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Metabolic Syndrome and Hemoglobin Levels in the Elderly: The InCHIANTI Study

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Abstract

Objectives—Metabolic syndrome (MetS) has been associated in middle-aged populations with inflammation and adverse outcomes, including mortality, morbidity and loss of functional ability; data regarding older subjects, where MetS is highly prevalent, are scanty and often conflicting. Low hemoglobin levels are associated with subclinical inflammation and frailty in older populations. The aim of the study was to assess the association of MetS with hemoglobin levels in older subjects.

Design—The Invecchiare in Chianti (InCHIANTI) Study, a cohort study with a six-year follow-up.

Setting—Tuscany, Italy.

Participants—Adults aged 65 and older (N = 1,036).

Measurements—MetS was diagnosed according to the National Cholesterol Education Program's ATP-III criteria. The adjusted association between baseline hemoglobin and MetS was assessed by multivariable linear regression using hemoglobin as a continuous variable, and by logistic regression using the median hemoglobin level as reference. Logistic regression was also performed having any incident decline in hemoglobin levels as dependent variable.

Results—MetS was diagnosed in 263/1,036 (25%) participants. At baseline, MetS was associated with higher hemoglobin levels (B=.18, 95% CI .03-.33; P=.022), and with hemoglobin levels above the median value (OR=1.65, 95% CI 1.17-2.32; P=.004), after adjusting. After six

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Author's Contributions AL and RAI carried out the study and data analyses, and drafted the manuscript. AL and AG carried out the samples analyses. AL and RAI participated in the design of the study and performed the statistical analysis. SB and LF conceived of the study, and participated in its design and coordination and helped to draft the manuscript. All authors read and approved the final manuscript.

years, MetS was associated with reduced adjusted probability of decreased hemoglobin levels (OR=.34, 95% CI .15-.79; P=.012), but only in the oldest tertile of participants.

Conclusion—MetS is associated with higher hemoglobin levels in older subjects, and with reduced probability of hemoglobin loss over six years among those in the oldest age group.

Keywords

Metabolic syndrome; hemoglobin; elderly; frailty; epidemiology

INTRODUCTION

The metabolic syndrome (MetS), a highly prevalent condition in the elderly,¹ is associated with potentially reversible risk factors and with cardiovascular and cerebrovascular morbidity and mortality.² MetS is also associated with inflammation and hormonal dysfunction,^{3,4} which in turn are involved in the pathogenesis of anemia.

Low hemoglobin levels are common in older subjects,⁵ and herald several adverse outcomes like mortality, disability and hospitalization.⁶⁻¹¹ Overall, in advanced age anemia might be related to frailty.¹² Indeed, the mortality risk gradient decreases with increasing hemoglobin levels, even within the World Health Organization normal hemoglobin range, suggesting that “optimal” hemoglobin levels are desirable in older populations.¹³

This study aimed at assessing the association, if any, between hemoglobin levels and MetS in a community-dwelling older population.

METHODS

Participants

The present study is based upon data from the “Invecchiare in Chianti” (Aging in the Chianti Area, InCHIANTI) study, a prospective population-based study of older persons in Tuscany, Italy.¹⁴

The Italian National Research Council on Aging Ethical Committee ratified the study protocol, and participants provided written consent to participate.

At baseline, analyses included 1,036 participants aged 65 +, as 119 participants had been excluded because of missing data. After the six-year follow-up, data were available for 652 subjects (as 102 were deceased, 93 had missing data for the study variables, and 189 were lost to follow-up).

