

Case Analysis

Lactic Acidosis and Acute Renal Failure after Oral Sodium Phosphate for Bowel Preparation in a Diabetic Patient Using Metformin – A Case Report

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Oral sodium phosphate (OSP) for bowel preparation before colonoscopy has been widely prescribed for many years. However, its safety, especially the possible renal damage, gradually raised concern in recent years. Here, we report a diabetic patient on metformin, developing lactic acidosis and acute renal failure after taking OSP for colonoscopy. This patient recovered after emergency hemodialysis. OSP bowel cleansing may be contraindicated in patients on metformin for diabetes mellitus.

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Key Words

Lactic acidosis;
Acute renal failure;
Oral sodium phosphate;
Metformin

Oral sodium phosphate (OSP) and metformin are both very common and widely prescribed agents for bowel preparation and diabetes control, respectively. Renal damage after usage of OSP and lactic acidosis after metformin are both well recognized adverse effects.^{1,2} Hence, there are regulations for each of these two agents to limit their use in specific populations. However, the safety of OSP usage in patients taking metformin is seldom discussed. We report here a diabetic patient on metformin who developed lactic acidosis and acute renal failure after ingestion of OSP.

Case Report

A 65-year-old woman with type 2 diabetes mellitus came to our emergent department (ED) because of progressive dyspnea for one week. The initial studies at ED revealed high anion gap metabolic acidemia (pH: 7.26, pCO₂: 26 mmHg, Na: 129 meq/L, Cl: 70: meq/L, HCO₃⁻: 13.9 mmol/L) and renal insufficiency (BUN/Cr: 73/8.5 mg/dL). Blood test for BUN/Cr 5 months previously at our hospital was 20/1.1 mg/dL. Her finger blood sugar on arrival at ED was 210 mg/dL. Blood and urine ketone were not

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detected. Further work up for metabolic acidemia showed elevated blood lactate level; that was 14.0 mmol/L. She was admitted to medical intensive care unit and received emergency hemodialysis because her dyspnea and metabolic acidemia worsened even after medical management. She recovered from the acidosis and acute renal failure after two sessions of hemodialysis and was discharged. The renal function at discharge was BUN/Cr: 32/1.8 mg/dL and returned to 29/1.1 mg/dL two weeks later at follow-up. Her medical history revealed that she had been on daily insuline injection and oral metformin in a usual dose at a clinic in the past one year. A week prior to admission, she had a colonoscopy at our hospital using a standard and splitting dose of OSP (45 mL each in separate days) for the bowel preparation for a follow-up study of her colonic adenoma that was removed 3 years ago. She denied other accompanying medication during this period. Two and three years previously, when she had her first two colonoscopies, she was receiving the insuline injection only for the diabetes. On both occasions, OSP was used for bowel cleansing without any ill effect. Therefore, we think the development of lactic acidosis and acute renal failure in our patient who was under usual dose of metformin was associated with the intake of OSP.

Discussion

Colorectal cancer has become the first common cancers in Taiwan. Colonoscopy remains the best modality to detect and even to remove colorectal neoplasms in its early stage. A good bowel preparation before colonoscopy is essential to obtain a qualified examination. Among several bowel purgatives, polyethylene glycol (PEG) and OSP solution are the two most discussed agents in the literatures. OSP, for its low volume, may be more palatable for many patients.³ However, its safety became an important issue since many serious side effects, and even fatalities, have been reported in the past few years.

Renal injury, whatever temporary or permanent, is the most worrisome problem related to the OSP usage.² The renal injury associated with OSP is termed as acute phosphate nephropathy or acute nephrocalcinosis

because it is caused by deposition of calcium-phosphate complex in distal renal tubules.⁴ Patients with age over 55, and those who are taking non-steroidal anti-inflammatory drugs (NSAIDs), angiotensin converting enzyme inhibitor (ACEI) and angiotensin receptor blockers (ARBs) are at higher risks of developing renal injury with the use of OSP. Therefore, the Food and Drug Administration (FDA) of United State, has issued a safety alert for OSP in 2008 and meanwhile asked the manufacturer to conduct a post-marketing trial to assess the safety issue of OSP usage.

Metformin, which belongs to biguanide group, is a very common and also effective anti-diabetic drug by acting on reduction of hepatic glucose output and increase of insulin-mediated glucose utilization in peripheral tissues. Currently, it is also the first line agent for diabetic patients who begin their blood sugar control. In addition to its gastrointestinal discomfort, the most severe, potentially fatal adverse effect is the development of lactic acidosis. The mortality rate for metformin-associated lactic acidosis (MALA) could be 45%.⁵ The mechanism for MALA is complex and not yet clearly understood. Patients with heart, liver or kidney disease, alcoholic and hypoxic, are more likely to develop MALA. To prevent MALA, it should be very cautious for men with serum Cr over 1.5 mg/dL, and women with serum Cr over 1.4 mg/dL.

Although the safety concern for diabetic patients who take OSP had been discussed, few report focused on the relationship between OSP and Metformin.⁶ This was not the first time for our patient to use OSP prior to colonoscopy. Major adverse effect has not been reported when OSP was used in patients on other diabetic drugs. In our patient, acute renal failure or dehydration after OSP may be a precipitating factor for MALA. Therefore, we think co-ingestion of OSP and metformin is a dangerous combination and should avoid in our daily practice even though metformin was not listed in FDA's notification.

In summary, it is mandatory for us to obtain complete medical and drug history when using OSP for bowel preparation. If OSP is not suitable, full-volume PEG in spit administration or low-volume PEG would be the safer and effective regimen for bowel preparation.⁷

References

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病例分析

一使用減糖敏錠的糖尿病患者在服用口服磷酸鈉清腸後發生乳酸中毒及急性腎衰竭 – 病例報告

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以口服磷酸鈉作為大腸鏡檢前的清腸準備已經被廣泛使用多年。然而，其使用上的安全性，特別是針對腎功能的傷害逐漸引起關注。我們報告一位使用減糖敏錠 (metformin) 為降血糖藥的糖尿病患者，在服用口服磷酸鈉作為大腸鏡檢前的清腸後，出現乳酸中毒及急性腎衰竭的狀況。雖經緊急血液透析後康復，此兩種藥物併用的安全性仍值得我們多加注意。

關鍵詞 乳酸中毒、急性腎衰竭、口服磷酸鈉、減糖敏錠。