MAGNESIUM METABOLISM IN HEMODIALYSIS VERSUS PERITONEAL DIALYSIS PATIENTS: A PILOT STUDY

Vassilis Filiopoulos[1], Dimitra Biblaki[1], Nikolaos Manolios[1], Ioannis Karatzas[2], Dimitrios Arvanitis[1], Dimosthenis Vlassopoulos[1]

[1]Nephrology and [2]Biochemistry Department, "Sismanogleion-Amalia Fleming" General Hospital, Athens, Greece

INTRODUCTION: Serum magnesium (sMg) levels are variable among end-stage renal disease (ESRD) patients on dialysis, determined by dietary intake, medications, residual renal clearance and dialysate Mg concentration. Furthermore, clinical studies have shown that lower Mg is associated with vascular calcification and cardiovascular mortality in this patient group. However, limited data are available regarding sMg metabolism under different dialysis modalities.

AIM OF THE STUDY: The present study evaluated Mg homeostasis in hemodialysis (HD) versus peritoneal dialysis (PD) patients.

PATIENTS AND METHODS:

- Thirty-four stable HD patients and 12 PD patients were included in the study. Baseline patient characteristics are reported in Table I.
- In the HD group, 25 patients received conventional HD and 9 hemodiafiltration (HDF). Thrice weekly HD session length was 4-5 hours.
- In the PD group, 3 patients were on continuous ambulatory PD (CAPD) and 9 on automated PD (APD) plus one daily exchange.
- Dialysate Mg concentration was 0.5 mmol/L in both HD and PD methods.
- Residual renal function was negligible (<100mL/24h) in both groups.
- PPI, omeprazole, at a dose of 20 mg once daily, was administered as in Table I.
- Follow-up period was 3 months for both groups.
- No patient was receiving Mg-containing phosphate binders.
- Biochemistry measurements including sMg, serum calcium (Ca), phosphorus (P), parathyroid hormone (PTH) and alkaline phosphatase (ALP) were performed monthly and dialysis adequacy was determined at the same intervals by single-pool KT/V (spKT/V) for HD and total weekly KT/V urea for PD patients.

Table I: Baseline patient characteristics

	HD patients	PD patients
Number of patients	34	12
Male/female	24/10	7/5
Age (median, range, years)	67 (25-89)	63 (43-82)
Time on dialysis (median, range, months)	93 (6-373)	44 (6-100)
Conventional HD/HDF or CAPD/APD	25/9	3/9
Dialysate Mg (mmol/L)	0.5	0.5
PPI/NO PPI	18/16	7/5

- Standardized KT/V per week was calculated for HD patients to allow comparison with their PD counterparts.
- Mean values of the 3 monthly measurements were compared for all the studied parameters.

RESULTS:

- Main baseline demographics were similar in the two groups, with the exception of dialysis vintage that was significantly higher in HD group.
- Mean sMg levels were found significantly higher in the HD group compared to PD group (2.27±0.21 vs 1.86±0.51 mg/dL, p<0.001).
- Mean PTH was also significantly higher in the HD group compared to PD group (307.73±178.79 vs 172.80±104.81 pg/mL, p=0.01).
- Dialysis adequacy was better in HD group (standardized KT/V 2.5±0.3 vs weekly KT/V 2.2±0.5, p=0.01).
- No significant difference was found in the other studied parameters between the two groups (HD vs PD; mean Ca: 9.06±0.54 vs 9.2±0.47 mg/dL, mean P: 4.59±1.00 vs 4.00±0.66 mg/dL, mean ALP: 232.41±83.96 vs 265.27±103.16 U/L).
- Significantly lower mean sMg levels were found in patients on PPI compared to PPI free patients (2.03±0.39 vs 2.32±0.24 mg/dL, p=0.006) independent of dialysis modality, whereas no significant difference was found in the other studied parameters of these patients.
- No significant differences were noted in sMg and the other studied parameters between men and women, CAPD/APD and HD/HDF patients.

