Clinical Interventions in Aging

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CASE REPORT

Laxative-induced rhabdomyolysis

This article was published in the following Dove Press journal:
Clinical Interventions in Aging
24 March 2010
Number of times this article has been viewed

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Abstract: The present study describes a case of laxative-induced rhabdomyolysis in an elderly patient. An 87-year-old woman was hospitalized for the onset of confusion, tremors, an inability to walk, and a fever that she had been experiencing for 36 hours. She often took high dosages of lactulose and sorbitol syrup as a laxative (about 70 g/day). During her physical examination, the patient was confused, drowsy, and she presented hyposthenia in her upper and lower limbs, symmetric and diffuse moderate hyporeflexia, and her temperature was 37.8°C. Laboratory tests revealed severe hyponatremia with hypokalemia, hypocalcemia, hypochloremia, and metabolic alkalosis. Moreover, rhabdomyolysis markers were found. The correction of hydroelectrolytic imbalances with saline, potassium and sodium chlorure, calcium gluconate was the first treatment. During her hospitalization the patient presented acute delirium, treated with haloperidol and prometazine chloridrate intramuscularly. She was discharged 12 days later, after resolution of symptoms, and normalized laboratory tests. Over-the-counter drugs such as laxatives are usually not considered dangerous; on the other hand, they may cause serum electrolytic imbalance and rhabdomyolysis. A careful monitoring of all the drugs taken by the elderly is one of the most important duties of a physician since drug interactions and their secondary effects may be fatal.

Keywords: rhabdomyolysis, laxatives, elderly, over-the-counter drugs

Introduction

Elderly people are frequently exposed to hydroelectrolytic imbalances. Aging is associated with adipose tissue increase, lean mass decrease and water content[1] (Table 1). Furthermore, plasma renin–angiotensin decrease and altered baroreceptorial function cause a minor and delayed response to brain thirst perception.[2] Other age-related changes are the inability of the kidneys to retain sodium and concentrate urine. This is due to a decrease in nephron numbers and a reduced sensitivity of renal receptors to antidiuretic hormone (ADH).[3] Furthermore, comorbidities, malnutrition, and polypharmacy cause a decrease in human homeostatic functions; together, these factors cause a high morbidity and electrolytic imbalances in the elderly. Hypokalemia and hypocalcemia are frequently seen in people affected with rhabdomyolysis. We present a case report of laxative-induced rhabdomyolysis.

Case report

An 87-year-old woman was hospitalized for the onset of confusion, tremors, an inability to walk, and a fever that she had been experiencing for 36 hours.

Table 1 Differences of body composition between young vs elderly people

Body compartment	Aged 25 years	Aged 70 years
Fat	14%	30%
Water	61%	53%
Lean mass	19%	12%
Inorganic bone	6%	5%

She had a clinical history of arterial hypertension, cerebrovascular disease, colon diverticulosis, depression, and anxiety. She lived at home and was being treated with valsartan/hydrochlorothiazide 160/12.5 mg/day, furosemide 25 mg three times a week, aspirin 100 mg/day, bromazepam 2.5 mg/ml 12 drops at bedtime. She usually took high dosages of lactulose and sorbitol syrup as a laxative each day (about 70 g/day).

During her physical examination, the patient was confused and drowsy. She showed hyposthenia in her upper and lower limbs, symmetric and diffuse moderate hyporeflexia, her temperature was 37.8°C. Her heart rate was 94 beats per minute, rhythmic, arterial pressure was 90/60 mmHg in clinostatism; a hypophonesis in her left lung basis was present, abdomen was meteoric, tender, painless, and no peripheral edema was present. Laboratory tests revealed severe hyponatremia with marked hypokalemia, hypocalcemia, mild hypochloremia, and metabolic alkalosis. Moreover, rhabdomyolysis was found (Table 2). Clinical history did not reveal any falls prior to admission.

Renal function was decreased; high levels of transaminase, mild hypoalbuminemia, and neutrophil leukocytosis were present. Cholinesterase, T-troponin, autoantibodies, aldosterone, basal cortisol, parathytoid hormone (PTH), and thyreostimulating hormone (TSH) were normal (Table 2). Potassium in 24-hour urine was inferior to 20 mEq/L and sodium in 24-hour urine was inferior to 10 mEq/L; both of these results suggested a nonrenal cause of electrolyte loss.

Electrocardiogram revealed sinus rhytm, with sporadic supraventricular and ventricular extrasystoles, presence of *U* waves.

A chest X-ray showed a circumscribed left basal effusion, a brain computed tomography scan showed chronic vasculopathy. An abdomen ultrasonography was negative.

