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# Severe nausea and vomiting caused by composite potassium hydrogen phosphate injection

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## ABSTRACT

**Objective** By sharing a case of severe nausea and vomiting caused by parenteral nutrition, explore ways to improve the safety of parenteral nutrition infusion. **Methods** The causes of total parenteral nutrition for nausea and vomiting were analyzed by group infusion. **Results** After two days parenteral nutrition solution, the patient experienced nausea and vomiting. Through the design of the group, the patients were given fluids according to the group. Nausea and vomiting occurred again when the infusion was given to the compound potassium hydrogen phosphate injection and 0.9% sodium chloride injection group, and the infusion was stopped immediately for symptomatic treatment. After symptoms abate, patients continue to be infused with other medications, None of the above adverse reactions occurred again. **Conclusion** Considering that the patient's nausea and vomiting are related to complex potassium hydrogen phosphate, it is recommended to give separate infusion during parenteral nutrition therapy.

**Keywords:** Composite potassium hydrogen phosphate injection; Total parenteral nutrition; Severe vomiting

Compound potassium hydrogen phosphate injection is mainly used as a phosphorus supplement in parenteral nutrition [1]. Its main components are dipotassium hydrogen phosphate and potassium dihydrogen phosphate, which belong to high concentration electrolytes and have the effect of correcting hypophosphatemia [2]. Healthy adults need about 900mg of phosphorus per day, and they also expel the same amount each day. Phosphorus participates in sugar phosphorylation in sugar metabolism in human body, constitutes phospholipids in membrane components, and is one of the important components of ribonucleic acid(RNA), deoxyribonucleic acid (DNA) and

many coenzymes in cells [3]. Phosphorus is also involved in energy storage, conversion, transportation and the regulation of body fluid buffering [4]. Therefore, phosphorus supplementation is necessary for patients who cannot eat.

## 1 Clinical Data

1.1 Case Overview The patient, a 67-year-old female, was admitted to our hospital on July 6, 2023 for further treatment due to recurrence of ovarian cancer after surgery and chemotherapy. The patient had no history of drug or food allergy. Physical examination in hospital: temperature 36°C, pulse 99 times/min, breathing 22 times/min, blood pressure

115/73mmHg, weakness and poor spirit. The abdomen was puffy in appearance, without gastric type, intestinal type and peristaltic wave. The abdomen was soft, and there was light tenderness around the umbilical cord. There was no tenderness in the rest area. Laboratory examination on the second day of admission: total protein 54.3g/L, albumin 27.0g/L, sodium 128mmol/L, chlorine 97mmol /L, calcium 1.92mmol /L, magnesium 0.6mmol/L. Admission diagnosis: ovarian cancer; Esophageal cancer (after chemoradiotherapy); Hypoproteinemia; Electrolyte disturbance; Incomplete intestinal obstruction.

**1.2 Treatment Process** The patient was diagnosed with incomplete ileus, was forbidden to eat or drink, and was given total parent nutrition(TPN) support on day 2 of admission. Parenteral nutrition preparations included: 30% fat milk injection 250ml, 18AA compound amino acid injection 900ml, a variety of trace elements 10ml, 1 water-soluble vitamin, 10ml fat-soluble vitamin, 50% glucose injection 350ml, 15% potassium chloride injection 6g, compound potassium hydrogen phosphate injection 2ml, 10% sodium chloride injection 60ml, 10% calcium gluconate injection 1g, 25% magnesium sulfate injection 0.7g, insulin injection 30 units. The route of administration was intravenous drip. The frequency of administration was once a day. The patient experienced nausea and vomiting several times during the infusion of nutrient solution on day 1, which was not corrected After metoclopramide injection.

On the second day, 100mg of vitamin B6 was added to the total parenteral nutrition solution, and the symptoms of nausea and vomiting were aggravated. Then, ondansetron

injection of 8mg was injected intravenously, but with poor effect.

