Letters to the Editor

Around Manaslu Ultramarathon: Diarrhea Is Still the King

To the Editor:

In Sanskrit, Manaslu means “mountain of the spirit.” In this place where heaven and skies meet, the Manaslu Mountain Trail Race took place from November 7 to 17, 2016. The event was an 8-stage footrace covering 212 km around the 8160-m-high mountain, reaching an elevation of 5160 m at Larke Pass. Participants had to run from altitudes of 600 to 5100 m during a period of 10 days. Every day, they ran across diverse terrain, covering 22 to 30 km in distance in the lap of the Himalayas.

Forty participants registered for the race; 2 dropped out before the start of the race due to illness and 38 completed the event. It was a privilege to be a part of this ultrarace as an expedition doctor. Participants ran the course, but I was among those who walked, consistently remaining as a sweeper. After reaching the finish line at the end of the day, I would make house calls on the runners to offer assistance for any medical problems. We stayed in tea houses instead of camping, so house calls were much easier to attend. Even though medical supplies were adequate with oral and IV medications, we refilled extra medications so that we would not run out of medications during the event.

We encountered a variety of medical issues during the race, starting from 600 m altitude. The initial problems consisted of muscle cramps, dehydration, and a few musculoskeletal injuries. As the race proceeded, with a gradual rise in altitude, diarrhea was a more common problem than acute mountain sickness (AMS). Out of 38 participants (31 foreigners and 7 natives), 9 participants suffered from diarrhea, and all 9 were foreigners. On the other hand, only 2 participants reported symptoms of AMS.

The traveling itinerary of the race was set with a daily altitude gain of <500 m once above 3000 m to decrease the risk of AMS. Most of the participants were athletes who had trained at high altitude. With the gradual ascent profile, despite the exertion, very few participants encountered altitude-related problems. High-altitude headache was common, but only 2 patients presented with symptoms of mild to moderate AMS while crossing the pass at 5160 m altitude. Approximately 10 of the participants were on a prophylactic dose of acetazolamide (125 mg) and did not seem to have problems. Those who presented with symptoms were not on acetazolamide prophylaxis. AMS symptoms appeared on the day the participants crossed the Larke Pass at 5160 m while walking from Samdo at 3800 m to Bimthang at 3800 m.

Those who developed AMS had symptoms of headache, nausea, vomiting, and fatigue. Their Lake Louise Score was 5, and all of those symptoms were relieved after medication (acetazolamide 250 mg twice daily and paracetamol 500 mg) and an overnight stay at 3800 m. The next day, they continued the race.

On other hand, diarrheal cases were seen from a fairly low altitude of 2600 m. At higher altitudes, the participants had to use squat latrines, and water used for hand washing was freezing cold; diarrhea became a common issue among the participants, probably due to lack of proper hand washing. The kitchen staff's sanitation was very good; none of the staff had complaints of diarrhea, and they frequently used hand sanitizer gel. Nine participants suffered from diarrhea and were troubled by sulfur-smelling burps, nausea, and uncontrolled diarrhea. They had to stop and find a place for defecation 3 to 4 times during the race each day. None of the 9 who had diarrhea were residents of Nepal, and all were treated empirically with azithromycin (500 mg) every day for 3 days. Five of the 9 runners afflicted with diarrhea responded to azithromycin, suggesting a bacterial origin. The 4 who failed to respond were given a 2-g tinidazole stat dose, which relieved their symptoms. All patients took medication under the doctor's guidance. Participants were treated with oral medications; none of them required IV fluid for rehydration. In addition to antimicrobials, adequate use of oral rehydration solution and rest speeded their recovery.

We expected to have more altitude-related illness, but diarrhea turned out to be the major problem. Diarrhea becomes a huge problem when athletes have to run long distances over multiple days in difficult terrain—going up and down the hills, gaining altitude every day, and risking altitude illness. Proper hand washing, adequate use of hand sanitizer gel, and an adequate reserve of antimicrobials and electrolyte solution are a must during such an expedition. Prevention of diarrhea remains a challenge in travelers, and the appropriate management of traveler's diarrhea remains paramount.

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Avalanche Accident Resulting in Leg Amputation

To the Editor:

Amputation injuries are rarely seen in helicopter emergency medical services missions, and complete

amputations even less so.¹ Although it has been reported that the most frequently injured part of the lower limb for skiers is the knee, no case of amputation has yet been reported among 13,381 lower extremity skiing injuries.² We recently had to face a dramatic avalanche accident resulting in complete traumatic leg amputation, which is the first case that we are aware of described to date.

A 43-year-old man was caught in an avalanche while ski touring on a frequently used itinerary. The slope was 40 to 45 degrees. He deployed his avalanche airbag by pulling its handle. He sustained only partial burial, and his companions were able to raise the alarm using a cell phone. A rescue helicopter winched a rescue doctor directly on site. The victim was conscious and reported pain in both legs, estimated at 8 out of 10. Primary survey revealed a complete amputation of the right leg and mild bleeding and an obvious fracture of the left. The patient's heart rate was 67 beats/min and the respiratory rate was 17 breaths/min. Oxygen was provided through a nonrebreather mask, and hemoglobin saturation was measured at 99%. Fentanyl 100 micrograms and ketamine 20 mg were administered intravenously, and a tourniquet was placed on the right mid-thigh. The patient was immobilized on a spine board with a cervical collar and a left lower limb splint. He was then winched into the helicopter and airlifted to a hospital.

He remained hemodynamically stable on admission, with a pH of 7.29, lactate of 3.3 mmol/L, and hemoglobin of 133 g/L. A radiological survey revealed a complete open avulsion of the lower leg at the right knee and open left tibial and fibular fractures. The patient was taken to the operating room for revision of the amputation stump, and a modified Gritti-Stokes amputation was performed while the fractured left tibia was stabilized by an external fixator. The postoperative course was uneventful aside from moderate posttraumatic rhabdomyolysis with peak creatinine kinase levels at 11,748 U/L, without consequent acute renal failure.

After closed reduction and internal fixation of the left lower limb fractures, the patient was fitted with a molded right leg prosthesis and underwent multidisciplinary rehabilitation. At 1-year follow-up, full healing had occurred, and he had resumed his professional as well as his prior sport activities. He reported being satisfied with his quality of life and gave consent for his case to be used in a publication.

Although the cause of death of avalanche victims is usually asphyxiation after complete burial,³ most victims who survive experience traumatic injuries.^{4,5} Lower limb injuries predominate over upper limb injuries and occur in about one-third of avalanche victims.⁵ According to a case series of 82 avalanche victims admitted alive to a hospital, 13% of the patients had lower limb fractures.⁵

The site of the accident described was completely snow-covered and free of trees, rocks, or obstacles. We therefore presume that a twisting mechanism of the leg was responsible for its avulsion.

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Channel 7-7 PMR: A Radio Communication Initiative in Mountain-Related Emergencies in Spain

To the Editor:

During recent decades, mountains have received a growing flow of visitors, even becoming major tourist