

## QUESTION

A 65-year-old man with a 30-year history of hypertension and a 10-year history of type 2 diabetes mellitus presents to the emergency department with a 2-week history of progressive weakness and numbness in both lower extremities. He reports that the symptoms are worse in the evenings and are relieved by walking. He also reports a 10-pound weight loss over the past 6 months. His medical history is significant for hypertension, type 2 diabetes mellitus, and chronic kidney disease (stage 3). He is currently taking lisinopril, metformin, and insulin. His physical examination is notable for bilateral lower extremity weakness and numbness, particularly in the distal extremities. There are no focal deficits on the physical examination.

His laboratory studies are significant for a hemoglobin A1c of 8.5%, a serum creatinine of 2.5 mg/dL, and a serum vitamin B12 level of 150 pg/mL. His serum folate level is 12 ng/mL. His serum vitamin D level is 15 ng/mL. His serum ferritin level is 100 ng/mL. His serum homocysteine level is 15 µmol/L. His serum methylmalonic acid level is 0.5 µmol/L. His serum methylcitrate level is 0.5 µmol/L. His serum methylcrotonylglycidate level is 0.5 µmol/L. His serum methylsuccinate level is 0.5 µmol/L. His serum methylglutamate level is 0.5 µmol/L. His serum methylmalonate level is 0.5 µmol/L. His serum methylsuccinate level is 0.5 µmol/L. His serum methylcrotonylglycidate level is 0.5 µmol/L. His serum methylglutamate level is 0.5 µmol/L. His serum methylmalonate level is 0.5 µmol/L.

His electrocardiogram is significant for sinus bradycardia. His chest radiograph is significant for bilateral lower lung zone opacities. His computed tomography scan of the abdomen is significant for bilateral lower lung zone opacities. His magnetic resonance imaging scan of the spine is significant for bilateral lower lung zone opacities. His magnetic resonance imaging scan of the brain is significant for bilateral lower lung zone opacities. His magnetic resonance imaging scan of the head is significant for bilateral lower lung zone opacities. His magnetic resonance imaging scan of the neck is significant for bilateral lower lung zone opacities. His magnetic resonance imaging scan of the chest is significant for bilateral lower lung zone opacities. His magnetic resonance imaging scan of the abdomen is significant for bilateral lower lung zone opacities. His magnetic resonance imaging scan of the pelvis is significant for bilateral lower lung zone opacities. His magnetic resonance imaging scan of the lower extremities is significant for bilateral lower lung zone opacities.

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## ANSWER

The patient's symptoms and laboratory findings are consistent with vitamin B12 deficiency. The physical examination findings of bilateral lower extremity weakness and numbness, particularly in the distal extremities, are characteristic of a peripheral neuropathy. The laboratory studies show a low serum vitamin B12 level, a high serum homocysteine level, and a high serum methylmalonic acid level, which are all indicative of vitamin B12 deficiency. The patient's weight loss and chronic kidney disease (stage 3) are also consistent with vitamin B12 deficiency. The patient's electrocardiogram findings of sinus bradycardia and chest radiograph findings of bilateral lower lung zone opacities are also consistent with vitamin B12 deficiency. The patient's magnetic resonance imaging scan of the spine and brain findings of bilateral lower lung zone opacities are also consistent with vitamin B12 deficiency. The patient's magnetic resonance imaging scan of the head, neck, chest, abdomen, and pelvis findings of bilateral lower lung zone opacities are also consistent with vitamin B12 deficiency. The patient's magnetic resonance imaging scan of the lower extremities findings of bilateral lower lung zone opacities are also consistent with vitamin B12 deficiency.

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