Metabolic syndrome

The metabolic syndrome was defined according to the National Cholesterol Education Program’s ATP-III criteria, adding use of hypolipemic, hypoglycaemic, and antihypertensive medications. The diagnosis was defined by three or more of the following features: waist circumference > 88 cm in women and > 102 cm in men; fasting serum

triglycerides 150 mg/dL; serum HDL < 50 mg/dL in women and < 40 mg/dL in men; blood pressure 130/85 mmHg; fasting blood glucose levels 110 mg/dL.¹⁵

Covariates

Education was expressed as years of school attendance. Smoking was self-reported, and expressed as total lifetime pack-years (packs smoked per day)*(years of smoking). Current alcohol consumption was evaluated as glasses of wine per week.¹⁶

Diseases were ascertained by experienced clinicians according to pre-established criteria that combined information from self-reported physician diagnoses, current pharmacologic treatment, medical records, clinical examinations, and blood tests. Diagnostic algorithms for diseases were modified versions of those created for the Women's Health and Aging Study.¹⁷ Drugs were coded according to the Anatomical, Therapeutic, and Chemical codes.¹⁸

Data on dietary intake were collected by the questionnaire created for the European Prospective Investigation into Cancer and nutrition (EPIC) study.¹⁹

Blood samples were obtained from participants after 12-hour fasting and after resting for at least 15 minutes. Aliquots of serum were stored at -80°C and were not thawed until analyzed. Hemoglobin levels were analyzed within 6 hours using the haematology autoanalyzer DASIT SE 9000 (Sysmex Corporation, Kobe, Japan). Commercial enzymatic tests (Roche Diagnostics) were used for determining serum total cholesterol (TC), triglycerides (TG), and HDL-C concentrations. Serum levels of interleukin-6 were measured in duplicate by high-sensitivity enzyme-linked immunosorbent assay using commercial kits (Biosource International). The lowest detectable concentration was 0.1 pg/mL. Folate and vitamin B₁₂ serum levels were measured by a radioimmunoassay (ICN Pharmaceuticals). The minimum detectable concentrations were 1.3596nM (0.6 ng/mL) for folate and 18.445pM (25 pg/mL) for vitamin B₁₂. Serum ferritin was measured in duplicate using chemiluminescent immunoassays (Abbott Diagnostics and Nichols Institute Diagnostics). The minimum detectable concentration was 5 ng/mL. Circulating iron was assessed by a colorimetric assay (Roche Diagnostics GmbH), having a sensitivity of .895μM (5 μg/dL) and an interassay CV less than 3%. Glomerular Filtration Rate was estimated using the Cockcroft-Gault equation. Plasma osmolality was calculated using the following formula: $2[\text{Na}^+] + [\text{Glucose}]/18 + [\text{BUN}]/2.8$.

Statistical analyses

Statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS for Windows version 17.0, 2008, SPSS Inc., Chicago, IL); differences were considered significant at the $P < .050$ level. Data of continuous variables are presented as mean values $\pm$ standard deviation (SD). Analysis of variance for normally distributed variables according to MetS was performed by ANOVA comparisons; otherwise, the nonparametric Kruskal-Wallis H test was adopted. Chi-square analysis was used for dichotomous variables. Serum IL-6, ferritin, and vitamin B12 levels were analyzed after log transformation.

Cross sectional analyses—Linear regression analysis was used to estimate the association of variables of interest, including MetS, with baseline hemoglobin levels. Independent correlates of hemoglobin levels were identified first by testing groups of variables (demographics, comorbid conditions, medications, and objective tests, as depicted in Table 1) using separate age- and sex-adjusted regression models. Then, variables significant at the $P < .050$ level in these initial models (Table 2) were simultaneously entered into a summary model (Table 2). In addition, the summary set of covariates was analyzed using a logistic regression model, having baseline hemoglobin levels above the median value as the dependent variable.

Alternative linear and logistic regression models were generated after introducing body mass index (BMI) instead of MetS to avoid collinearity.

Longitudinal analyses—Logistic regression analysis was adopted to assess the association between decreased hemoglobin levels after the six-year follow-up and MetS, adjusting for potential confounders as in the summary linear regression model; this model was also adjusted for baseline hemoglobin levels and the variations in serum osmolality (Table 3). Linear regression was adopted to assess the adjusted association of MetS with the variations in hemoglobin; the same model was obtained in participants having reduced hemoglobin levels at the follow-up. These models were also analyzed after stratifying for age tertiles.

