

Introduction: “Pseudohyperkalemia” refers to a false elevation in serum potassium due to an in vitro release of intracellular potassium, often as a result of mechanical stress during sample collection or handling. Occasionally, it is observed in patients with leukocytosis, particularly in the setting of chronic lymphocytic leukemia (CLL), possibly due to increased lymphocyte fragility and lysis. Failure to identify pseudohyperkalemia may lead to inappropriate treatment and iatrogenic hypokalemia.

Case Presentation: An 83-year-old female with a history of CLL not on treatment, atrial fibrillation, and complete heart block status post dual-chamber pacemaker presented with shortness of breath and cough. She was hospitalized for suspected new-onset heart failure. On admission, labs revealed hyperkalemia (6.6 mmol/L) and leukocytosis ($143.9 \times 10^3/\mu\text{L}$). There were no acute changes on electrocardiogram. She received insulin, dextrose, sodium bicarbonate, and sodium zirconium cyclosilicate, which transiently normalized her potassium. However, she soon required retreatment with the aforementioned agents. Given suspicion for pseudohyperkalemia, point-of-care testing (i-Stat®) was employed to assess whole blood potassium, revealing a low-normal value of 3.6 mmol/L. Throughout her hospitalization, traditional laboratory methods continued to show occasional elevations in serum potassium. However, her potassium remained within normal limits when analyzed using point-of-care testing. Thus, she did not require any further hyperkalemia treatment.

Discussion: Among those with CLL, pseudohyperkalemia is not rare. In a study investigating 119 hyperkalemic episodes in a cohort of patients with CLL, 41.2% of the episodes were later identified as pseudohyperkalemia. Despite its relatively high incidence, pseudohyperkalemia is easy to overlook in the absence of specific protocols. Based on the association between pseudohyperkalemia and leukocytosis, studies have recommended repeat potassium testing using point-of-care analysis or whole blood sampling for patients with elevated potassium readings and leukocyte counts above $50 \times 10^3/\mu\text{L}$. This case highlights the need for greater awareness of pseudohyperkalemia and its associated clinical scenarios. Furthermore, the results of our workup suggest that point-of-care whole blood analysis using i-Stat® is an effective method for detecting spurious elevations in serum potassium. If used in patients with risk factors for pseudohyperkalemia, i-Stat® analysis may prevent iatrogenic hypokalemia.