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Refeeding Syndrome After Resumption of Meals in a Person Experiencing Homelessness

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Abstract

Refeeding syndrome (RFS) is a potentially life-threatening complication of nutritional reintroduction after prolonged inadequate intake. We report a 64-year-old man experiencing homelessness who presented with weakness, muscle aches, cramps, and confusion after resuming regular meals at a shelter following a period of minimal intake. His body mass index was 17.3 kg/m², and initial laboratory testing showed severe hypophosphatemia (0.7 mg/dL), hypokalemia (3.0 mmol/L), and hypomagnesemia (1.2 mg/dL); electrocardiography showed a normal rate and rhythm. Management included intravenous thiamine, electrolyte replacement, telemetry, frequent electrolyte monitoring, and cautious caloric advancement beginning at 15 kilocalories per kilogram per day (15 kcal/kg/day). Full estimated caloric requirements were reached by hospital day five. He improved and was discharged on day six with shelter placement and psychiatric follow-up. This case highlights the importance of considering RFS in patients with prolonged inadequate intake who resume nutrition, including people experiencing homelessness, and monitoring electrolytes during refeeding.

Categories: Emergency Medicine
Keywords: emergency medicine, food insecurity, homelessness, hypophosphatemia, malnutrition, refeeding syndrome

Introduction

Refeeding syndrome (RFS) is a potentially life-threatening metabolic complication of reintroducing nutrition after prolonged inadequate intake. During starvation, total-body stores of phosphate, potassium, and magnesium may become depleted. Carbohydrate reintroduction stimulates insulin release, promoting the movement of these electrolytes into cells and potentially producing or worsening deficiencies in the blood. It also increases thiamine requirements. Clinical manifestations range from weakness, muscle cramps, and confusion to cardiac dysrhythmias, respiratory compromise, and cardiac dysfunction. Because early symptoms may be nonspecific, recognition can be challenging; reported incidence varies with the population studied and the definition used [1-4].

When a patient has experienced prolonged minimal intake, resumption of regular meals may reveal substantial nutritional and electrolyte risk. We describe a 64-year-old man experiencing homelessness who presented after resuming meals at a shelter with weakness, cramps, and severe hypophosphatemia, hypokalemia, and hypomagnesemia. The case highlights recognition and monitored nutritional reintroduction in emergency care.

Case Presentation

A 64-year-old man experiencing homelessness presented to the emergency department with two days of generalized weakness, muscle aches, cramps, and reported confusion. He had been living in a tent and subsisting primarily on bread and water before beginning regular meals at a local shelter two days before presentation. His symptoms developed during these two days after he resumed regular meals, with worsening muscle aches on the day of presentation prompting him to seek medical attention. Although cooperative, the patient was unable to provide a reliable estimate of the duration or extent of his inadequate nutritional intake because of confusion.

His medical history included schizoaffective disorder and mild hypertension. He had not taken his medications for several months and denied alcohol or illicit drug use.

On examination, he was awake and oriented to person, place, and time. His temperature was 98.6 °F (37 °C), heart rate 98 beats per minute, respiratory rate 16 breaths per minute, and blood pressure 130/70 mm Hg. He weighed 56 kg and was 180 cm tall; his body mass index (BMI) was 17.3 kg/m². He appeared lean, with generalized weakness but no focal neurologic deficits or signs of trauma.

The electrocardiogram showed a normal rate and rhythm. Laboratory studies included a complete blood

count, basic metabolic panel, serum magnesium and phosphorus levels, hepatic panel, urinalysis, serum ethanol level, urine drug screen, and troponin. Initial results showed severe hypophosphatemia (0.7 mg/dL), hypokalemia (3.0 mmol/L), and hypomagnesemia (1.2 mg/dL) (Table *1*). Phosphorus, magnesium, and potassium levels were monitored every 12 hours through hospital day 3 and daily thereafter. All three electrolyte levels had returned to the normal range by discharge.

Laboratory results	Result	Normal range	Units
White blood cell count	10,400	4.0-11.0	mm^3
Hemoglobin	14.1	10.6-15.6	g/dL
Platelet count	180	150-400	K/uL
Sodium	137	135-154	mEq/L
Potassium	**3.0**	3.5-5	mEq/L
BUN	18.0	5-20	mg/dL
Creatinine	1.1	0.6-1.2	mg/dL
Glucose	95.0	70-100	mg/dL
Calcium	8.8	8.5-10.5	mg/dL
Chloride	101.0	95-105	mEq/L
Bicarbonate	25.0	23-29	mEq/L
Magnesium	**1.2**	1.7-2.2	mg/dL
phosphorus	**0.7**	2.5-4.5	mg/dL
lactate	1.6	0.5-2.2	mmol/L

TABLE 1: Pertinent laboratory results.