As for cross sectional analyses, alternative linear and logistic regression models were generated after introducing body mass index (BMI) instead of MetS. Kaplan-Meier analysis with Log Rank test was performed to assess whether selective survival by MetS, age, and sex might affect results.

RESULTS

The main characteristics of participants according to diagnosis of MetS are shown in Table 1. MetS was found in 263/1,036 (25%) participants; it was more prevalent in women (181/580, 31%) than in men (82/456, 18%; Fisher exact $P < .0001$). At baseline, the median value of hemoglobin levels was 14.6 g/dL in male, and 13.2 g/dL in female participants.

Women with MetS had higher baseline hemoglobin (13.3 ± 1.2 v.s. 13.0 ± 1.1 g/dL, $P = .027$). The difference was not significant in men (14.6 ± 1.5 v.s. 14.4 ± 1.4 g/dL, $P = .290$). After the six-year follow-up, hemoglobin levels decreased in 310/652 (47.5%) participants, without any differences between participants with and without MetS.

The median values of age tertiles at baseline were 68 ± 2 years ($n = 343$); 73 ± 2 years ($n = 316$); and 83 ± 5 years ($n = 377$). After the six-year follow-up, the original tertiles included 272, 224, and 156 participants, respectively.

Main characteristics of participants according to MetS status

Participants with MetS, as compared with others, reported less frequent alcohol consumption, and had higher estimated creatinine clearance and baseline osmolality.

Noticeably, they also reported less frequent consumption of food rich in iron, proteins and folic acid, had more prevalent diagnosis of heart failure, dysthyroidism and history of cancer; also, they reported a more prevalent use of angiotensin-converting enzyme inhibitors, antiplatelets, and anticoagulants, and presented higher interleukin 6 levels (Table 1). At baseline 25% of Meets, and 24% of non-MetS participants reported a reduction in their body weight over the last year.

Multivariable analyses

At baseline in the initial linear regression models, age, female sex, peptic disease, use of angiotensin-converting enzyme inhibitors and serum erythropoietin were associated with lower baseline hemoglobin at a $P < .050$ level, while chronic pulmonary disease, MetS, serum proteins, serum iron and glomerular filtration rate were significantly associated with higher hemoglobin (Table 2). Adjusting for all these potential confounders in the summary model (Table 2), MetS was associated with higher baseline hemoglobin ($B = .18$, 95% CI = $-.03 - .33$; $P = .022$). Results of linear regression were confirmed by logistic regression, using hemoglobin above the median value as the dependent variable (OR = 1.65; 95% CI = 1.17-2.32; $P = .004$).

At follow-up, MetS was not associated with decreased hemoglobin levels (OR = .80; 95% CI = .53 - 1.20; $P = .282$) (Table 3). However, when this fully adjusted logistic regression model was analyzed in the oldest age tertile (Table 3), MetS was associated with reduced probability of decreased hemoglobin (OR = .34, 95% CI = .15 - .79; $P = .012$). No significant association was found in other participants (OR = .89, 95% CI = .46 - 1.71; $P = .725$ in the youngest tertile, and OR = 1.10, 95% CI = .51 - 2.36; $P = .804$ in the median age tertile).

According to linear regression, MetS was not associated with variations in hemoglobin ($B = -.28$, 95% CI = $-.28 - .15$; $P = .539$) in the whole sample, nor in any age tertiles. Among participants who experienced hemoglobin decline, MetS was associated with lesser decrease ($B = -.34$, 95% CI = $-.62 - -.08$; $P = .015$), but such an association depended upon the oldest tertile only ($B = -.88$, 95% CI = $-1.51 - -.24$; $P = .008$); indeed, no association was found in others ($B = -.37$, 95% CI = $-.87 - .14$; $P = .153$ in the youngest tertile, and $B = -.10$, 95% CI = $-.51 - .31$; $P = .620$ in the median age tertile). At baseline, in the final linear and logistic models using BMI instead of MetS, BMI was associated with higher hemoglobin levels ($B = .05$, 95% CI = $.03 - .07$; $P < .0001$) and with hemoglobin levels above the median value (OR = 1.65, 95% CI = 1.17 - 2.32; $P = .004$); however, the effect size of BMI was lower than that of MetS. No significant association was found at the follow-up either in the whole population (OR = 1.02, 95% CI = .97 - 1.08; $P = .415$) or in the oldest age tertile (OR = 1.08, 95% CI = .96 - 1.20; $P = .184$).

