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Post ambulatory swollen hands (POTASH) revisited: post ambulatory hand swelling in a half marathon participant

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To the Editor:

Hand swelling can be acute or chronic. The associated etiology can either be directly related (intrinsic) or indirectly caused (extrinsic) to the affected hands. Indeed, swollen hands can represent a condition localized to the hands or a specific manifestation of a systemic disorder [1-9].

Hand swelling can be unilateral or bilateral. Swollen hands can either be asymptomatic or associated with pain, pallor, paralysis, paresthesia, and/or pulselessness. Clinically, the edema can be pitting or non-pitting [1-9].



Figure 1. A, B) Post ambulatory swollen hands (POTASH) on the bilateral hands and digits of a 63-year-old man after completing a 13.1-mile half marathon. The patient presented with asymptomatic swollen digits on both hands and **A)** massive swelling of the right hand, and **B)** the left hand; the left fourth finger shows constriction proximal and distal to the ring, **B).** **C, D)** The man was not able to clench his fingers into the palm and make a fist; hence, both the **C)** right hand and the **D)** left hand show a positive fist sign.

Post ambulatory swollen hands (POTASH) is a condition that presents with acute hand swelling [10,11]. It is associated with ambulatory activities such as hiking, running, and walking [10-12]. The features of an older man who developed POTASH during a 13.1-mile half marathon are described and the characteristics of this unique presentation of hand swelling are summarized.

A healthy 63-year-old man presented with progressive swelling of his hands after participating in a half marathon. His past medical history was unremarkable. He was not taking any medications.

The 13.1-mile half marathon occurred in January 2022 in San Diego, California. He began the race at 9:42AM; the ambient temperature was 54 degrees Fahrenheit. He completed the race after three hours 58 minutes; at that time, the ambient temperature was 69 degrees Fahrenheit.

The entire race had been performed as a rapid walk without stopping. After the first hour, he noted asymptomatic swelling of his fingers and that he could not completely make a fist. As he continued, the swelling progressed, and he could not bring his fingertips to touch his palms.

Cutaneous examination after completing the race demonstrated bilateral swelling of not only his hands but also all his fingers; indeed, there was constriction proximal and distal to the ring on his left fourth finger. There was erythema of the palms and the ventral fingers. The swelling resulted in a positive fist sign; he was not able to clench his fingers into the palm and make a fist (**Figure 1**). There was no

pruritus, no urticaria, no angioedema, and no swelling of any other body site.

Similar to a prior episode of running-associated hand swelling [10], within two hours after completing the race the hand and finger swelling was 80 percent resolved. After four hours, his hands and fingers were still slightly swollen. However, six hours after he had stopped racing, all the swelling in his hands and fingers had completely resolved and he was able to make a tight fist (**Figure 2**).

Correlation of the patient's history and clinical presentation established the diagnosis of POTASH [10]. In addition to POTASH, other causes of acute hand swelling include allergic contact dermatitis, compartment syndrome, deep venous thrombosis, erythromelalgia, exercise-induced urticaria, infection, irritant contact dermatitis, medications, nocturnal hand swelling, post coronavirus disease 2019 (COVID-19) puffy hands, Raynaud disease and phenomenon, remitting seronegative symmetrical synovitis with pitting edema, and thoracic outlet syndrome [1,2,5,6,8,10-12]. In contrast, chronic hand swelling can result from acromegaly, carpal tunnel syndrome (tumor associated), complex regional pain syndrome type I, leprosy, lymphedema, mixed connective tissue disease, puffy hand syndrome,

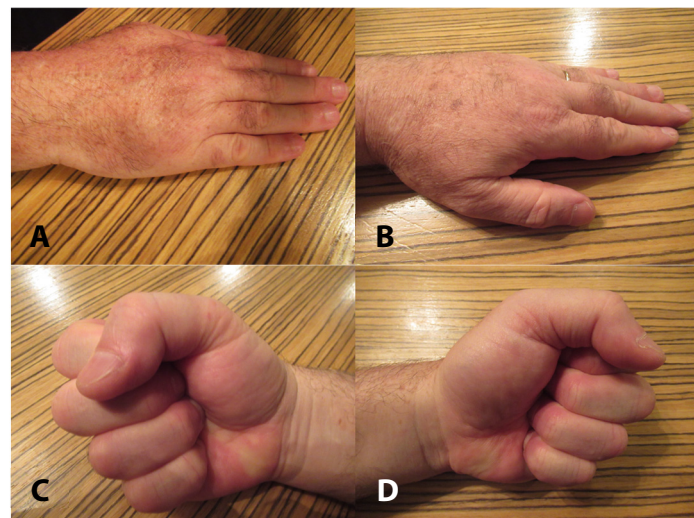


Figure 2. Complete spontaneous resolution of post ambulatory swollen hands (POTASH). **A)** The right hand and **B)** the left hand show that all the post ambulatory swelling in both hands and all ten digits had completely resolved six hours after the patient had stopped racing. **C)** The right hand and **D)** the left hand also both show a negative fist sign; the man can make a tight fist by clenching the fingers into the palm.

rheumatoid arthritis, scleroderma, and systemic organ (heart, kidney, and liver) disease [2-4,7,9].