The correction of hydroelectrolytic imbalances was the first treatment; intravenous saline 2000 mL/day, potassium chlorure (KCL) 60 mEq/day, sodium chlorure (NaCl) 40 mEq/day, calcium gluconate 10% 10 mL/day. Ceftriaxone 2 g/day and levofloxacine 500 mg/day intravenously,

Table 2 Laboratory serum tests on admission and on discharge

	On admission	On discharge
Sodium (mEq/L) (135–145)	106	133
Potassium (mEq/L) (3.5–5.3)	1.9	3.9
Chlorum (mmol/L) (98–106)	85	99
Calcium (mg/dL) (8.2–10.2)	6.3	8.5
CPK (IU/L) (up to 180)	1114	52
LDH (IU/L) (240–480)	614	464
Myoglobin (ng/mL) (19–72)	414	52
BUN (mg/dL) (10–50)	185	43
Cr (mg/dL) (0.5–1.2)	2.5	1
AST (IU/L) (up to 35)	87	28
ALT (IU/L) (up to 35)	65	32
Albuminemia (g/dL) (3.8–4.8)	3.2	3.7
WBC (mm^3) (5.2×10^3–12.4×10^3)	16.800	10.200
Neutrophils (mm^3) (1.9×10^3–8.0×10^3)	11.300	4800
Cholinesterase (kU/L) (8–18)	8	//
T-troponin (ng/mL) (0–0.1)	0.07	//
Aldosterone (ng/L) (40–300)	84	//
Basal cortisol (nmol/L) (140–690)	230	//
PTH (ng/L) (230–630)	250	//
TSH (IU/L) (0.2–4)	0.3	//

Notes: Laboratory values are reported in terms of the International System of Unit; normal values are reported in parentheses.
Abbreviations: IU, International Unit; CPK, creatine phosphokinase; LDH, lactate dehydrogenase; BUN, blood urea nitrogen; Cr, serum creatinine; AST, aspartate transaminase; ALT, alanine transaminase; WBC, white blood cells; PTH, parathyroid hormone; TSH, thyroid stimulating hormone.

human albumin 20% 50 mL every other day intravenously, enoxaparine 4000 international units (IU)/day subcutaneously, were administered.

During hospitalization the patient presented acute delirium and was treated with haloperidol 5 mg and prometazine chloridrate 25 mg intramuscularly.

She was discharged after 12 days after resolution of symptoms and normalized laboratory tests (Table 2). Diagnosis on discharge was "Delirium in patient with abnormal use of laxative and severe electrolytic imbalance. Rhabdomyolysis. Circumscribed left lung basal effusion. Cerebrovascular disease".

The Naranjo probability scale indicated a probable relationship between laxative use, electrolytic imbalances, and the onset of rhabdomyolysis (score = 7).[4]

Discussion

Over-the-counter drugs such as laxatives are usually not considered to be dangerous. On the other hand, doctors know that chronic use may change serum electrolytic concentrations. Nearly one in every 25 individuals

taking over-the-counter drugs are potentially at risk for a major drug–drug interaction, as shown by studies in the literature.[5]

Laxatives have an high osmotic power, resulting in the movement of great quantities of liquid and mineral salts in intestinal lumen.[6] This very simple case report seems to be representative of the issues mentioned above. It reveals the importance of elderly care provided by dedicated operators, since inadequate treatments may cause unpleasant consequences on frail and very old people. Rhabdomyolysis is a life-threatening event caused by crush injuries, natural disasters, ischemia, infections, stress exercise, but also by alcohol and drugs. A number of drugs may play a key role in determining rhabdomyolysis, either through a direct or indirect insult to sarcolemma. Rhabdomyolysis is known to be a cause of hyperkalemia; it may sometimes be associated to hypokalemia such as in our case report, with consequent cell wall alterations in ion transport and hyperpolarization.[7] Extracellular decrease in potassium potentiates negativity in membrane muscle cell fiber potential, normally –90 mV. The sodium potassium ATPase pump has to be reset; this is a metabolically active process which causes ATP consumption. The alterations may derive from discrepancy between ATP need and its availability. Differential diagnosis has to be made with Guillan–Barrè–Strohl syndrome. Our patient's lack of compliance did not allow us to perform an electromyography in order to exclude Wallerian degeneration. However, the absence of pain, caudocranial progression in the limbs, motor deficits, and regression of symptoms after appropriate treatment influenced our diagnosis.[8] Delirium, which is common in severely compromised elderly people, may be due to fever but especially to hyponatremia,[3] which may cause intracellular cerebral edema. The velocity of deficit onset may be much more important than its severity.[9]

Over-the-counter drugs such as laxatives may cause rhabdomyolysis through electrolytic imbalances. A careful monitoring of all the drugs taken by the elderly is one of the most important duties of a physician since drug interactions and their secondary effects may be fatal.

Disclosures

The authors would like to thank Miss Annamaria Squillace for her kind revision of English style and grammar. The authors report no conflicts of interest in this work.

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