On the third day, the drugs in the nutrient solution were transfused in groups as follows:

Prescription 1:30% fat milk injection + water-soluble vitamin for injection + fat-soluble vitamin injection;

Prescription 2:10% glucose injection +50% glucose injection + insulin injection +15% potassium chloride injection + compound potassium hydrogen phosphate injection;

Prescription 3:0.9% sodium chloride injection +10% sodium chloride injection;

Prescription 4:25% magnesium sulfate injection +10% glucose injection;

Prescription 5:10% calcium gluconate injection +10% glucose injection;

Prescription 6: Compound amino acid 18AA injection +15% potassium chloride injection.

The patient entered the above prescriptions in turn, and when "prescription 1" was injected, the patient was normal. During the infusion of "Prescription 2", the patient had severe nausea and vomiting and immediately stopped the infusion. Meanwhile the patient was given 20mg metoclopramide by intramuscular injection. About 2 hours later, the patient returned to normal and continued to be injected with other nutrient solutions. The patient did not have any adverse reactions of nausea and vomiting later.

**2 Results** After the change of treatment regimen, the patient did not appear nausea and vomiting again, the condition was stable, the condition was good, and the indicators were better than before.

### 3 Discussion

**3.1 Relevance evaluation** On the third day, all nutrient solutions were no longer fully integrated and were administered separately

by group. When "Prescription 1" was injected, the patient was normal. During the infusion of "Prescription 2," the patient experienced severe nausea and vomiting. There was a time correlation between drug use and the occurrence of adverse reactions. When the patient returned to normal, the intravenous infusion of other groups of drugs continued and the patient did not develop the above adverse reactions. According to the evaluation standards of the National Adverse Drug Reaction Monitoring Center, the adverse reaction in this case belongs to serious adverse reaction [5]. According to the Naranjo adverse drug reaction score of 6 points, the correlation evaluation is very likely.

**3.2 Mechanism Analysis** Parenteral nutrition refers to the infusion of nutrients through an external intestinal pathway (i.e. an intravenous route). Nutrients include nutrients such as water, glucose, amino acids, fat milk, electrolytes, multiple trace elements and vitamins. Patients were divided into TPN and partial parent nutrition (PPN) according to the degree of satisfaction of nutritional needs [6]. For patients with gastrointestinal dysfunction and critical illness, reasonable parenteral nutrition support can improve their weight and muscle function, improve treatment responsiveness and patients' quality of life, effectively reduce the number of days in hospital, and reduce clinical complications and mortality [7]. Parenteral nutrition is a mixture of various nutritional drugs, which is an unstable system, and its stability is affected by pH, cation concentration, glucose concentration and other factors [8,9]. Parenteral nutrition has become an important nutritional therapy widely used in critically ill patients in clinical practice, but parenteral nutrition solution has been listed as a high

warning drug by the drug safety study in the United States. Improper use of parenteral nutrition may cause harm or even death to patients [10]. Parenteral nutrition solution contains a variety of drugs, each of which may cause adverse drug reactions. Common amino acid injection and magnesium sulfate injection can cause nausea and vomiting [11,12]. Through searching the databases of Chinese National Knowledge Internet (CNKI), Wanfang Database and Pubmed, it was found that most of the adverse reactions caused by parenteral nutrition were liver function injury and abnormal glucose and lipid metabolism [13], while severe nausea and vomiting caused by compound potassium hydrogen phosphate injection added to parenteral nutrition solution were rarely reported. This case suggests that severe nausea and vomiting in patients receiving parenteral nutrition solution may be caused by complex potassium hydrogen phosphate injection.

**3.3 Consult literature and drug instructions** It has been reported that there is compatibility reaction between complex potassium hydrogen phosphate and compound vitamin preparations [14]. In this case, when the patient was given parenteral total nutrition two days ago, the prescription contained water-soluble and fat-soluble vitamins, and the severe nausea and vomiting in the patient could not be ruled out as caused by the compatibility of complex potassium hydrogen phosphate with water-soluble and fat-soluble vitamins.

