

PHOTO ROUNDS

Pits on the soles of the feet

A 22-year-old man came to the office with feet that were malodorous, had a rash, and were sweaty. The odor is made worse by any exercise that leads to a lot of foot sweating. His friends and family complain when he removes his shoes. He reported that everyone once left a public locker room after he removed his shoes. He is so embarrassed by this problem that he has waited months before seeking help.

The young man admits to wearing shoes that don't let his feet breathe well, but he finds these to be the most comfortable shoes he has. He doesn't like that his socks get wet easily from his excessive sweating. Aside from the malodor and

hyperhidrosis of the feet, he denies any pain or severe pruritus.

On examination, the foul odor was immediately apparent. Multiple cribriform pits were noted on the pressure-bearing areas of the soles (**FIGURE**). There was scaling of the skin on the soles and around the toes. There was no lymphadenopathy. No other skin or mucosal areas involvements. His family history and review of systems were unremarkable.

- What is your diagnosis?
- How would you manage this condition?

FIGURE Multiple pits on the sole



The patient had multiple cribriform pits on the pressure-bearing areas of the soles of his feet.

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■ **Diagnosis: Pitted keratolysis**

Pitted keratolysis (PK), also known as keratolysis plantare sulcatum, is a skin disorder characterized by pits and collarettes from bacterial infection. PK is a superficial infection, confined to the stratum corneum.

Micrococcus sedentarius, a Gram-positive *Staphylococcus*-related bacterium, *Dermatophilus congolensis*, a Gram-positive facultative anaerobic *Actinomyces* species, and several *Corynebacterium* species have all been identified as causative agents of PK. These bacteria make proteinases that destroy the stratum corneum and open small tunnels and pits in the skin.¹⁻⁴

■ **Clinical picture of PK**

The plantar aspects of the feet are most commonly affected by PK, pressure-bearing areas such as the ventral aspect of the toes and the ball of the foot in particular. Some patients develop lesions on the interdigital surfaces. The localized absence of the stratum corneum leads to a punched-out appearance of the skin.

Prolonged time of occlusion and hyperhidrosis often lead to increased skin surface pH. This triggers bacterial infections, resulting in PK. Malodor is common, presumed to be due the production of sulfur-compound byproducts such as thiols, sulfides, and thioesters.²⁻⁴ Often asymptomatic, a patient with PK may develop varying degrees of discomfort, ranging from mild burning sensation to severe tenderness and limitation of function.

The diagnosis is often clinical and seldom poses a challenge; skin biopsy is rarely performed. In recent reports, the use of transmission electron microscopy and scanning electron microscopy showed bacteria in the stratum corneum with typical transversal septations. Tunnel-like spaces were built inside the stratum corneum, where the bacteria exhibited a hairy surface.

The differential diagnosis for PK may include the following, especially when the soles are involved: candidal infections, basal cell nevus syndrome, and keratolysis exfoliativa.

■ **Management: Good foot hygiene, topical medications**

After clinical diagnosis of PK, most of the dermatologists and other practitioners with expertise in skin diseases management initiate empiric treatment. Management should include instructing patients to wear well-fitted shoes, avoid prolonged periods of occlusion, and use absorbent 100% cotton socks with frequent sock changes.

Topical erythromycin, clindamycin, and fucidic acid applied to the entire plantar surfaces of the feet are very effective. Topical mupirocin, benzoyl peroxide wash or gel, clotrimazole, miconazole, and Whitfield's ointment are also effective. Successful treatment with topical antiseptics, such as glutaraldehyde and formaldehyde, has also been reported. Oral erythromycin is another option, especially for resistant cases. This usually clears both the lesions and odor in 3 to 4 weeks.

In addition, applying antiperspirants such as aluminum chloride 20% solution helps reduce hyperhidrosis. Inert antiseptic foot powders may also be used. Recently, plantar hyperhidrosis and pitted keratolysis have been successfully treated with botulinum toxin injection (Botox).⁵

Along with good foot hygiene, our patient was advised to use topical fucidic acid cream and 20% aluminum chloride solution for 2 weeks. On his 2-week follow-up visit, the lesions were almost completely resolved, the malodor was gone, and the hyperhidrosis had decreased. ■

REFERENCES

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FAST TRACK

Patients should wear well-fitted shoes, avoid long periods of occlusion, and use absorbent 100% cotton socks with frequent changes