Acute hand swelling can resolve spontaneously, similar to the patient with POTASH, or it can persist. However, unilateral or bilateral, acutely swollen hands may warrant immediate evaluation and treatment. Indeed, prompt medical attention should be considered when there are new symptoms (such as pain, numbness, and/or warmth), changes in skin color (such as red erythema potentially associated with infection or purple ecchymoses and purpura possibly related to either emboli or thrombus), and/or recent trauma to the affected area [1,2,5,6,8,10].

POTASH was originally described as big hand syndrome in an article on post ambulatory hand swelling by Ravaglia et al. in 2011; the researchers evaluated the prevalence and demographics of big hand syndrome and its association with dog walking. Their study was performed in Sao Paulo, Brazil and all interviews were conducted in the country's native language, Portuguese. The investigators initially intended to only assess the prevalence of dog ownership and regular dog walking in the city. However, the researchers expanded the scope of their study when several participants reported the development of walking-associated big hands [11].

Ravaglia et al. observed post ambulatory hand swelling in almost a fourth (24 percent, 269 of 1109) of the eligible study subjects. This phenomenon was nearly twice as common in women (29 percent, 202 or 699) than in men (16 percent, 67 of 410); however, in subjects aged 60 years and older, the prevalence of hand swelling in women and men was almost identical. An unexpected, yet statistically significant ($P=0.003$) finding, was that the individuals with hand swelling were younger (by an average of about 3.5 years) than their counterparts who did not develop post ambulatory hand swelling; specifically, the mean age was 49.2 years among those with swelling in comparison to a mean age of 52.8 years among those without swelling [11].

The criteria for post ambulatory hand swelling were assessed by inquiring whether the study participants had difficulty either making a fist and/or removing

items such as rings, watches, and/or wristbands. The duration of swelling could only be evaluated in 258 of the affected individuals. The post ambulatory hand swelling resolved within one to two hours after finishing their walk in 88 percent (228 of 258) of the participants with swollen hands and persisted for more than 24 hours in the remaining 12 percent (30 of 258) of the individuals (26 women and four men) who tended to be older (54 years versus 49 years), [11].

Ravaglia et al. concluded that the phenomenon of post ambulatory hand swelling was relatively common and occurred more frequently in women. The researchers also noted that post ambulatory hand swelling occurred less often in owners who regularly walked their dog than in dog owners who stated otherwise. In addition, the investigators were compelled to comment that post ambulatory hand swelling had been “virtually totally ignored by the scientific literature [11].”

Ten years would pass before another article on ambulation-associated hand swelling would be published. In an autobiographic case report published in 2021, the author’s personal experience of this phenomenon was described in detail with an accompanying comprehensive review of postulated mechanism of the pathogenesis and proposed potential preventative measures. In addition, it was suggested that post ambulatory swollen hands subsequently be referred to by the acronym POTASH [10].

Similar to the patient in this letter, both of the investigators of the prior papers on POTASH recognized the inability of the affected individuals to make a fist; this is referred to as a positive fist sign [10,11]. In addition to POTASH, a positive fist sign has also been observed in individuals with acromegaly,

Blau syndrome, carpal tunnel syndrome (associated with giant lipoma), compartment syndrome, puffy hand syndrome, and remitting seronegative symmetrical synovitis with pitting edema [1-3,5,7,13]. Various mechanisms have been associated with the development of a positive fist sign; in patients with POTASH, edema—which subsequently resolves spontaneously resulting in the patient regaining their ability to clench the fingers into a tight fist (and thereby demonstrating a negative fist sign)—has been suggested as the etiology [10].

In summary, POTASH is a cause of acute hand swelling that is not only underdiagnosed, but also rarely reported. The pathogenesis of POTASH remains to be established and potentially preventative measures for the condition await evaluation. Similar to the man in this correspondence, asymptomatic bilateral swelling of the hands associated with rapid walking or running often results in a positive fist sign occurring secondary to the edema that prevents the participant from clenching their fingers to form a fist. Spontaneous resolution often occurs within two or less hours; less commonly, earlier investigators observed a small number of affected individuals (who were predominantly women) in whom the condition persisted for more than 24 hours. Additional observations of, and research into this apparently common, yet infrequently recorded, condition may elucidate the pathogenesis and prevention of POTASH.

Potential conflicts of interest

Dr. Cohen is a consultant for ParaPRO; however, this activity has no influence as a potential conflict of interest with regards to the manuscript. Therefore, the author declares no conflicts of interest.

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