

Lower Serum Magnesium 1-Year Posttransplantation Is Associated with Prolonged Use of Proton Pump Inhibitors and Decreased Graft Survival in Renal Transplant Recipients

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Introduction

Hypomagnesaemia is a known side effect of immunosuppressive regimen, especially calcineurin inhibitors, and has been associated with new onset diabetes after transplantation (NODAT), decreased graft survival in chronic cyclosporine nephrotoxicity and vascular stiffness. Proton pump inhibitors-induced hypomagnesaemia has been described recently, although its relevance in renal transplant recipients is still unknown.

Methods

We conducted a single center cross-sectional retrospective study of renal transplantations performed between 2006 and 2011 in order to evaluate the impact of low serum magnesium (Mg) levels in patient and graft outcomes. Serum Mg levels 1-year after renal transplantation were available for 316 patients. Patients were split into four groups, based in serum Mg levels. Lower serum magnesium group (Mg < 1.57 mg/dL) was compared with higher magnesium group (Mg > 1.97 mg/dL).

Qui-square test was used to compare categorical and ANOVA for continuous variables. Graft survival were determined using Kaplan-Meier and Cox multivariate regression, adjusted for receptor and donor age, presence of acute rejection, type of donor, diabetes, NODAT and immunosuppressive regimen.

Results

The patients were followed for a median of 1062 days (range, 284 – 2287). Baseline characteristics and outcomes of the patients in the low and high Mg groups are showed in Table 1.

Table 1. Comparison between low and high Mg groups.

	Low Mg group	High Mg group	p
Age, years	45.3 ± 10.9	38.6 ± 12.9	NS
Male	45%	56%	NS
Etiology of CKD			NS
Chronic glomerulonephritis	41%	42%	
Diabetic nephropaty	8%	8%	
Nephroangiosclerosis	15%	13%	
Polycystic kidney disease	10%	4%	
Caucasian	65%	69%	NS
Diabetes	23%	19%	NS
NODAT	27%	18%	NS
Donor age	39 ± 11	41 ± 11	NS

Data are percentages or mean ± SD, unless otherwise indicated.

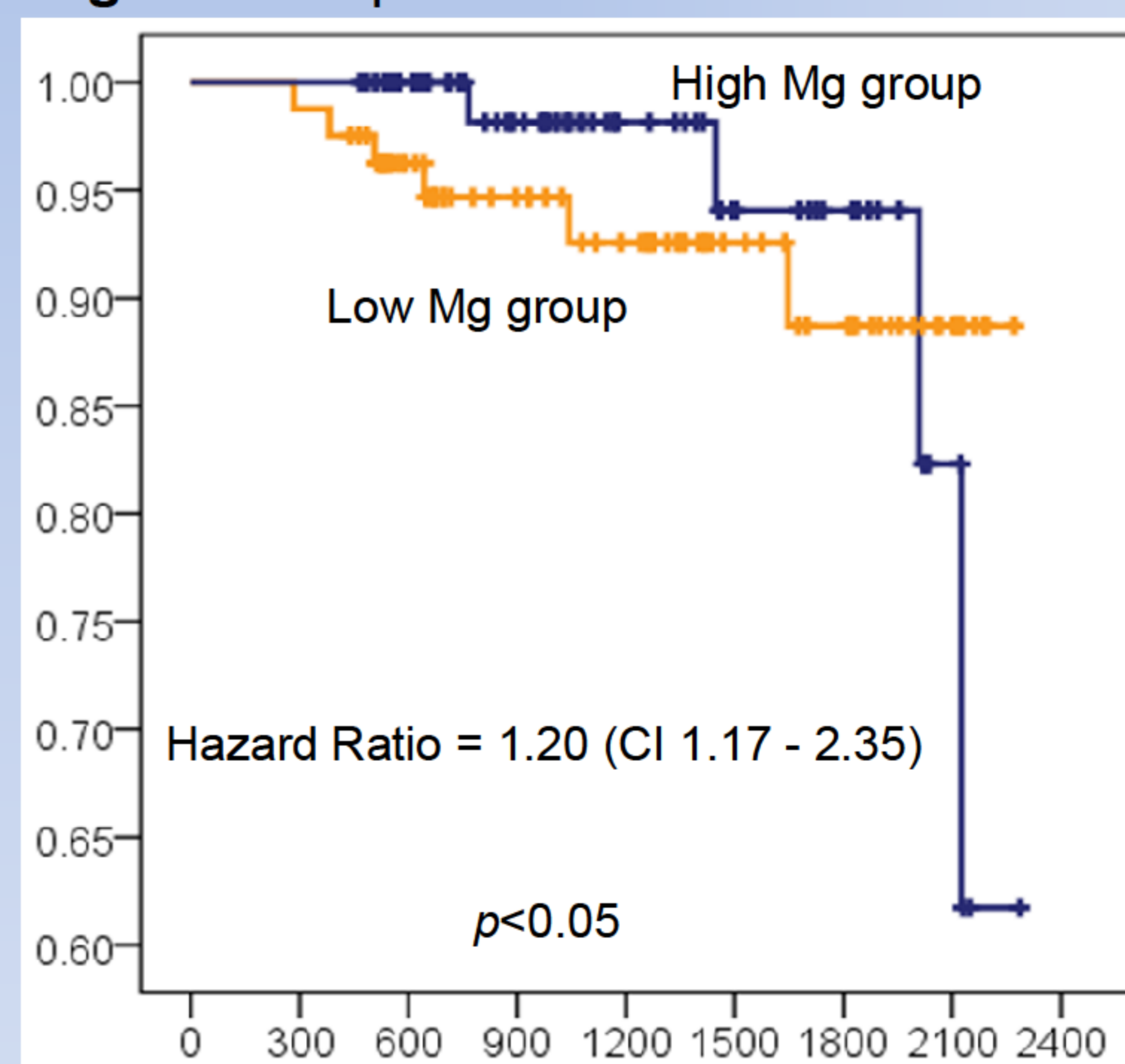
Table 1 (CONT). Comparison between low and high Mg groups.

	Low Mg group	High Mg group	p
Induction therapy			NS
IL2R antagonist	47%	59%	
Lymphocyte-depleting antibodies	36%	29%	
Immunosuppressive regimen			NS
Mycophenolic acid	70%	64%	
Cyclosporine A	1%	7%	
Tacrolimus	87%	88%	
Sirolimus	5%	7%	
Tacrolimus trough level	8.0 ± 4.3	4.7 ± 3.7	<0.001
PPI 1 year post-transplantation	90%	81%	0.04
Serum Cr 1 year post-transplantation (mg/dL)	1.38 ± 0.6	1.66 ± 1.22	NS
GFR 1 year post-transplantation (mL/min/1.73m ²)	59 ± 21	60 ± 53	NS
Delayed graft function	43%	37%	NS
Acute Rejection	16%	23%	NS

Data are percentages or mean ± SD, unless otherwise indicated.

The Kaplan-Meier curves of graft survival are showed in the Figure 1. Using Cox multivariate regression analyses, adjusted for recipient age, donor age and type, immunosuppressive regimen, diabetes, NODAT and presence of acute rejection, graft survival was significantly reduced in the low Mg group after 4.6 years posttransplantation (p=0.001).

Figure 1. Kaplan-Meier survival curves.



Conclusions

Hypomagnesaemia 1-year posttransplantation is associated with prolonged PPI use and with decreased graft survival.

PPI are an overlooked factor for magnesium loss.

Magnesium depletion might be involved in the mechanisms of calcineurin inhibitors toward fibrosis and chronic allograft injury.