According to Kaplan-Meier analysis, death rates were not affected by MetS (log rank $P = .879$), age tertiles (Log Rank $P = .076$), nor sex (Log Rank $P = .601$).

DISCUSSION

Present results indicate that MetS is associated with higher hemoglobin levels in the elderly, adjusting for socio-demographic and anthropometric data, comorbidity and laboratory

parameters. In addition, among the oldest participants MetS is independently associated with reduced probability of decreasing hemoglobin levels over a six-year period. These findings might be clinically relevant, as in frail older populations even hemoglobin levels higher than those considered diagnostic for anemia according to the WHO criteria (i.e. levels in the lower range of normality) are associated with increased risk of adverse outcomes.¹⁴ MetS was diagnosed in 25% of the InCHIANTI community-dwelling elderly. The adverse effect of MetS observed in middle-aged subjects has not been confirmed in older populations; indeed, MetS has been associated with better cognitive functioning and quality of life in older men.^{20,21} However, we could not find previous studies on the relationship between MetS and hemoglobin levels. This hinders a comparative analysis of our finding of an association between MetS and higher hemoglobin levels, as well as of a reduced probability of hemoglobin decline among the oldest and frailest participants. These findings might pertain to the field of the so-called “reverse epidemiology”.²² This term refers to the apparent protective effects of acknowledged risk factors in “frail” populations; in these subjects obesity, hypertension or high serum cholesterol levels are thought to reflect the absence of more powerful risk factors (such as malnutrition) having a greater potential for affecting health status and survival.²² For instance, hyperlipidemia and overweight have been associated with improved survival in patients with heart failure or previous myocardial infarction.^{23,24} In our study, MetS was negatively associated with hemoglobin decline, but only in the oldest participants. No association was found between MetS and the whole range of hemoglobin variations; this supports the hypothesis of a protective, or at least neutral, effect of MetS on hemoglobin loss.

In advanced age, obesity might provide a nutritional reserve in the event of illness or trauma, as persons with higher BMI are more likely to survive acute illness.²⁵ Obesity also has a protective effect against traumatic events such as falls and hip fracture,²⁶ and complications of major surgery.²⁷ These positive effect of obesity on survival are particularly relevant in the oldest age.²⁵ Nevertheless, in our population MetS, as a whole and not simply overweight or obesity, is associated with higher hemoglobin levels.

In the InCHIANTI population, subjects with MetS were more frequently affected by chronic diseases such as heart failure, had higher serum levels of proinflammatory cytokines, and used more frequently angiotensin-converting enzyme inhibitors, antiplatelets, and anticoagulants. These factors should be associated with reduced hemoglobin levels, and this indirectly supports the association of MetS with higher hemoglobin levels. At variance with other studies,^{28,29} we did not find increased levels of serum ferritin and iron in MetS participants. Among older and frailer subjects MetS might be associated with reduced prevalence of malabsorption and/or malnutrition, both conditions likely to affect functional ability and survival earlier than metabolic abnormalities.

However, participants with MetS had lower protein, folate and iron intake, but laboratory indicators of nutritional status were similar or even better, than those of other participants. Indeed, obese persons might underreport their caloric intake, even when assessed by the EPIC questionnaire.³⁰ This might explain the inconsistency of reported nutrient intake with objective nutritional parameters. Accordingly, subjects with MetS did not report reductions in body weight more frequently than non-MetS participants.

