Oral Fleet® Phospho®-Soda Laxative-Induced Hyperphosphatemia and Hypocalcemic Tetany in an Adult

Report of a Case

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PURPOSE: This study was undertaken to report an adverse outcome of the routine use of Fleet® Phospho®-Soda for bowel cleansing and to review the available literature. METHOD: Report of a case and review of the literature is presented. RESULT: Administration of Fleet® Phospho®-Soda for bowel preparation in an adult resulted in hyperphosphatemia and hypocalcemic tetany. Review of the literature shows this to be the first such report. Further evaluation suggests a role for partial bowel obstruction and renal failure in this complication. CONCLUSION: Although Fleet® Phospho®-Soda solution continues to be a safe bowel preparation, caution should be used in adults with bowel obstruction and renal failure. [Key words: Fleet® Phospho®-Soda; Bowel preparation; Hyperphosphatemia; Hypocalcemia]


Oral Fleet® Phospho®-Soda preparation is a popular method of bowel cleansing.1-3 Although numerous reports have been published attesting to the potential dangers of sodium phosphate enemas, particularly in children, serious complications from the oral preparation have not been reported.4-8 We present a case report of confusion and tetany induced by hyperphosphatemia and hypocalcemia after routine administration of oral Fleet® Phospho®-Soda as a bowel preparation for surgery.

REPORT OF A CASE

A 69 year-old Russian female presented with constipation, decreased caliber of stools, and blood per rectum for one month. A standard 4-liter GoLYTELY® bowel preparation (Braintree Laboratories, Inc., Braintree, MA) was given, and colonoscopy revealed a lesion at 20 cm that was grossly consistent with carcinoma, beyond which the scope could not be passed. Biopsy was not obtained because of therapeutic anticoagulation for chronic atrial fibrillation.

Surgery was scheduled one week later. On admission, electrolytes were normal other than an albumin of 3 (Table 1). The patient received a bowel preparation the day before surgery, which consisted of Fleet® Phospho®-Soda-buffered oral saline laxative. Ninety milliliter doses of undiluted laxative were administered at 3 p.m. and 8 p.m. along with intravenous hydration at 100 ml/hour and instruction to drink three 8-ounce glasses of water between the doses. However, nursing reported poor oral intake. Stool output following the preparation was subjectively less than expected. The following morning, the patient was found to be in a confused state and had painful tetanic contractions of both upper extremities. Laboratory revealed a calcium level of 4.3 and a phosphate level of 14.9. Intravenous calcium gluconate and oral Amphojel™ suspension (Wyeth-Ayerst Lab., Philadelphia, PA) were administered under monitored conditions. The tetany resolved rapidly, and clear sensorium returned within 24 hours. Repeat lab-
Table 1. Electrolyte Values Surrounding Fleet® Phospho-Soda Bowel Preparation Initiated at 15:00 on Day 1

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<thead>
<tr>
<th>Time</th>
<th>Day 1</th>
<th>Day 2</th>
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<th>Day 3</th>
<th>Day 9</th>
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<td>08:00</td>
<td>135</td>
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<tr>
<td>06:30</td>
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Sodium (136–143) 135 143 134 135
Potassium (3.6–5) 3.9 2.5 4.0 4.4
Blood urea nitrogen (6–25) 7 17 27 55
Chromium (0.4–1.3) 0.6 1.3 1.7 2.3
Magnesium (1.4–1.9) 1.6 1.4 1.9 1.7
Calcium (8.6–10.3) 8.1 4.3 5.6 6.2 7.6 8.2
PO₄ (2.3–4.1) 2.9 14.9 8.4 9.6 5.4
Albumin (3.9–5) 3.0 2.2 2.2 2.2 2.2

oratory studies eight hours later revealed that calcium and PO₄ levels were improving. Twenty-four hours after the event, the patient was completely asymptomatic, with nearly normal calcium and PO₄ levels, although the blood urea nitrogen (BUN) and creatinine had increased to 27 and 1.7, respectively.

During the ensuing week, BUN rose to a maximum of 55 and creatinine to 2.3 without other indications of renal insufficiency. By two weeks after the event, the BUN and creatinine had normalized, and the patient underwent uneventful low anterior resection following GoLYTELY® bowel preparation. She recovered uneventfully and is doing well at home.

DISCUSSION

Oral Fleet® Phospho-Soda preparation is the choice for bowel cleansing by the Colorectal Surgery Division at our institution. Our experience is consistent with that of several other groups who found that Fleet® Phospho-Soda is more effective, less expensive, and better tolerated than polyethylene glycol-based lavage solutions.1-3 The usual regimen is two 45 ml doses of Fleet® Phospho-Soda laxative (monobasic sodium phosphate, 2.4 g, and dibasic sodium phosphate, 0.9 g/5 ml).3 However, because of occasionally inadequate preparation, we increased the dosage to 90 ml, twice accompanied by 24 ounces of water orally and intravenous hydration if the patient is hospitalized. We have been using this regimen for many years with excellent results and no previously recognized adverse sequelae. Cohen et al.,1 reporting on electrolyte changes in 143 patients given a total of 90 ml of Fleet® Phospho-Soda bowel preparation before elective colonoscopy, showed a statistically significant rise in phosphate by a mean of 3 mg/dl and a decrease in calcium by a mean of 0.3 mg/dl, but no clinical sequelae were identified. Other studies have confirmed similar changes, again without clinical significance.2,3,9 Our patient’s phosphate level rose from 2.9 to 14.9 mg/dl, and calcium fell from 8.1 to 4.3 mg/dl after receiving only double the usual dosage.

To date, there has been only one report of serious sequelae with the use of oral Phospho-Soda laxative in adults. This involved a patient who ingested “huge” daily doses for chronic constipation. Serum phosphate and calcium levels were 45 to 49 and 4.6 to 5 mg/dl, respectively, and, despite intravenous calcium replacement, she died 12 hours after admission.10 The pediatric literature, as well, contains only one report of similar complications from oral ingestion of a phosphate-based laxative. This involved a two-year-old boy who was being treated with a total of 1,380 ml of a 1:1 dilution of Fleet® enema in isotonic saline as a gastric lavage solution for iron tablet ingestion; the patient became comatose and was noted to have a calcium level of 3.1 and a phosphorus level of 38 mg/dl. Intravenous calcium and oral aluminum containing antacids normalized his electrolytes within 38 hours, and the patient was discharged, neurologically normal.11

There are several reports of complications, including one fatality, associated with hyperphosphatemia and hypocalcemia following Fleet® enemas in children.4-7 Only one such incident has been reported in an adult. This was an 81-year-old male with chronic renal failure who retained the enema for 24 hours because of stool impaction. The next day, he had a calcium level of 5.4 and phosphorus level of 18 mg/dl. He did well after intravenous calcium gluconate and digital disimpaction.8

Our patient’s unusually high phosphate absorption may have been influenced by several factors. Even though her bowel preparation consisted of double the usual dosage, we have observed no adverse effects in hundreds of patients treated similarly. That such a dramatic change in electrolytes would occur without