Abnormal values are in bold.

ATP, adenosine triphosphate; BUN, blood urea nitrogen

Oral intake was limited to 15 kcal/kg/day, with simple carbohydrates restricted through hospital day 3. Caloric intake was advanced on hospital day 4, and full estimated caloric requirements were reached by hospital day 5. The patient improved clinically and was discharged on hospital day 6 with shelter placement and coordinated psychiatric follow-up. Social work assisted with access to his medications.

Discussion

RFS describes the metabolic and fluid shifts that can occur when nutrition is reintroduced after prolonged undernutrition. During starvation, the body adapts by increasing its reliance on fatty acids and ketone bodies, while total-body stores of phosphate, potassium, magnesium, and thiamine may become depleted. Proteolytic and lipolytic responses are part of this adaptive starvation physiology [5]. When carbohydrates are reintroduced, the insulin response promotes the intracellular uptake of phosphate, potassium, and magnesium and increases thiamine demand for glucose metabolism. These shifts can lead to hypophosphatemia, hypokalemia, hypomagnesemia, and sodium and water retention [1-3,6].

Clinical manifestations range from weakness, muscle cramps, and altered mental status to edema, respiratory compromise, dysrhythmias, and cardiac dysfunction. Hypophosphatemia can impair processes dependent on adenosine triphosphate (ATP), muscle function, and oxygen delivery; thiamine depletion can further compromise carbohydrate metabolism and neurologic or cardiac function [1,3,7]. The symptoms are nonspecific, and RFS may be overlooked when nutritional history and phosphate levels are not assessed.

RFS has no universally applied definition, and incidence estimates vary across settings and populations [2,3,8]. Risk is associated with prolonged inadequate intake, significant weight loss, low body mass, and conditions involving malnutrition, nutrient loss, or impaired absorption. Eating disorders and chronic illness are recognized risk settings; adolescent-specific guidance addresses refeeding hypophosphatemia in hospitalized patients with anorexia nervosa [1,9]. Nutritional assessment should integrate history, weight

and intake changes, examination, and laboratory findings rather than rely on an isolated laboratory marker [10].

The American Society for Parenteral and Enteral Nutrition (ASPEN) consensus recommendations define RFS using percentage decreases in serum phosphorus, potassium, and/or magnesium within five days of calorie reintroduction, with severity based on the magnitude of the decrease and associated organ dysfunction or thiamine deficiency [4]. In this case, pre-refeeding electrolyte values were unavailable, so a percentage decline from baseline could not be established. The timing of meal resumption and the concurrent severe hypophosphatemia, hypokalemia, and hypomagnesemia supported clinical concern for RFS, but the available data do not permit classification using the ASPEN percentage-change criteria.

Management principles include identifying risk before or at nutritional reintroduction, providing thiamine, monitoring fluid status and electrolytes, correcting deficiencies, and advancing calories with attention to the patient's risk and response [1,4,8]. The evidence base and recommendations vary, so caloric plans should be individualized and accompanied by close monitoring. In this patient, clinicians administered thiamine 100 mg intravenously, replaced phosphate, potassium, and magnesium, used telemetry, and monitored electrolytes every 12 hours through hospital day 3. Oral intake began at 15 kcal/kg/day, with advancement beginning on day 4 and full estimated caloric requirements reached by day 5.

This case illustrates how refeeding risk may become apparent when regular meals resume after a period of minimal intake. A history of living in a tent and relying mainly on bread and water provided important context for the patient's low body mass and presentation. Emergency clinicians can ask about recent food intake and weight change, consider checking phosphate alongside potassium and magnesium when clinically indicated, and communicate refeeding risk during admission and nutritional planning.

This report has limitations. It describes one patient, and electrolyte values before the resumption of meals were not available. The temporal relationship and laboratory pattern support the clinical concern, but a pre-refeeding baseline would be needed to document the magnitude of electrolyte changes and apply the ASPEN biochemical severity criteria. The case therefore illustrates a recognition and management challenge rather than establishing the incidence or causal effect of homelessness on RFS.

Conclusions

This case illustrates the importance of considering refeeding syndrome when a patient with prolonged inadequate intake resumes regular meals, including in emergency care. In this patient, weakness and cramps accompanied severe hypophosphatemia, hypokalemia, and hypomagnesemia after meals resumed. Thiamine administration, electrolyte replacement, frequent monitoring, and cautious caloric advancement guided care. Because pre-refeeding electrolyte values were unavailable, the magnitude of electrolyte changes from baseline could not be determined. A careful nutritional history and appropriate electrolyte monitoring are essential when evaluating patients at risk for refeeding syndrome, particularly when the duration and extent of preceding nutritional deprivation are uncertain.

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

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Disclosures

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