



Modern milk alkali syndrome—a preventable serious condition

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In the post H₂-blocker era, milk alkali syndrome has become very rare. However, with growing use of over-the-counter (OTC) calcium preparations, a resurgence of this disorder has been noticed. We report a case of severe hypercalcaemia resulting from overuse of calcium preparations.

Case report

A 47-year-old female from an adult home (residential care home / rest home) was brought to the emergency room with history of abdominal pain, loss of appetite, lethargy, and constipation.

Her past medical history was significant for Down's syndrome and hypothyroidism. Her home medications were risperidol, levothyroxine, alendronate 70 mg once a week; two calcium preparations (one containing calcium carbonate 500 mg and vitamin D 200 IU, and the other containing calcium carbonate 500mg) each three times a day; and raloxifene 60 mg once a day. It was not clear from the adult home notes why the patient was taking two calcium preparations: raloxifene and alendronate.

ER vitals (vital signs) were normal and the physical examination was unremarkable. Her lab results at admission revealed sodium 148 mmol/L (normal range: 135–145 mmol/L), potassium 3.3 mmol/L (3.5–5.3 mmol/L), chloride 104 mmol/L (97–107 mmol/L), bicarbonate 33 mmol/L (22–33 mmol/L), blood urea nitrogen (BUN) 25 mg/dl (5–19 mg/dL), creatinine 4.1 mg/dL (0–1.1 mg/dL), glucose 79 mg/dL, calcium more than 16.5 mg/dL (8.5–10.3 mg/dL), and albumin 3.8 g/dL; liver function tests and thyroid-stimulating hormone (TSH) were normal.

Intact parathyroid hormone (PTH) was 8.9 pg/mL (10–69 pg/mL) and serum protein electrophoresis and urine protein electrophoresis were normal. Renal sonogram showed no abnormality.

The patient was treated with intravenous (IV) fluids and furosemide for hypercalcaemia secondary to milk alkali syndrome. Her serum calcium normalised in 2 days and renal function returned to normal.

Discussion

The commonest cause of hypercalcaemia is hyperparathyroidism in outpatient settings and malignancy in inpatient settings. Milk alkali syndrome was a common cause of hypercalcaemia when peptic ulcer disease was treated with Sippy regimen¹ consisting of hourly administration of milk and cream with a mixture of bicarbonate containing salts that included calcium carbonate.

Renal failure and alkalosis as toxicities of Sippy regimen was recognised by Hardt and Rivers in 1923.² The hypercalcaemia which is now known to be central to the milk alkali syndrome was first described by Cope in 1936.³ With the advent of H₂ antagonists and proton pump inhibitors, the use of antacids to treat peptic ulcer disease declined dramatically and the incidence of the syndrome fell to 2% of all patients admitted with hypercalcaemia during 1985 to 1989.⁴

Recently, there has been resurgence of the cases of milk alkali syndrome due to common use of calcium therapy for osteoporosis, readily-available OTC calcium carbonate preparations, and use of calcium carbonate to minimise secondary hyperparathyroidism in patients with chronic renal failure.

In a recent study during surveillance period from 1998 to 2003, milk alkali syndrome was the third most common cause of hypercalcaemia (8.8%) and the second most common cause of severe hypercalcaemia (>14 mg/dL).⁵ Therefore, with the increased use of calcium carbonate for treatment of osteoporosis, an increased awareness of the milk alkali syndrome is necessary.

There is no correlation between reported intakes and the severity of the hypercalcaemia or other manifestations of the disease.⁴ In susceptible patients, milk alkali syndrome begins with development of hypercalcaemia. High serum calcium produces a decrease in glomerular filtration rate and along with increased alkali intake, causes metabolic alkalosis and further decreases calcium excretion.⁶ Nausea and vomiting further dehydrates the patient thereby worsening the effects of hypercalcaemia, renal failure, and metabolic alkalosis. Our patient was taking calcium preparation 3 grams/day.

Symptomatic patients and patients with serum calcium levels above 13.5 mg/dL generally warrant aggressive intervention. Treatment initially consists of IV normal saline and a loop diuretic.⁷

This case highlights a serious complication of a nonprescription drug when used inadvertently. Milk alkali syndrome is likely to become more common with increased use of calcium preparations for osteoporosis. It can easily be recognised by taking a thorough medication history.

Similarly before prescribing “safe” medications such as calcium preparations, we should carefully assess other similar medications that the patient may be taking.

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