Referring to the instructions of compound potassium hydrogen phosphate injection and related literature, the routine usage and dosage of this drug is 2.5 ml per 1000 kcal. Excessive use of complex potassium hydrogen phosphate injection may cause hyperphosphemia,

hypocalcemia, muscle twitch, spasm, gastrointestinal discomfort, etc. In this case, the doctor calculated the conventional dose according to the patient's own situation by using the formula, there was no overuse, and the patient had serious nausea and vomiting symptoms, rather than mild symptoms of gastrointestinal discomfort. Therefore, this case is not the adverse reaction reported in the drug instructions, and clinical workers should be carefully considered when using it, especially when treating parenteral total nutrition, to reduce the occurrence of such adverse events as much as possible.

#### 4 Summary

When TPN needs to add compound potassium hydrogen phosphate, the pharmacist recommends separate infusions. For patients requiring phosphorus supplementation through parenteral nutrition, organophosphorus preparations (sodium glycerophosphate) are recommended. Organophosphorus preparations have lower dissociation degree in solution, can ensure compatibility and stability with some electrolytes (calcium, magnesium, potassium, sodium plasma) within a large concentration range, and greatly reducing the impact on the stability of parenteral nutrient solution [15].

#### reference

[1] Filippini T, Naska A, Kasdagli MI, et al. Potassium Intake and Blood Pressure: A Dose-Response Meta-Analysis of Randomized Controlled Trials. *J Am Heart Assoc.* 2020;9(12):e015719.

[2] 张建群. 低磷血症在危重症患者中的临床意义及研究进展 [J]. *中国现代药物应用*, 2014,8(12):86.

[3] Adu-Afarwuah S, Arnold CD, Lartey A, et al. Prevalence of morbidity symptoms among pregnant and postpartum women receiving different nutrient supplements in Ghana and Malawi: A secondary outcome analysis of two randomised controlled trials. *Matern Child Nutr.*

2023;19(3):e13501.

[4] Santander Ballestín S, Giménez Campos MI, Ballestín Ballestín J, Luesma Bartolomé MJ. Is Supplementation with Micronutrients Still Necessary during Pregnancy? A Review. *Nutrients.* 2021;13(9):3134.

[5] 国家食品药品监督管理局和卫生部. 药品不良反应报告和监测管理办法 [S]. 卫生部令第 81 号。

[6] 陈小红, 袁少筠, 余丽娴等. 我院 3143 例肠外营养不合理处方分析 [J]. *中国现代药物应用*, 2018,12(12):213-215. DOI:10.14164/j.cnki.cn11-5581/r.2018.12.122

[7] 解晓帅, 张凤莹, 穆殿平. 持续质量改进在提高全肠外营养混合液临床输注安全性的应用 [J]. *中国医院药学杂志*, 2019,39(17):1804-1807.

[8] 李尧, 李晓明, 宋艳梅等. 我院 5770 份肠外营养医嘱药物稳定性和选药合理性分析 [J]. *中国药房*, 2017,28(20):2754-2757.

[9] 钱颖翔, 曾潇, 田雨舟等. 某三甲医院胃肠外科肠外营养处方的合理性分析 [J]. *中南药学*, 2018,16(11):1626-1630.

[10] 中华医学会肠外肠内营养学分会. 标准与规范 - 规范肠外营养液配制 [J]. *中华临床营养杂志*, 2018,26(3): 72-78.

[11] Fernández-Quintela A, Milton-Laskibar I, Trepiana J, et al. Key Aspects in Nutritional Management of COVID-19 Patients. *J Clin Med.* 2020;9(8):2589.

[12] Lambert K, Bird L, Borst AC, et al. Safety and Efficacy of Using Nuts to Improve Bowel Health in Hemodialysis Patients. *J Ren Nutr.* 2020;30(5):462-469.

[13] Leszkowicz J, Plata-Nazar K, Szlagatys-Sidorkiewicz A. Can Lactose Intolerance Be a Cause of Constipation? A Narrative Review. *Nutrients.* 2022;14(9):1785. Published 2022 Apr 24.

[14] 黄铮, 郭静. 复方维生素与复合磷酸氢钾存在配伍禁忌 [J]. *中华现代护理杂志*, 2010,16(24):2967.

[15] 金仙梅, 赵宇飞, 常健等. 肠外营养液中添加复合磷酸氢钾致严重过敏反应 1 例 [J]. *儿科药学杂志*, 2019,25(11):65-66.