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EXERTIONAL RHABDOMYOLYSIS IN A LONG-DISTANCE MIGRANT

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☐ **Abstract—Background: Exertional rhabdomyolysis is a common condition with potentially life-threatening consequences; early recognition can prevent severe downstream complications. Some migrants and undocumented immigrants who have travelled to the United States have encountered extreme heat or other austere conditions during their journey, many of which have involved long stretches of travel on foot. These factors can combine to put these migrants at risk for rhabdomyolysis. Hospitals near the border of Mexico and the United States commonly encounter patients with adverse medical complications related to the process of border crossing. Case Report: We report a patient with exertional rhabdomyolysis complicated by acute kidney injury who presented to a hospital located thousands of miles from the United States–Mexico border. Why Should an Emergency Physician be Aware of This?: Undocumented immigrants frequently disperse to disparate metropolitan areas after crossing the border, and therefore medical providers should remain vigilant for the medical complications of this dangerous journey.** © 2019 Elsevier Inc. All rights reserved.

☐ **Keywords—rhabdomyolysis; immigration; migrants; border-crossers; border-crosser nephropathy**

INTRODUCTION

Foot pain, swelling, and rash can each be common reasons for presentation to an emergency department for care. In this case, however, extensive soft tissue injuries to the feet that were not adequately explained by the history initially offered by the patient were clues that led to the discovery of a more complex social history and history of the present illness. The emergency department often serves as the gateway to health care for new immigrants, who may otherwise find care inaccessible because of linguistic, financial, and access barriers. Front-line providers should be vigilant in evaluating examination findings that may represent trauma related to the journey of immigration to better address these patients' broader needs and to connect them to appropriate resources.

CASE REPORT

A 24-year-old Spanish-speaking woman with no medical history of any chronic illness presented to the emergency department with the chief complaint of bilateral foot pain and blistering. The patient offered no further history.

On examination, the patient appeared to be well. She had a blood pressure of 131/89 mm Hg, a pulse of 87 beats/min, a temperature of 36.8°C, oxygen saturation of 99% on room air, and a respiratory rate of 18 breaths/min. Her physical examination findings were unremarkable except for the finding of symmetrically edematous feet, with extensive cutaneous abrasions (Figure 1). Given the extent of apparent soft tissue injury, a panel of laboratory tests were sent, which were notable for a creatinine kinase level of 5892 U/L, blood urea

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Figure 1. Soft tissue damage on the feet of a 24-year-old woman at the time of her arrival in the emergency department.

nitrogen of 85 mg/dL, creatinine of 3.88 mg/dL, aspartate aminotransferase of 349 U/L, alanine aminotransferase 336 U/L, hemoglobin 11.1 g/dL, hematocrit of 34.5%, potassium oo 3.2 mEq/L, and calcium of 9.0 mg/dL.

The finding of an elevated CK level raised suspicion for soft tissue injuries out of proportion to the apparent physical examination findings. On further interview, she offered that she came to the hospital (in New York) after crossing the southern border of the United States and traveling across the country. She initially walked for 2 days in the hot sun through the desert. She then spent several weeks in another state where she had little to drink, and subsequently took a 5-day car trip during which she was given little to drink and during which she was not allowed to urinate. When she arrived at her final destination, her family found her in pain and unable to ambulate. She was brought directly to our hospital by her family.

During her emergency department stay she was treated with fluconazole and clindamycin for presumed tinea pedis with bacterial superinfection, a normal saline infusion, and she was admitted to the medical ward. Her creatinine level began to decline beginning on hospital day 3. The CK level began to decline beginning on hospital day 1, from an initial level of 5892 U/L to 4005 U/L and then to 1096 U/L. Her wounds were treated with silver sulfadiazine and they improved over the course of the hospital stay. On hospital day 7 she was discharged with an improved renal function (creatinine 2.5), which ultimately recovered fully as an outpatient.

DISCUSSION

Rhabdomyolysis and acute kidney injury, both seen in this patient, are among the most commonly encountered pathologies in migrants seeking medical care after crossing the United States–Mexico border (1). The combined conditions of extreme heat, prolonged physical exertion, and concomitant hypovolemia can lead to exertional rhabdomyolysis, complicated by prerenal azotemia myoglobinuric acute kidney injury, a syndrome described as “border-crosser nephropathy” (2). Similar presentations have been noted in migrants who have been subjected to extreme conditions and limited access to water while in transit to Europe (3). In general, patients with exertional rhabdomyolysis follow a benign clinical course regardless of their presenting CK level. However, when rhabdomyolysis is complicated by acute kidney injury, as with our patient, the prognosis becomes worse. Creatinine levels at time of presentation directly correlate with mortality (4). Treatment of severe rhabdomyolysis centers on aggressive fluid resuscitation, although the ideal selection of fluid remains controversial and beyond the scope of this paper. Electrolytes, particularly potassium, calcium, and phosphate, should be closely monitored. The use of bicarbonate for urine alkalization has been studied without clear benefit but may be considered a treatment option. Similarly, the use of diuretics lacks

clear evidence, but may be considered a treatment option (5,6). In severe cases of rhabdomyolysis with acute kidney injury, patients may require hemodialysis for correction of electrolyte imbalances, fluid overload, or uremia. In the small case series initially describing border-crosser nephropathy, a disproportionally high number of patients required dialysis, although the reason for this is unclear (2). Of note, the timely identification of patients at risk for border-crossing nephropathy may be challenging.

In 2017, 341,084 people were apprehended while trying to cross the United States–Mexico border. These migrants have often fled conditions of extreme violence or poverty in their countries of origin. Individuals from as far away as Asia and Africa may join others who have trekked from their native countries in South America or Central America to seek asylum in the United States. These migrants, who are largely young and healthy, are exposed to severe conditions with minimal resources during the journey. At least 432 migrants are known to have died trying to cross the border in 2017, an increased number from previous years despite decreased numbers attempting the crossing (7). This increasing number of deaths has been attributed to a "funneling effect" of migrants toward increasingly dangerous journeys (i.e., traveling through more desolate landscapes, increasing reliance on "coyotes") in response to heightened border security efforts. Coroner reports of deceased migrants identify suspected or confirmed environmental exposure as the primary cause of death (8).

The unique medical problems of recent border crossers may be readily appreciated and diagnosed in hospitals near the United States–Mexico border, where such patients are commonly encountered, but may be more likely to be missed elsewhere in the country. Because undocumented immigrants disperse throughout major U.S. metropolitan areas after crossing the border, medical providers should consider complications of arduous migration in recent immigrants who have similar suggestive presenting complaints (9). However, these patients may be unwilling to seek care or volunteer their status given recent changes in immigrant enforcement policies, so a proactive provider can make a large impact on this population (10).

WHY SHOULD EMERGENCY PHYSICIAN BE AWARE OF THIS?

Although they are commonly young and healthy, undocumented migrants to the United States and elsewhere frequently endure grueling journeys that take tolls on their physical well-being. Our patient's occult presentation of exertional rhabdomyolysis exemplifies the type of pathology that may be seen (or more frequently missed) among people who have recently arrived in the United States. With emergency departments increasingly serving as de facto safety nets for this vulnerable population, it is important that emergency medicine providers understand their unique social and physical circumstances to provide optimal care.

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