

Aquatic/aquagenic Dermatoses: The Thin Line Between Pool Palms and Aquagenic Syringeal Acrokeratoderma

Deniz Demircioğlu, Emel Öztürk Durmaz

Acıbadem University School of Medicine, İstanbul, Turkey

Corresponding author:

Emel Öztürk Durmaz, MD
Acıbadem Maslak Hospital
Büyükdere Caddesi 40
Maslak 34457
emelerkek@yahoo.com

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ABSTRACT Pool palms and pool toes are friction or pressure-induced aquatic dermatoses resulting from extensive and repetitive rubbing of fingers, palms, soles, and toes against the rough anti-slippery surfaces or edges of pools. Aquagenic syringeal acrokeratoderma is a sporadic, episodic, and acquired disorder of palmar skin linked to water exposure. Herein we describe a case of aquatic/aquagenic dermatosis that presented clinical and diagnostic difficulties. Differentiating between pool palms and aquagenic syringeal acrokeratoderma is a challenge, and we believe that both disorders lie on a spectrum of watersport dermatoses.

KEY WORDS: pool palms, pool toes, aquagenic syringeal acrokeratoderma, transient reactive papulotranslucent acrokeratoderma, watersport hands

INTRODUCTION

Pool palms (PP)/pool toes (PT) are friction or pressure-induced aquatic dermatoses resulting from extensive and repetitive rubbing of fingers, palms, soles, and toes against the rough (cement) anti-slippery surfaces or edges of pools (1-4). Aquagenic syringeal acrokeratoderma (ASA), also known as transient reactive papulotranslucent acrokeratoderma, aquagenic wrinkling of the palms, and watersports hands, is a sporadic, episodic, and acquired disorder of palmar skin linked to water exposure (1,5). Herein we describe a patient in whom the differentiation between PP and ASA proved difficult.

CASE REPORT

A 4-year-old boy presented with a 1-week history of asymptomatic redness on the palms. The complaint had started immediately following swimming pool activities as part of a summer school. There was no history of atopy, medication intake, or exposure to detergents, disinfectants, antiseptic gels, and hand sanitizers.

Dermatologic examination revealed erythematous to whitish macules and patches with tache noir on the palmar eminences and pulps of the fingers (Figure 1). There was no hyperhidrosis. The lesions were accentuated with a 5-minute water immersion test and acquired a whitish appearance with sloughing (Figure 2). Dermatoscopy revealed marked enlargement of the sweat duct pores in the affected areas.

Clinical and dermatoscopic findings were consistent with both pool palms and aquagenic acrosyringial acrokeratoderma. No biopsy was attempted in order to prevent pediatric morbidity. Conservative treatment through limitation of pool activity, application of a zinc oxide barrier cream, and use of calcipotriene ointment 0.005% bid accomplished clearance of the lesions within a month.

DISCUSSION

PP/PT has a predilection for the pediatric age group due to the greater fragility of palmar/plan-



Figure 1. Erythematous to whitish macules and patches, confined to thenar and hypothenar eminences and pulp of the fingers. Note the presence of subcorneal bleeding (tache noir) on the thumb.



Figure 2. Discrete and confluent whitish pebbly papules and plaques with sloughing after 5 minutes of water immersion.

tar skin and increased propensity for playing in the pool and rubbing against pool surfaces (1-3,6). It is encountered early in the swim season before the patients' soles/palms acquire resilience to trauma by thickening and/or forming calluses (1,6). Typically, a history of frequent and prolonged swimming pool activity (walking, aqua exercising) is elicited (1,2,6).

PP/PT present as symmetrical shiny erythematous papules and plaques, preferentially located on the convex areas of the palms and/or soles and the pulps of the fingers and/or toes (2,4,6). Blisters and subcorneal bleeding (tache noir/talon noir) may develop, depending on the extent of friction (1). The lesions are concentrated on the bony prominences of the palms/soles and finger/toe pads, as these areas are the most likely traumatized areas due to contact with pool surfaces and edges (2,3). In some cases, only the toes may be afflicted due to tiptoe walking in the pool (1). The lesions are generally asymptomatic and blanchable (2,7). Itching, tenderness, and pain are exceptional complaints that may provoke antalgic limping¹.

Since PP/PT are benign and self-limited disorders, no laboratory workup or specific treatment is required (1-3,6,7). Providing reassurance to the patient is all that is necessary². Once rubbing is discontinued, spontaneous resolution is observed (3,6). However, the risk of secondary bacterial and viral infections (verruca) on the hands and feet is increased, owing to friction-induced disruptions in epidermal barrier (1). Cessation of swimming, cold water compresses,

cold water soaking, and application of barrier creams (petrolatum jelly or dimethicone) may help in rapid healing of the affected palms/soles (1,2). If treatment is requested, topical shake lotions (containing camphor and menthol) and oral acetaminophen or ibuprofen may alleviate the accompanying tenderness and pain sensations. Topical antibiotics may prevent secondary bacterial infections. For prophylaxis, wearing rubber-soled pool shoes may be advised (1).