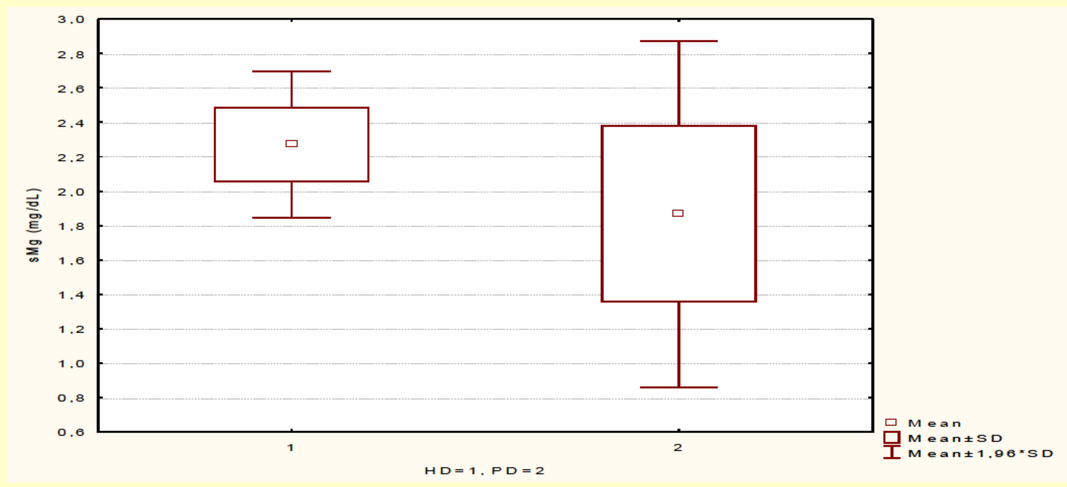

Fig.1: Mean sMg in both groups

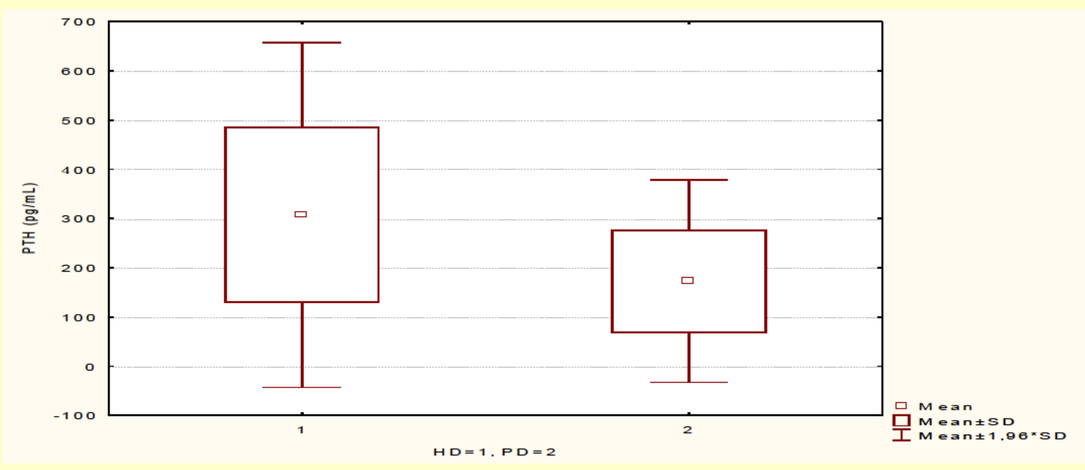

Fig.2: Mean PTH in both groups

CONCLUSIONS:

HD patients have higher sMg and PTH levels compared to PD patients without significant differences in other parameters of bone metabolism. This difference in sMg appeared to be independent of factors such as sex and HD or PD submodality. PPI use was associated with lower sMg in both dialysis methods. Dietary limitations in the PD group could explain lower SMg levels and would suggest oral supplementation or higher dialysate concentrations.

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DOI: 10.3252/pso.eu.51era.2014