

Symptomatic Hypocalcemia due to Sodium Phosphate for Bowel Preparation following Minimally Invasive Parathyroidectomy

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ABSTRACT

This paper presents a case on symptomatic hypocalcemia due to sodium phosphate use for bowel preparation following parathyroidectomy. Serum calcium and parathyroid hormone were in normal levels postoperatively. Two months following the operation, phosphosoda was administered for bowel preparation. Following bowel preparation severe carpopedal spasm developed. It can be speculated that sodium phosphate administration for bowel preparation may precipitate hypocalcemic tetany in the patients undergoing parathyroidectomy for primary hyperparathyroidism.

Keywords: Sodium phosphate, Bowel preparation, Parathyroidectomy, Symptomatic hypocalcemia.

INTRODUCTION

Fleet Phospho-soda contains sodium phosphate and has a laxative effect. It is widely and effectively used to prepare the bowel for colonoscopic examination or surgery. However, laxatives have some systemic adverse effects and can cause hypocalcemia, hyperphosphatemia, hypernatremia and acidosis. Despite these important metabolic effects, symptoms due to these disturbances are rare and usually clinically insignificant.^{1,2}

However, if patients have a tendency for hypocalcemia, the use of laxatives can lead to symptomatic hypocalcemia. This is the first report presenting symptomatic hypocalcemia after sodium phosphate administration for bowel preparation in a patient undergoing parathyroidectomy for primary hyperparathyroidism.

CASE REPORT

A 55-year-old woman presenting classical symptoms of primary hyperparathyroidism, such as bone pain, weakness and fatigue was evaluated in the surgery clinic. She also had hypertension and was using calcium canal blocker (verapamil 240 mg per day). Her preoperative parathyroid hormone (PTH) level was 225 ng/mL (range 12-72), serum calcium was 11.3 mg/dL (range 8.5-10.5) and 24 hours urinary excretion of calcium was 465 mg/24 hours (range 80-320 mg/24 hours). Her blood phosphorus, alkaline phosphatase, albumin, urea and creatinine levels were within normal limits. Vitamin D level was 21 ng/ml (range 11-70 ng/ml). Dual-energy absorptiometry (DXA) measurement of T and Z scores in the hip bone and vertebrae were -0.4, 0.4 and -2.3, -1.2 respectively.

Her sestamibi scan revealed a parathyroid adenoma located in the left-lower neck. The patient underwent minimal invasive

parathyroidectomy for primary hyperparathyroidism. A parathyroid adenoma measuring 15 × 10 × 5 mm was excised through a lateral 2.5 cm incision under local anesthesia. Intraoperative parathormone level dropped from 203 pg/mL to 27 pg/mL dramatically after the excision of the adenoma. Symptomatic hypocalcemia developed at about 12 hours following surgery. The patient had mild symptoms, such as circumoral numbness and paresthesia in the hands and feet. PTH and calcium values on the morning of postoperative day one were 22 ng/mL and 8.1 mg/dL respectively. After starting oral calcium (1500 mg/day) and vitamin D supplementation, the patient was discharged on postoperative day one. Serum calcium and PTH levels at follow-up on 30th day postoperatively were 9.3 mg/dL and 41 pg/mL, and she had no symptoms related to hypocalcemia. Calcium and vitamin D supplementation were continued in addition to verapamil, 240 mg/day for hypertension.

Two months after the operation, the patient was admitted to the clinic with mild abdominal pain and constipation. Abdominal ultrasonography revealed cholelithiasis. There were no symptoms or findings due to intestinal obstruction or hypocalcemia, but the patient was hospitalized and colonoscopy was planned to investigate the reasons for constipation. The patient drank clear liquids on the day before colonoscopy and received two doses of 45 mL oral Fleet® Phospho-soda® (CB Fleet Co. inc., Lynchburg VA, USA) (monobasic sodium phosphate 2.4 gm, dibasic sodium phosphate 0.9 gm) at 4 hours interval for bowel preparation in the late afternoon and evening of the same day. Furthermore the patient was administered Fleet® Enema 133 mL (monobasic sodium phosphate 19 gm, dibasic sodium phosphate 7 gm) by rectal route in the same

evening. Watery stool frequency was 7 to 8 after taking phospho-soda.

