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Case Report

Colonoscopy-Related Nephropathy

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Abstract

Acute phosphate nephropathy (APhN) is a clinical entity which causes acute and subsequent chronic renal failure after exposure to oral sodium phosphate (OSP) bowel purgatives. Generally, patients who will undergo colonoscopy are given 45 ml of OSP twice, starting 12-24 hours before the procedure. After intestinal absorption, elevated urea and creatinine, transient hyperphosphatemia, hypocalcemia, hypernatremia, hyponatremia, hypokalemia and high anion gap metabolic acidosis may also be observed. The case presented in this article is that of a 60-year-old patient diagnosed with type 2 diabetes, hypertension and dyslipidemia. A colonoscopy was performed to investigate the aetiology of her iron deficiency anaemia. The patient was prepared for the colonoscopy with OSP, and following the procedure, an acute kidney injury developed that was clinically compatible with APhN.

Keywords: *Oral sodium phosphate therapy, Kidney injury, Acute*

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Introduction

Colonoscopy is a widely utilised diagnostic and therapeutic tool for the management of colonic disease. (1). It is the gold standart to visualize the large bowel (2). Acute phosphate nephropathy (APhN) is a clinical condition that results in acute and subsequent chronic renal failure following exposure to oral sodium phosphate (OSP) intestine purgatives. APhN is seen as a result of oral sodium phosphate use in patients undergoing bowel cleansing before colonoscopy (3). Generally, patients who will undergo colonoscopy are given 45 ml of OSP twice, starting 12-24 hours before the procedure. After intestinal absorption, elevated urea and creatinine, transient hyperphosphatemia, hypocalcemia, hypernatremia, hyponatremia, hypokalemia and high anion gap metabolic acidosis may also be observed (4). Advanced age, angiotensin-converting enzyme (ACE) inhibitors or angiotensin receptor blockers (ARB) use, acute or chronic kidney disease or the presence of a kidney transplant, retention of oral sodium phosphate (OSP) resulting from poor bowel motility or colitis, female gender, volume depletion, hypertension, diabetes, and diuretic, lithium, or nonsteroidal anti-inflammatory drug use are considered risk factors. (5). This case report describes a patient who developed nephropathy and required urgent observation and treatment after phosphate administration before colonoscopy.

Case

60-year-old female patient, who had diabetes, hypertension and dyslipidemia, was continuing her follow-up due to polypectomy performed after a previously detected tubulovillous adenoma in the rectum. For preparation, two oral purgatives containing sodium phosphate were used 6 hours apart, starting 16 hours before the colonoscopy. The patient, who had fatigue, applied to the internal medicine clinic and was hospitalized after being diagnosed with acute renal failure.

Vital signs: Blood pressure: 90/60 mm Hg, fever: 36.5 degrees, pulse: 113/min. Physical examination findings were normal. In laboratory tests, creatinine: 2.03 mg/dL (0.79 mg/dL 1 week ago), urea: 52 mg/dL, sodium: 137 mmol/L, potassium: 4.16 mmol/L, phosphorus: 4.98 mg/dL, calcium: 9.86 mg/dL was detected. There was no proteinuria and urine sediment was within normal limits. The current history and laboratory findings suggested that acute renal failure might be due to acute phosphate nephropathy. All other etiological causes of acute kidney injury were excluded. Necessary parenteral hydration was provided. After the creatinine

value decreased to 0.88 mg/dL, the patient was called for a check-up and discharged.

In the literature, patients developing acute kidney injury after the use of OSP preparations have been reported. In the study conducted by Markowitz et al. (6), 21 patients who underwent colonoscopy preparation with oral phosphate solution were evaluated. As a result of the data obtained in the study, risk factors such as advanced age, hypertension, inadequate hydration and medication use were found to be associated with the risk of developing acute phosphate nephropathy. We think that risk factors such as advanced age, hypertension and diabetes history may be effective in the development of acute phosphate nephropathy in our patient.

Discussion

Colonoscopy is a frequently used method for many indications. OSP is frequently used for process preparation. It should be kept in mind that these preparations may cause phosphate nephropathy. Advanced age, diuretic use, female gender, and chronic diseases such as diabetes and hypertension are risk factors for the development of acute phosphate nephropathy. In order to reduce complications in high-risk patients, different alternatives for colonoscopy preparation should be tried or adequate hydration should be provided and the patient should be carefully monitored for the development of acute renal failure.

When we look at other studies in the literatüre, Şahin et al. (7) conducted a retrospective study on 122 patients who used OSP solutions for colonoscopy preparation and whose creatinine levels were within normal limits, and noted the creatinine values after an average of one month to determine the effect of OSP solutions on renal functions. There were 60 women and 62 men, and their average age was 64±13 years. While the patients' creatinine (0.87±0.38 mg/dL and 0.8±0.31 mg/dL; $p<0.05$) and phosphate (6.22±3.02 mg/dL and 3.51±0.63 mg/dL; $p<0.05$) values increased after OSP solution use, their GFR (94.12 ± 28.70 and 84.99±26.67; $p<0.05$) values decreased. OSP solution preparation was associated with a decrease in GFR levels in elderly patients whose creatinine levels were within normal limits. In the study conducted by Lieberman et al. (8), there were 32 patients scheduled for elective colonoscopy who had a serum creatinine level of less than 1.5 mg/dL. After use of OSP solutions, significant increases in serum phosphate and sodium and decreases in serum calcium and potassium were observed.

In the study conducted by Gumurdulu and colleagues (9), a total of 70 individuals were included, comprising 38 men and 32 women with a mean age of 47 ± 12 years

and a range of 25–80 years. After administration of OSP, a notable decline was observed in serum calcium and potassium levels ($P < 0.05$), while there was a marked increase in serum phosphate and sodium levels ($P <$ or $= 0.01$) compared to pre-treatment levels. There was a positive correlation found between the mean change in serum phosphate and age (Pearson's $r = 0.705$; $p < 0.001$).

Considering the studies in the literature and our patient, the indication of colonoscopy should be reconsidered in patients with high risk factors for acute phosphate nephropathy. The use of other effective agents other than phosphate solutions should be evaluated, or if the use of phosphate solution is necessary, the patient should be evaluated for adequate hydration and a break from the use of nephrotoxic drugs for a while.

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