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CASE REPORT

Amputation of lower limb for necrotizing soft-tissue infection in an ultramarathon runner

Yu-Hao Huang [a,b], Tung-Ying Hsieh [a,b], I-Chien Chen [b], Chung-Sheng Lai [b,c], Sin-Daw Lin [b,c], Su-Shin Lee [b,c], Kao-Ping Chang [b,c,*]

[a] *Department of Surgery, Kaohsiung Medical University Hospital, Kaohsiung, Taiwan*
[b] *Division of Plastic and Reconstructive Surgery, Department of Surgery, Kaohsiung Medical University Hospital, Kaohsiung, Taiwan*
[c] *Faculty of Medicine, College of Medicine, Kaohsiung Medical University, Kaohsiung, Taiwan*

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Summary Necrotizing soft-tissue infection (NSTI) is a life-threatening disease with rapid progression, which has rarely been discussed in the medical literature with regard to marathon runners. We present the case of a 51-year-old Taiwanese woman, a female ultramarathon runner who had a medical disaster after her participation in La Trans-Gaule French ultramarathon. After completing the competition, she was diagnosed to have septicemia and a potentially life-threatening NSTI of both lower limbs. Therefore, she underwent emergent right above-the-knee amputation and left foot transmetatarsal amputation. Then she came back to Taiwan to receive further treatment. After meticulous reconstructive surgery and continuous rehabilitation programs, she was instructed to wear prostheses and finally resumed her daily activities. Although several organ systems can be affected by marathon running, soft-tissue infections have seldom been discussed. In our case, the patient suffered from bilateral lower limb amputation caused by severe necrotizing infection after the competition. Thus, soft-tissue infection is also an important issue for ultramarathon runners and medical service providers from ultramarathon associations.

Conflicts of interest: All authors declare no conflicts of interest.

* Corresponding author. Division of Plastic and Reconstructive Surgery, Department of Surgery, Kaohsiung Medical University Hospital, 100 Tzyou 1st Road, Kaohsiung 807, Taiwan.
E-mail address: kapich@kmu.edu.tw (K.-P. Chang).

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1. Introduction

Marathon running has been a popular sport around the world. Medical problems of the musculoskeletal, gastrointestinal, cardiac, renal, and pulmonary systems and electrolyte and fluid imbalance in marathon runners have widely been discussed.[1] Environmental factors also play an important role in the patients' needs of medical attention in a marathon race.[1] After searching PubMed, we have found that there is still no article discussing the relationship between marathon and soft-tissue infection to date. Necrotizing soft-tissue infections (NSTIs) have high morbidity and mortality rates and should be diagnosed and managed as early as possible.[2,3] Here, we present an unusual case of a patient who suffered from a devastating septic shock and underwent lower limb amputations because of NSTIs after a marathon race.

2. Case report

This 51-year-old woman took part in an ultramarathon race, *La Trans-Gaule*. She was a talented Taiwanese marathon runner and had been nicknamed "ultramarathon mama." She had to run almost 50–60 km every day in the competition. After completing the race, she visited the emergency department of a local hospital due to severe pain in both lower legs. At the emergency department, she was afebrile, but blisters on both feet associated with mild swelling were noted. The vital signs on arrival were relatively stable. The hemogram showed leukopenia and anemia. Serum biochemical analysis showed elevation of C-reactive protein, hyponatremia, and impairment of liver function, as shown in Table 1. She was then admitted under the impression of lower limb cellulitis and mild dehydration. After admission, she was treated with broad-spectrum antibiotics and intravenous fluid.

Unexpectedly, she was found in shock status the next morning. There were ecchymoses and mottling of the skin extending from both feet to middle calves. Bilateral tension of the feet skin texture with poor capillary refilling was noted. Moreover, follow-up blood tests revealed progressively worsening data. With the deteriorating status of the patient, she was immediately transferred to a medical center hospital.

At the medical center hospital, she appeared ill and lethargic. Her blood pressure dropped to 90/60 mmHg. Bilateral skin necroses were noted on the cold, partial ischemic bilateral foot. Some toes were erythematous and swollen with pus formation. There were several large blisters on both cyanotic heels. Poor pulsation of the dorsalis pedis artery was noted bilaterally. Repeated laboratory results are shown in Table 2. The hemogram showed severe leukopenia and high levels of creatine kinase and lactate. The Laboratory Risk Indicator for Necrotizing Fasciitis (LRINEC) score was calculated to be 8, which strongly suggested necrotizing fasciitis (NF). Finally, she was diagnosed to have bilateral NSTI of lower legs combined with compartment syndrome and septic shock.

The runner was hospitalized in a medical center hospital in France for 27 days. She underwent emergent right above-the-knee amputation and left foot transmetatarsal amputation. As for the infection and shock status, antibiotics and inotropes were administered. In the following days, her condition was gradually stabilized. Besides, bacterial cultures yielded group A streptococcus and methicillin-sensitive *Staphylococcus aureus*. The other wounds became stable with the use of broad-spectrum antibiotics and vacuum-based dressing. Finally, the patient was transferred back to a medical center in Taiwan for follow-up care.

On arrival, the vital signs were relatively stable except for mild fever. The right amputation stump was well healed and the left leg was covered with full-thickness skin defect with odorous and devitalized tissues. The Achilles tendon and the flexor hallucis longus tendon were exposed as shown in Fig. 1. After obtaining the results of wound culture, adequate fluid resuscitation and empirical antibiotics were started. After admission, regional fasciotomy and debridement of the left leg were performed on the next day. The wounds were treated with frequent dressing changes, broad-spectrum antibiotics, and hyperbaric oxygen therapy. Afterward, debridement and skin grafting were consecutively performed. She practiced wheelchair ambulation and then shifted to a walker with a right transfemoral prosthesis and left prosthetic foot smoothly. As her general and wound conditions improved, she was discharged 2 months later with regular outpatient clinic follow-up (Fig. 2). The patient is now wearing bilateral prostheses and has free ambulation (Fig. 3).

Table 1 Initial laboratory work.

	Result	Normal
White blood cells (mm^3)	1120	4000–10,500
Hemoglobin (g/dL)	10.4	11.9–15.5 for female
Platelets (mm^3)	197,000	150,000–450,000
C-reactive protein (mg/L)	400	<5.0
ALT/AST (IU/L)	178/85	10–42/10–40
BUN/Cr (mg/dL)	2/0.9	7–18/0.6–1.3
Na (mmol/L)	129	136–145

ALT = alanine aminotransferase; AST = aspartate aminotransferase; BUN = blood urea nitrogen.

Table 2 Laboratory examinations the next day.

	Result	Normal
White blood cells (mm^3)	640	4000–10,500
Hemoglobin (g/dL)	9.8	11.9–15.5 for female
Platelets (mm^3)	79,000	150,000–450,000
C-reactive protein (mg/L)	329	<5.0
BUN/Cr (mg/dL)	31/0.8	7–18/0.6–1.3
Na (mmol/L)	126	136–145
CK (U/L)/fibrinogen (g/L)	1976/7	25–145/2–4
pH/bicarbonates (mmol/L)	7.36/16	7.35–7.45/22–26
Lactate (mg/dL)	54	<5
Glucose (mg/dL)	158	70–130

BUN = blood urea nitrogen; CK = creatine kinase.