

PROTON PUMP INHIBITOR-INDUCED HYPOMAGNEAEMIA IN HEMODIALYSIS PATIENTS AND ITS PREDICTIVE FACTORS

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INTRODUCTION: Long-term use of proton pump inhibitors (PPIs) has been reported in association with low serum magnesium (sMg) levels, which in turn may cause serious adverse events, including tetany, cardiac arrhythmias, tremors and seizures. Furthermore, clinical studies have shown that hypomagnesaemia is associated with vascular calcification and cardiovascular mortality among patients with end-stage renal disease (ESRD). However, limited data are available regarding the impact of extensively used PPIs on sMg in ESRD patients undergoing maintenance hemodialysis (HD).

AIM OF THE STUDY: The present study was performed to prospectively evaluate PPI-induced hypomagnesaemia in HD patients and detect potential predictive factors.

PATIENTS AND METHODS:

- Eighteen stable HD patients, male/female 13/5, aged 68.5 (39-89) years, dialyzed for 118.5 (22-348) months were included in the study.
- Eleven patients received conventional HD and 7 hemodiafiltration (HDF). Thrice weekly HD/HDF session length was 4-5 hours. Dialysate Mg concentration was 0.5 mEq/L.
- Ten out of 18 patients, median age 71 (56-89), were on PPI, omeprazole, at a dose of 20 mg once daily, already for 25 (14-48) months at baseline (PPI group) and the remaining patients, median age 61.5 (39-78), were PPI free (no PPI group).
- Follow-up period was 14 months.
- No patient was receiving Mg-containing phosphate binders. In both groups half of the study patients were on cinacalcet and/or paricalcitol throughout the follow-up period.
- Biochemistry measurements including sMg, serum calcium (Ca), phosphorus (P), parathyroid hormone (PTH) and alkaline phosphatase (ALP) were performed monthly and HD adequacy was determined at the same intervals by urea reduction ratio (URR) and single-pool KT/V (spKT/V).

Table: Patients characteristics

Number of patients	18
Male/female	13/5
Age (median, range) years	68.5 (39-89)
Dialysis vintage (median, range) months	118.5 (22-348)
HD/HDF	11/7
PPI/no PPI	10/8
Duration of PPI treatment at baseline (median, range) months	25 (14-48)
Primary renal disease:	
Diabetic nephropathy	2
Chronic glomerulonephritis	2
Interstitial nephropathy	3
Polycystic kidney disease	4
Unknown nephropathy	7

RESULTS:

- sMg levels were found lower in the PPI group throughout the study compared to the no PPI group and this difference was statistically significant in months 1, 5 and 10 (2.19±0.28 vs 2.51±0.54 mg/dL, p=0.002, 1.91±0.33 vs 2.40±0.24 mg/dL, p=0.002 and 2.11±0.20 vs 2.41±0.29 mg/dL, p=0.02, respectively), whereas no significant difference was found in the other studied parameters, including Ca and PTH.
- In both groups, no significant changes were detected during the study period in all measured parameters, with the exception of PTH that was significantly higher by the end compared to baseline (282.50±121.65 vs 551.67±215.10 pg/mL, p=0.002 for PPI group and 178.21±114.14 vs 453.62±288.80 pg/mL, p=0.01 for no PPI group).
- URR > 75% and spKT/V > 1.5 were found in the PPI group, while in the no PPI group > 70% and > 1.4, respectively, throughout the study.
- No significant differences were noted in sMg and the other studied parameters between the two groups when analyzed according to sex (male or female), HD modality (conventional HD or HDF) and cinacalcet or paricalcitol use.