PP/PT is mainly caused by mechanical trauma, pressure, and friction. Overhydration of the stratum corneum in areas of skin exposed to traumatic insult has been implicated as the pivotal pathogenetic event. Disinfectants and liquid cleansers have also been criticized; however, PP lesions do not involve concave skin areas where disinfectants and liquid cleansers are expected to accumulate and irritate (6).

In the present case, the most important differential diagnostic consideration was ASA, which has been increasingly prevalent during the COVID-19 pandemic, possibly secondary to frequent hand wash, exposure to liquid cleansers, detergents, hand sanitizers, disinfectants, and gloves (4,8). Friction, sweating, occlusion, moisture, disinfectants, and liquid cleansers have been proposed as exacerbating factors both in ASA and PP (1,5,9). In contrast to PP, the palms are usually involved diffusely in ASA, although marginal distribution as in PP has also been reported (5). Rarely, ASA lesions might be reminiscent of palmar erythema, PP, or an eczematous disorder and appear as red to brown patches, sometimes with mild

Table 1. Comparison of pool palms/pool toes (PP/PT) and aquagenic syringeal acrokeratoderma (ASA) (1-10)

	PP/PT	ASA
History	Blauvelt <i>et al.</i> , 1992	English & McCollough, 1996
Classification	Aquatic dermatosis	Aquagenic dermatosis
Inheritance	Sporadic and acquired†	Sporadic and acquired†
Trigger	Water sports, swimming pool	Water exposure, water sports
Age of onset	Pediatric age group	Adolescence or young adulthood
Associated, triggering, or exacerbating disorders	Atopy, psoriasis	Cystic fibrosis, medications (tobramycin, salazopyrin, clarithromycin, and cyclooxygenase inhibitors: aspirin, ibuprofen, celecoxib, indomethacin, rofecoxib), atopic dermatitis, focal hyperhidrosis, marasmus, nephrotic syndrome, and Raynaud phenomenon
Localization	Palms and/or soles	Palms†
Distribution	Marginal areas of friction and pressure; bony prominences and pulps of fingers; bilateral and symmetrical; convexities	Diffuse†; bilateral and symmetrical†; concavities†
Morphology	Shiny erythematous papules and plaques; tache/talon noir	Translucent whitish pebbly papules with central puncta, transient edema and wrinkling, rarely palmar erythema, or eczematous appearance
Symptomatology	Asymptomatic†	Symptomatic (tightness, tingling, burning, itching, and mild pain with flexion)†
Course	Spontaneous resolution upon cessation of friction or rubbing	Fluctuating course with reactive episodes and quiescent intervals; spontaneous resolution possible
Etiopathogenesis	<ul style="list-style-type: none"> • Epidermal barrier disruption because of friction or pressure • Overhydration of the stratum corneum in areas of skin exposed to traumatic insult • Disinfectants, liquid cleansers, friction, pressure, sweating and occlusion 	<ul style="list-style-type: none"> • Transient structural and functional barrier alterations (salt retention or abnormal water absorbance) resulting in overswelling of the stratum corneum and compensatory dilatation of the eccrine ducts • Inherent structural weakness of the eccrine duct walls or aberrations in eccrine glands • Friction, occlusion, sweating, liquid cleansers, detergents, disinfectants, antiseptic gels, hand sanitizers, gloves, topical preparations, hyperhidrosis
Prognosis	Benign and self-limited	Benign and self-limited
Complications	Secondary bacterial and viral infections	None
Treatment	<ul style="list-style-type: none"> • Cessation of swimming • Barrier agents • Shake lotions • NSAID 	<ul style="list-style-type: none"> • Cessation of water exposure • Barrier agents • Calcipotriene, tretinoin, tazarotene • Antiperspirants, iontophoresis, botulinum toxin injections, endoscopic thoracic sympathectomy • NB-UVB

† Exceptions reported.

exfoliation or hyperkeratosis (10). Clinically, there is a thin line between PP/PT and ASA (1,5). Table 1 shows the known similarities and differences between ASA and PP/PT.

In our patient, symmetrical marginal distribution of asymptomatic red to white macules and patches, along with subcorneal bleeding over the convexities of the palms and pulps of fingers, favored a diagnosis of PP. However, the hand-in-the-bucket sign was positive and revealed whitish pebbly papules and plaques with sloughing, indicating a diagnosis of ASA. Furthermore, dermatoscopy exposed enlarged

sweat duct pores in the affected areas, once again supporting a diagnosis of ASA.

CONCLUSION

The present case may represent the simultaneous occurrence of two different aquatic/aquagenic disorders in the same patient. However, we believe that the etiopathogenetic, clinical, and dermatoscopic distinction between ASA and PP is blurred and that both disorders may reside on a continuous spectrum of aquatic/aquagenic/watersport dermatoses.

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