistent acne that shows no improvement and actually worsens with oral antibiotic treatment as seen in patient 4.

In treating recalcitrant acne complicated by *Pityrosporum* folliculitis, host response plays a significant role in determining whether a patient may be able to permanently eradicate the yeast colonization. Patients may require prophylaxis or retreatment (ie, antifungal shampoos and/or pulse dosing of oral antifungals), especially during times in which they are prone to breakouts. Five of our 6 patients who responded to oral antifungal treatment also required maintenance with ketoconazole shampoo or selenium sulfide shampoo. In addition, 3 of these 6 patients required multiple courses of oral antifungals.

Pityrosporum folliculitis usually responds well to oral antifungal medications. Topical antifungals are less use-

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ful in the initial treatment of *Pityrosporum* folliculitis but are important in maintenance and prophylaxis. The discontinuation of oral and topical antibiotics is also useful when treating *Pityrosporum* folliculitis. Furthermore, one is able to get a clearer picture of the extent of the acne once the folliculitis is treated if some or all of acne medications are discontinued prior to the initiation of antifungal treatment.

A KOH mount can be prepared by gently scraping 1 of the monomorphic pustules with a sterile scalpel blade, smearing the pustular contents on a glass slide, and treating it with 1 to 2 drops of 10% KOH and a coverslip. The slide can then be examined under the microscope for spores. This allows for a more immediate diagnosis than either skin biopsy or culture.[6] Cultures of *Malassezia* are rarely required for diagnosis and are complicated by the yeast's special culture-medium requirements. *Malassezia* grows only within a medium rich in C_{12}, C_{13}, and C_{14} fatty acids, which can be achieved by adding olive oil to the medium.[9]

These patients were described with the goal of encouraging physicians to have a high suspicion for *Pityrosporum* folliculitis in adolescent patients with recalcitrant acne. We also advocate performing a KOH preparation in any patient with monomorphic or acneiform pustules on the scalp, trunk, or upper extremities who is not responding to or worsening with antibiotics. There is no one specific treatment regimen that can be suggested to eradicate both acne vulgaris and *Pityrosporum* folliculitis. Therefore, close patient follow-up to monitor response to therapy is important. Our patients responded well to oral ketoconazole or fluconazole. Patients must be advised of potential adverse effects of ketoconazole and other antifungals including nausea, vomiting, diarrhea, abdominal pain, and hepatotoxicity. Liver function should be evaluated in patients on long courses or multiple courses of oral ketoconazole.

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