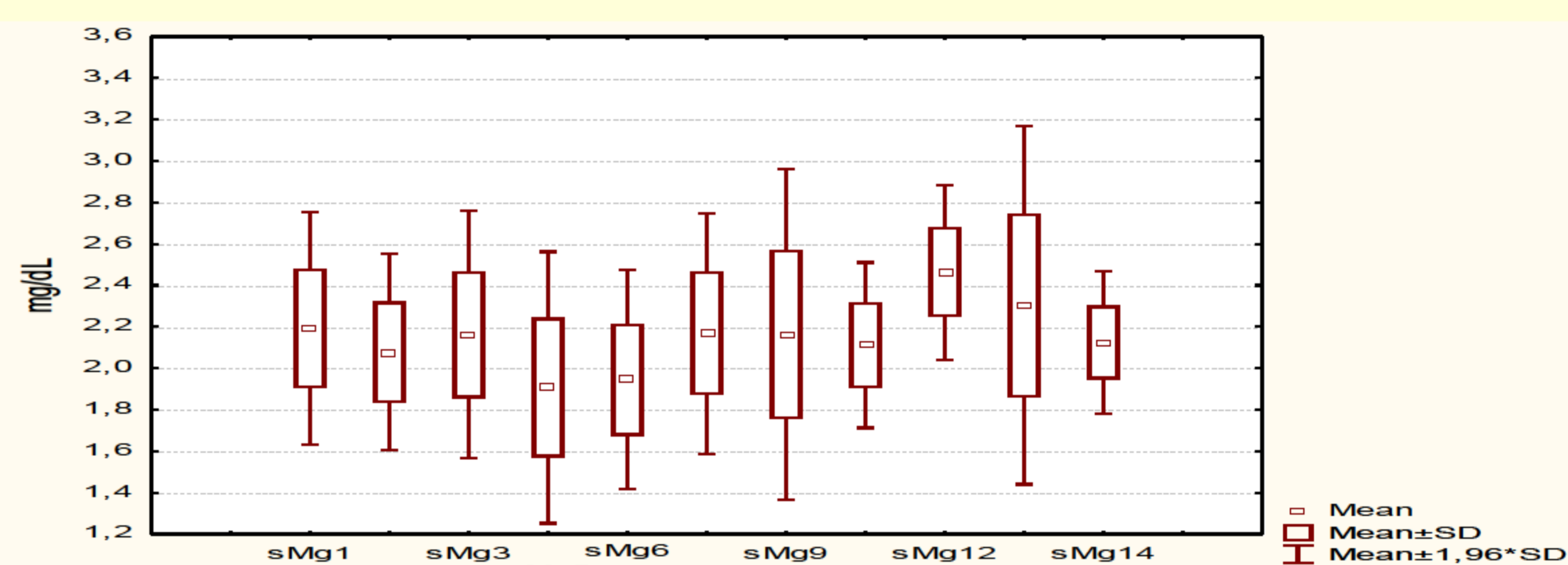


Fig 1: Serum magnesium levels throughout the study in the PPI group

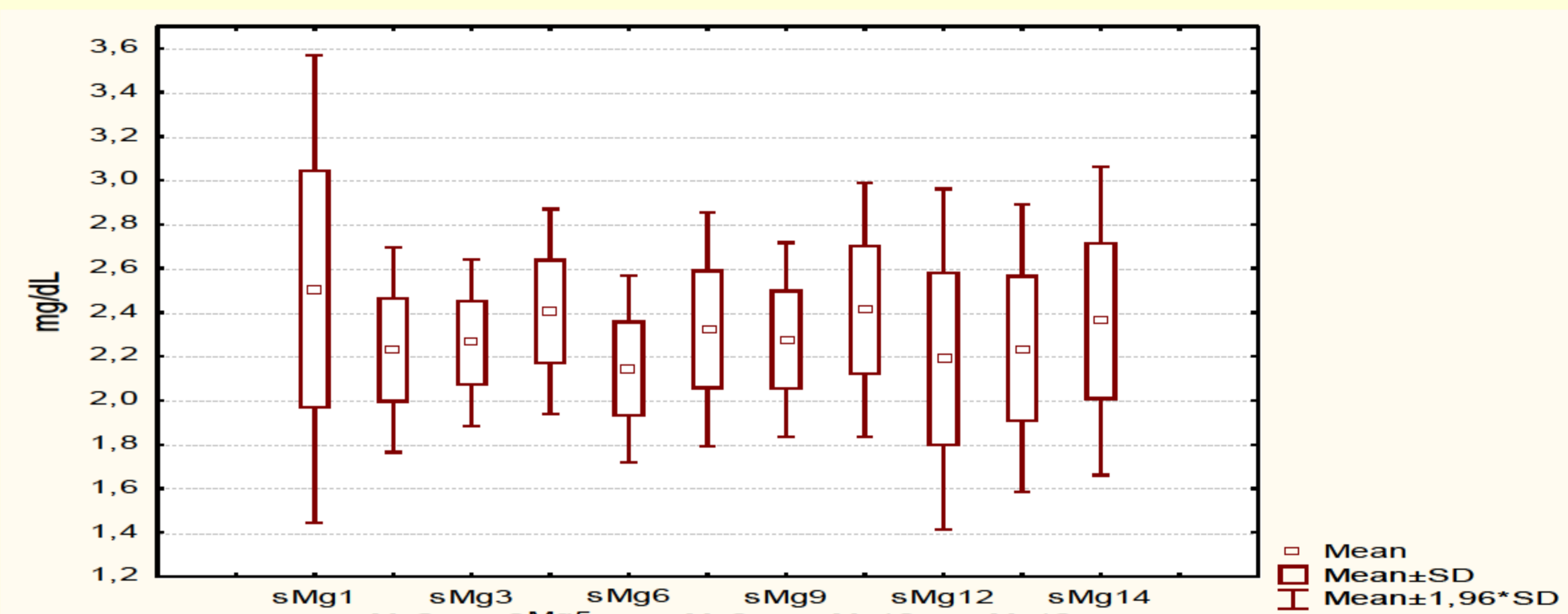


Fig 2: Serum magnesium levels throughout the study in the no PPI group

CONCLUSIONS:

Long-term PPI use was associated with variably lower sMg levels in HD-HDF patients without significant differences in serum Ca and PTH levels. This association appears to be independent of factors such as sex, HD adequacy and modality as well as cinacalcet or paricalcitol use.

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