About 6 or 7 hours after phospho-soda administration the patient complained of paresthesia in her hands and feet, circumoral numbness. Shortly after these symptoms, severe carpopedal spasm developed. There was no laryngospasm or seizure. Tension arterial and pulse rate were normal. Serum calcium level was 7 mg/dL and PTH was 58 ng/mL. Serum sodium, potassium and chlorine levels were 145 meq/L (range 136-152), 3.3 meq/L (range 3.2-5.2) and 108 meq/L (range 97-109) respectively. Magnesium level was 2.2 mg/dL (range 1.8-2.6). Serum phosphate, creatinine and albumin levels were within normal limits.

For treatment, calcium gluconate 1000 mg was followed by a slow infusion of calcium. After intravenous infusion of calcium gluconate 1500 mg/day and prophylactic oral magnesium citrate, despite normal blood magnesium level, the symptoms subsided within 24 hours. The next day, the serum calcium level of the patient was kept at 8.1 mg/dL and oral vitamin D and calcium medication was started. On the day following oral supplementation the patient's calcium level was 9.1 mg/dL and the patient was discharged without symptoms. Colonoscopic examination was postponed. Without calcium medication, the patient was symptom free and her serum calcium and PTH levels were 9.4 mg/dL and 79 ng/mL at the postoperative 6th month follow-up.

DISCUSSION

Phospho-soda contains sodium phosphate, which has a laxative effect. It is also widely and effectively used to prepare the bowel for colonoscopic examination or surgery. However, phospho-soda has some systemic adverse effects on blood electrolytes. It has been reported that phospho-soda can cause hypocalcemia, hyperphosphatemia, hypernatremia and acidosis. These effects have been observed even at normal doses.²⁻⁴ Despite these important metabolic changes fortunately, symptoms are rare and usually clinically insignificant.^{1,2}

On the other hand, if patients have some predisposing factors for hypocalcemia, then symptomatic hypocalcemia may develop during the use of phospho-soda. For example alendronate sodium, which reduces bone metabolism can cause hypocalcemia. It has been reported that severe symptomatic hypocalcemia can develop in patients using this agent if another hypocalcemic agent, such as phospho-soda is used for bowel preparation at the same time.⁵ In addition, chronic renal failure and vitamin D deficiency or magnesium depletion have also been reported as other predisposing factors for symptomatic hypocalcemia when phospho-soda is used for bowel preparation.⁶ In the same manner, it can be suggested that, in the present case, parathyroidectomy can be considered as a predisposing factor causing hypocalcemia, as remaining parathyroid glands may be suppressed and cannot secrete enough PTH to compensate for serum calcium levels in the early postoperative period. Adding phospho-soda for bowel preparation in these patients may trigger symptomatic hypocalcemia.

Another important point in the use of phospho-soda for bowel preparation is the dosage and the interval between these. Some reports presenting hypocalcemic tetany have reported the use of overdose or a shorter interval between two doses of this laxative.^{3,5} In the present case, the recommended dose was given orally, but an additional phospho-soda enema was also administered by rectal route. This may be considered as an overdose. In addition, the interval between the oral doses was shorter than the recommended duration, whereas, others have recommended longer intervals and smaller doses.^{7,8} Based on these observations, it should be noted that safe limits of doses and the time intervals of Fleet® Phospho-soda application are narrow and should not be exceeded, especially in patients prone to hypocalcemia. Two other cases of hypocalcemic tetany due to standard doses and an additional enema administration have been reported in the literature.⁶ Therefore, physicians should be aware of the hypocalcemic effect of phospho-soda preparation, especially in overdose cases.³ Avoiding prescribing or using this agent for bowel preparation in patients who are prone to hypocalcemia can help to avoid serious hypocalcemic side effects.

CONCLUSION

It can be speculated that sodium phosphate administration for bowel preparation may lead to hypocalcemic tetany after surgical excision of the pathologic parathyroid tissue in patients with primary hyperparathyroidism. Physicians should prescribe this drug with caution for these patients in the postoperative period.

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