

Fifty Miles for My Fiftieth Birthday: Problem Handouts



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Part 1

Lincoln is a 50-year old runner who, over the past five years, has completed five half-marathons and four marathons. He regularly runs six to seven days a week, totaling thirty to fifty miles per week. For his fiftieth birthday Lincoln decided to participate in the Silver Rush fifty mile run. This fifty mile out-and-back run started at an elevation of 10,000 feet in Leadville, Colorado, and ascended 7,400 feet over four peaks, with the highest pass at 12,200 feet. The average ambient temperature during the race was 80°F.; the race had 600 participants.

The first half of Lincoln's run progressed well, and he made it to the turnaround checkpoint in just under six hours. He was eating and drinking according to plan, but noticed that it took a very long time to chew and swallow his last solid energy bar as he approached the turnaround checkpoint. As he was changing shoes and replenishing his supplies from his drop bag he became nauseated and barely make it to the porta-potty before vomiting. He sat next to his drop bag, still nauseated, for ten to fifteen minutes, and began to question whether or not he could continue the race.

He ultimately completed the race, running and walking the last twenty five miles in seven hours and forty five minutes, ascending 3,700 feet and running at an average elevation of 10,000–12,000 feet. He ran the last two hours consuming no food and less than one liter of water.

After crossing the finish line he proceeded, as required, straight to the medical tent, discussed his situation, and was administered sips of Coke, pretzels, and part of a sandwich. The paramedics working the race assessed his situation and sent Lincoln on his way back to his hotel.

Patient History:

- Patient is five foot nine inches tall, weighs 165 pounds, and has less than 3% body fat.
- Pre-race physicals (conducted six months and one month before the race) were unremarkable.
- No history of heart, cardiopulmonary or G.I. problems.
- Stress tests administered during pre-race physicals were both normal.
- Medications: OTC vitamins, glucosamine-chondroitin sulfate, and one baby aspirin a day.

What is your diagnosis for this patient?



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Part 2

Upon returning to his hotel Lincoln showers and attempts to rest before going to dinner with his wife. While resting on the bed shortly after his shower he experienced muscle cramps and twitch in random locations—first his lower limbs, then his abdomen, followed by upper limbs, facial musculature, and other locations. He couldn't stay in one position for more than what seemed like a few seconds, and opted to skip dinner.

At 2:30 in the morning he and his wife went to the local E.R. and the following were determined during his examination by the attending physician.

Physical examination:

- Heart rate: 80
- Respiratory rate: 25/minute and shallow
- Blood pressure: 117/67
- Rectal temperature: 101°F
- Disseminated intravascular coagulation
- Patient is unable to urinate

Laboratory findings:

- Heme pigment in urine
- Serum levels
 - potassium 6.8 mEq/liter
 - sodium 126 mEq/liter
 - glucose 35 mEq/dl
 - creatine kinase 3,000 I/UL
 - urea nitrogen 10 mg/dl
 - creatine 1.7 g/dl
- Blood smear demonstrated fragmented RBCs

The patient was immediately admitted to the I.C.U. and treated over a 24 hour period with

- nine liters of IV fluids composed of 50% isotonic saline to which 75 mmol/L sodium bicarbonate was added.
- IV fluids were supplemented with 10ml/hour of 15% mannitol.
- IV administration of furosemide and allopurinol

Within 24 hours the patient was moved to the renal unit of the hospital, and ultimately discharged within 72 hours of admission to the hospital.

What is your diagnosis for this patient?



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Part 3

Answer the following questions, utilizing sound anatomical logic:

1. What is your diagnosis for this patient?
2. This patient would be considered an extremely fit individual based on his regular exercise regimen. How would you explain the onset of this condition in such a fit individual?
3. What is the anatomical reason for the patient taking a very long time to chew and swallow his last solid energy bar as he approached the turnaround checkpoint?
4. Based on the patient's laboratory findings, multiple systems were in distress when the patient was admitted. How did the patient's primary problem contribute to these other systems becoming involved?

