Photo Quiz: Unusual pits to the bottom of the foot

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ANSWER: Pitted keratolysis

Pitted keratolysis or PK was first described in a Ceylonese patient in 1910, by Castellani as *keratoma plantare sulcatum* secondary to yaws.[1,2] The condition is caused by a cutaneous gram positive bacterial infection linked to both the Corynebacterium and Actinomyces species.[1,2] This disorder is characterized by keratomatous pitting of the skin usually to weightbearing regions of the foot, such as the forefoot and heels.

The condition has no age or sex predilection and can affect individuals at any age. The condition is associated with athletics and individuals who prefer going bare-footed in tropical regions. The condition may or may not be associated with underlying hyperkeratosis. It can be malodorous and pruritic in nature. It is also known to be associated with hyperhidrosis and perfuse sweating of the feet. In association with hyperhidrosis, the punched-out pits can coalesce and form white clusters.[3,6] The keratin pits associated with this condition are usually small in the diameter range of 0.5-7mm. Larger pitting and lesions are associated with a variant form called *crateriform pitted keratolysis.*[1] It is suggested that the pitting is caused by proteases secreted by the bacteria and alter the structure of both the corneodesmosomes and the keratohyalin granules. The corneodesmosomes at the bottom of the pits were in part cleaved leading to partial corneocyte dissociation.[4]

The differential diagnosis in our quiz included arsenical keratosis, keratosis punctata, keratosis pilaris, intractable plantar keratosis, porokeratosis plantaris discreta, hyperhidrosis and bromohidrosis.

Arsenical keratosis present as yellow-brown lesions usually seen on the sole of the feet after exposure to arsenic.[6] It is also involves the hand. Although the brown discoloration of arsenical keratosis may appear similar to pitted keratolysis, arsenical keratosis is extremely rare and only occurs after long-term exposure to arsenic. It has been shown to cause Bowen's disease or in-situ squamous cell carcinoma.[7]

Keratosis punctata is a dominantly inherited disorder that develops between the ages of 15 and 30. [6] The condition will last a lifetime.[6] These lesions are more punctuate, as the name implies and will not disappear when superficially debrided as in pitted keratosis.

Keratosis pilaris is not a condition that involves the plantar surface of the foot. It is commonly associated with atopic dermatitis.[6] It is associated with kertinization of hair follicles. It is an extremely common benign condition that manifests as small, rough folliculocentric keratotic papules, often described as chicken bumps, chicken skin, or goose bumps, in characteristic areas of the body, particularly the outer-upper arms and thighs.[8]

Intractable plantar keratosis or IPK is usually an isolated hyperkeratotic lesion under a metatarsal head. These lesions are large and measure up to 20-30mm in diameter.[9] These lesions are sometimes confused with porokeratosis plantaris discreta, however, porokeratosis is a much smaller hyperkeratotic lesion that can reach a depth of 1.5mm or more. It can also be associated with non-weightbearing surfaces, unlike the IPK.

Hyperhidrosis is a local condition of sweaty feet or excessive perspiration. This condition can certainly lead to and is commonly associated with pitted keratolysis. Bromohidrosis is the termed used to describe the pungent odor of malodorous feet. Bromohidrosis is commonly associated with hyperhidrosis, ingestion or exposure to heavy metals such as arsenic and the odor associated with fungal and bacterial infections of the feet.[6]

Treatment of pitted keratolysis can include localized debridement of the overlying epidermis and topical drying agents with oral and topical antibiotics. Topical drying agents can include Drysol or aluminum chloride hexahydrate. Roll-on antiperspirants such as aluminum chloride have also been described.[1] Zeasorb super absorbent powder to address the hyperhidrosis can also be useful. Oral antibiotics to treat the underlying infection are also indicated when treating PK if the condition is resistant to topical antibiotic treatments. The oral and topical antibiotic of choice is clindamycin. Antibacterial gels or creams such as clindamycin, erythromycin and mupirocin has also been described.[5] Twice daily applications of these topicals for 2-3 weeks will usually clear the lesions. In other cases, botulinum toxin injections have been shown to be effective. The overall prognosis is excellent when properly treated.

The patient was prescribed erythromycin 2% cream for two weeks. She was advised to keep her feet dry and use talcum powder after the application of erythromycin cream. After having the condition for over a year, the condition resolved promptly after 2 weeks of topical treatment.

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