

The Development of Hypocalcemic Tetany Following the Intestinal Cleanse of a Patient with Vitamin D Deficiency

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ABSTRACT The most important step of a safe colonoscopy examination is proper intestinal cleansing. There are several different methods that can be applied to the intestinal cleanse. Because of some adverse effects such as electrolyte imbalance, dehydration, allergic reactions, cramping, vomiting, the decision should be made after reviewing the individual characteristics of every patient, which includes age, comorbidities, medication and the fluid/electrolyte balance. In this case, we review a 38 year old female patient who did not have any comorbidities or long-term medications; who developed hypocalcemic tetany following the colonoscopy preparation with sodium phosphate intestinal cleanse. Significant vitamin D deficiency was the only pathological finding in our case that can be responsible for hypocalcemic tetany.

Keywords: Hypocalcemia; cathartics

The bowel cleanse for the colonoscopy operation should be conducted using an effective, safe, and tolerable by the patients. However, matching all these criteria is not always possible for every patient. Sodium phosphate –a cleansing agent for colonoscopy, should be carefully administered in the cases where the body fluid/electrolyte balance may be offset; such as of chronic kidney failure, heart failure, old age, diuretic use, angiotensin-converting enzyme (ACE) inhibitor and angiotensin receptor blockers (ARBs) use. It is not always possible to foresee the possible adverse effects of the cleansing agents on healthy individuals. We review the case of severe hypocalcemic tetany that developed in a female patient after the oral administration of two doses of 45 mL sodium phosphate, together with the possible causes.

CASE REPORT

The 38-year-old female patient applied with complaints of stomach ache, difficulty in defecation and changes in bowel habits that had been continuing for six months. The patient had a family history of colon cancer developing under the age of 40, thus she was referred for a colonoscopy examination. On the day of the colonoscopy, the patient noted that she did not feel well; she had a tingling sensation all over the body, but especially in the legs. Subsequently, the colonoscopy was canceled, and the patient

was referred to the emergency clinic. The evaluation revealed that the patient was conscious, the respiratory rate was 20 (slight tachypnea), the arterial blood pressure was 110/60 mmHg, the heart peak rate was 68/min, the fingertip oxygen saturation was 97%. The patient had positive Chovestek and Trousseau findings (Figure 1).

The patient's history did not reveal any known chronic illnesses. There were no prior operations other than the 3 c-sections (the last one one-and-a-half years ago) and no continuous drug use. It was indicated that the patient had orally taken the two 45 mL doses of sodium phosphate solutions with 500 mL of water the day prior to the planned colonoscopy. She subsequently developed complaints of nausea, followed by numbness in the legs

and a tingling sensation all over the body. The patient had clinical findings of tetany and positive Chovestek and Trousseau signs. The laboratory findings were as followed: Creatinine (Crea): 0.55 mg/dL, Calcium (Ca): 5.5 mg/dL, Phosphorus (P): 2.9 mg/dL, Magnesium (Mg): 1.7mg/dL, Sodium (Na): 141 mmol/l, Potassium (K): 3.8 mmol/l; blood gases: pH: 7.390, HCO₃: 22.5 (mmol/l), Lactate (Lac): 0.9, Hemoglobin (Hgb): 13.3 g/dL (Table 1). The patient had hypocalcemia, hypophosphatemia, and hypomagnesemia. She was IV infused 1000 mg calcium gluconate. The tetany improved after the first dose and the patient was prescribed two more daily doses of calcium gluconate (1000 mg) infusions together with electrolyte controls. Later on, the patient received IV 4 mg of magnesium sulfate for the treatment of hypomagnesemia. The Ca, Mg and P levels were normal after two days. The 25(OH)-vitamin D level was determined to be 2.26 ng/mL. The patient was given an oral vitamin D replacement of 50.000 IU for three days. The tests revealed that the patient did not have any parathormone (PTH) anomalies (which leads to a predisposition of hypocalcemia) or any pathologies such as kidney failure. It was assumed that the sodium phosphate solution -administered as a preparation for the colonoscopy -led to symptomatic hypocalcemia together with the underlying



FIGURE 1: Demonstrates carpopedal spasm of hypocalcemic patient.

TABLE 1: The electrolyte state of the patient prior to colonoscopy preparation, after the preparation and after treatment.

	Before colonoscopy procedure	After usage of sodium phosphate	After two days electrolyte replacement
Creatinine (mg/dL)	0.52	0.55	0.48
Na/K (mmol/l) (132-146)	140/4.2	141/3.8	140/4.0
Ca (mg/dL) (8.8-10.6)	9.8	5.5	8.8
P (mg/dL) (2.5-4.5)	No data	2.9	2.6
Mg (mg/dL) (1.77-2.58)	No data	1.7	2.0
HCO ₃ (mmol/l)	No data	22.5	
AST/ALT (U/L)	13/9	17/11	
ALP/GGT (U/L)	107/14	115/13	
Hgb (g/dL)	13.2	13.3	
pH	No data	7.390	
25(OH)-vitamin D (ng/mL) (30-100)	No data	2.26	
Albumin (g/dL)	No data	4.6	
PTH (pg/ml)	No data	120.7	
Thyroid Stimulating Hormone (TSH) (μIU/l)	No data	0.450	
Cortisol (μg/dL)	No data	10.95	

ing vitamin D deficiency. The patient was discharged with a stable overall condition and a replacement therapy of 2000 mg Ca and 1600 IU vitamin D.

DISCUSSION

Sodium phosphate is one of the osmotic agents that is used for the preparation prior to colonoscopy. It should be used with caution in the cases of acute kidney failure and electrolyte imbalance.¹ The sodium phosphate solutions are reported to cause hyperphosphatemia together with hypocalcemia among patients with kidney disease. However, this condition may be asymptotically and transiently present among healthy individuals.² It is noted that several factors may lead to electrolyte imbalance; such as being female, old age, decreased bowel movement, dehydration, the frequent administration of sodium phosphate.^{3,4} In this case, the female patient had decreased bowel movements. There d no known comorbidities, however, the patient used an insufficient amount of water when orally taking the sodium phosphate solution, which may have contributed to the development of the hypocalcemic outcome. Berker et al. have found that a single dose of 45 mg sodium phosphate led to the development of hypocalcemia and hypophosphatemia in a patient with hypoparathyroidism.⁵ In this case, the PTH levels were normal. Despite the lack of literature findings, we believe that the significant vitamin D

deficiency may have led to the development of symptomatic hypocalcemia.

In conclusion sodium phosphate- a cleansing agent for colonoscopy, should be carefully administered in the cases where the body fluid/electrolyte balance may be offset; such as of chronic kidney failure and the use of diuretics. The patients who are observed to be healthy may react adversely to sodium phosphate, especially if there is hypocalcemia. Thus, the Vitamin D levels should be examined and patients must be called for control examination for two days long.

Informed Consent

Informed consent was obtained from the patient.

Source of Finance

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Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

All authors contributed equally while this study preparing.

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