Abstract

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An unresolved iatrogenic hypomagnesemia

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Background

Many drugs can cause an imbalance in plasma magnesium levels, among these the best known are: diuretics, proton pump inhibitors, antibiotics. Proton-pump inhibitor-induced hypomagnesemia (PPIH) is a well-recognized phenomenon. While many observational studies and meta-analyses have confirmed this association, there are no prospective controlled studies to support causation[1].

Case history

A 75-year-old female with diabetes mellitus, hypertension, CAD and nephrolithiasis, after multiple hospitalizations for vomiting and hydro-electrolyte imbalance without organic cause and poorly responsive to therapy (PPI, antiemetics, prokinetics), went to ED for a similar episode. The laboratory tests showed severe hypomagnesemia and hypokalemia. Diagnostic exams (EGDS, chest-abdomen CT, brain-abdomen MRI) were negative for an acute disease. We hypothesized PPI therapy as the trigger of electrolyte imbalance, so we replaced pantoprazole with famotidine and treated the patient with hydrating support, with normalization of the tests and improvement of the clinical picture.

Discussion

PPIH is not due to renal magnesium wasting, but rather decreased gastrointestinal absorption mediated by the pH-dependent regulation of transient receptor potential melastatin-6/7 transporters (TRPM6/7) in the colonic enterocyte, as well as in a lesser way in the small intestine by which the increase of the luminal pH of the small intestine and of the transepithelial electrical resistance (TEER) due to the reduction of claudine - 7 and - 12 (CLDN-7 and −12). Futhermore it must supposed also a complex interplay of molecular biology, pharmacology, and genetic predisposition, as well as an altered composition of the gut microbiome due to PPIs[2]. Treatment duration (>1 year) and daily dose are important contributing factors for the development of PPIH. To date, the cornerstone of hypomagnesemia treatment is still PPI withdrawal. However, this is not possible for patients who are dependent on PPIs. Alternative treatment options, such as oral Mg2+ supplementation or the use of different acid suppressants, are less effective. The gut microbiome might be a novel target to ameliorate PPI-induced side effects using prebiotic strategies. We need further studies and a more in-depth understanding of the mechanisms relating PPIs to hypomagnesaemia to correct this not so rare although little known phenomenon.

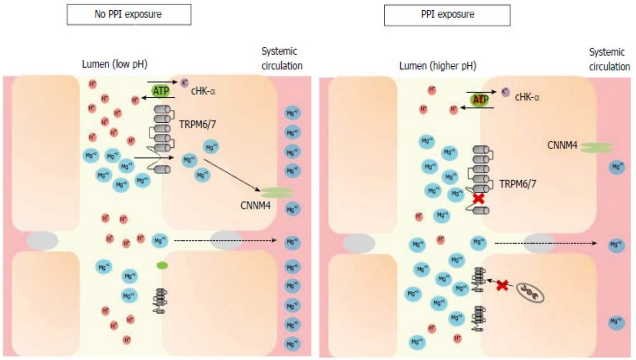

Figure 1: TRPM6/7 affinity for magnesium decreases in a higher pH environment mediated by PPIs. While this may trigger mRNA transcription of TRPM6 channels in most individuals, hypomagnesemia may develop when this compensation is incomplete or the individual has additional risk factors.

References

1. Park CH, Kim EH, Roh YH, Kim HY, Lee S,et al. The association between the use of proton pump inhibitors and the risk of hypomagnesemia: a systematic review and meta-analysis.
2. Gommers LMM, Hoenderop JGJ, de Baaij . Mechanisms of proton pump inhibitor-induced hypomagnesemia. Acta Physiol .