Bowel Preparations Might Pose Problems in Renal Patients

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**Problem:** Many institutions have a mechanism in place to alert practitioners when patients with renal dysfunction are receiving excessive doses of certain drugs. For example, a computer system might display a message if the dose or frequency of levofloxacin or digoxin is excessive in a patient with compromised renal function.

Serious consequences to renal patients can easily go unrecognized, however, when doses for some bowel preparations are too high. Many medication-error reports have documented phosphate intoxication from misuse of oral and rectal solutions of sodium phosphates. The Food and Drug Administration (FDA), United States Pharmacopeia (USP), and the Institute for Safe Medication Practices (ISMP) recently learned of the death of a hospitalized, frail woman who was prescribed “one and one-half bottles” of Fleet Phospho-soda (2.4 g monobasic sodium phosphate and 0.9 g dibasic sodium phosphate/5 mL) orally with a repeat dose in the evening. A nursing supervisor entered the pharmacy and obtained three bottles of the product. The first dose was given at 6 PM, followed by another dose at 8 PM. After a night of pain, anxiety, respiratory difficulty, and several episodes of cardiac arrest, the patient expired. When hospital staff reviewed the event, phosphate overdose was suspected. Before Fleet Phospho-soda was administered, the patient’s calcium and phosphorous levels were 8.8 (n=8.5–10.5 mg/dL) and 1.5 mg/dL (n=2.5–4.5 mg/dL), respectively. When the patient arrested, her calcium and phosphorous levels were 6.2 and 27.7 mg/dL, respectively. The patient was also in metabolic acidosis with a pH of 7.03! Fleet Phospho-soda is commercially available in 45- and 90-mL bottles. The pharmacy stocked only 90-mL bottles, but the physician had counted on the 45-mL bottles being used.

Several accidental phosphate enema overdoses have also occurred in children. For example, a five-month-old child was hospitalized after his mother gave him an entire adult sodium phosphate enema. Another report states that after two elderly patients with renal failure received cleansing enemas or another bowel-prep regimen prior to a bowel procedure, a nephrologist contacted the pharmacy department to express concern about the phosphate load in these patients. One patient who had received two Fleet enemas (7 g dibasic sodium phosphate and 19 g monobasic sodium phosphate per 118-mL delivered dose) had a transient increase in his phosphate level (5.2 mEq/dL) that declined over time. The other patient who had received 45 mL of Fleet Phospho-soda (8.1 g dibasic sodium phosphate and 21.6 g monobasic sodium phosphate per 45-mL dose) did not become hyperphosphatemic, but was at the upper limit of normal laboratory values for phosphate. Neither patient developed hypocalcemia or tetany, and both left the hospital with no problems.

In another case, a physician prescribed “Fleet enema every six to eight hours, as needed,” but the order was intercepted by a pharmacist and corrected before administration. Neutra-Phos, a product commonly used to treat hypophosphatemia, contains 8 mM of phosphorous per tablet and is often given in a dose of two tablets, three to four times daily. In contrast, both Fleet products have over 160 mM of phosphate per dose.

Magnesium is another bowel preparation product that can accumulate in patients with renal dysfunction. Significant amounts of magnesium are available in magnesium citrate solution and milk of magnesia.

**Safe Practice Recommendation:** Because bowel preparations often are floor-stock items or freely available in automated dispensing systems prior to a pharmacist’s clinical review of the order. During order entry, computer systems should warn practitioners when these agents are about to be used on patients with decreased renal function.