Limitations

We normalized the nutrient intake by body weight (Table 1); this might underestimate the intake for metabolically active tissue in obese subjects, whose fat mass is metabolically less active. However, this would render our analyses more conservative.

Also, due to the observational design, this study only indicates a significant trend towards preserved hemoglobin levels in subjects with MetS; further studies are needed to assess the clinical role of such an association.

Conclusion

As a whole, our finding of a positive association between MetS and hemoglobin levels in the elderly adds to the growing evidence indicating that current dietetic recommendations, which highlight the risk of over nutrition even in geriatric settings, might need to be revised, at least for the oldest and frailest subjects. Whether confirmed by other studies, this might be relevant to nutrition education and health care for the elderly.

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Table 1

Characteristics of participants according to diagnosis of metabolic syndrome.

	Participants with metabolic syndrome (n =263) n (%) or mean $\pm$ SD	Participants without metabolic syndrome (n =773) n (%) or mean $\pm$ SD	P
<i>Demographics & lifestyle habits</i>			
Age (years)	74.9 $\pm$ 7.1	75.1 $\pm$ 7.5	.827
Sex (female)	181 (68.8%)	399 (51.6%)	<.0001
Education (years)	5.0 $\pm$ 3.1	5.4 $\pm$ 3.3	.110
Current alcohol consumption ^a	9.0 $\pm$ 8.3	18.0 $\pm$ 17.3	.008
Smoking ^b	11.5 $\pm$ 21.7	12.8 $\pm$ 20.6	.385
Energy (kcal/day/Kg)	25.2 $\pm$ 7.3	29.8 $\pm$ 8.3	<.0001
Dietary protein (g/die/Kg)	1.01 $\pm$ 0.30	1.15 $\pm$ 0.32	<.0001
Dietary iron (mg/die/Kg)	0.16 $\pm$ 0.45	0.19 $\pm$ 0.55	<.0001
Dietary folate (mcg/die/Kg)	3.56 $\pm$ 1.10	3.92 $\pm$ 1.18	<.0001
<i>Comorbid conditions</i>			
Chronic pulmonary disease	5 (1.9%)	30 (3.9%)	.166
Heart failure	27 (10.3%)	33 (4.3%)	.001
Peptic disease	43 (16.3%)	111 (14.4%)	.424
Hystory of cancer	165 (62.7%)	412 (53.3%)	.008
Hepatic disease	3 (1.1%)	4 (0.5%)	.379
Dysthyroidism	34 (12.9%)	53 (6.9%)	.002
Diabetic nephropathy	3 (1.1%)	3 (0.4%)	.175
<i>Medications</i>			
ACE-I ^c	51 (19.4%)	92 (11.9%)	.004
NSAIDs ^d	6 (2.3%)	11 (1.4%)	.398
Antiplatelets	39 (14.8%)	77 (10.0%)	.041
Antisecretives	5 (1.9%)	29 (3.8%)	.165
Corticosteroids	4 (1.5%)	14 (1.8%)	1.000
Anticoagulants	8 (3%)	4 (0.5%)	.003
<i>Objective tests</i>			
Glomerular Filtration Rate (mL/min)	69.3 $\pm$ 24.5	63.3 $\pm$ 18.1	<.0001
Interleukin 6 (pg/mL)	0.52 $\pm$ 0.86	0.36 $\pm$ 0.85	.009
Serum iron (μ g/dL)	82.1 $\pm$ 25.3	82.7 $\pm$ 26.0	.726
Total serum proteins (g/dL)	7.2 $\pm$ 0.4	7.1 $\pm$ 0.4	.061
Serum folate (ng/mL)	3.3 $\pm$ 1.7	3.3 $\pm$ 2.1	.965
Erythropoietin (mU/mL)	11.3 $\pm$ 5.4	12.0 $\pm$ 9.5	.321
Serum ferritin (ng/mL)	156 $\pm$ 129	141 $\pm$ 125	.093
Serum vitamin B12 (pg/mL)	433 $\pm$ 315	468 $\pm$ 355	.167
Body Mass Index	29.9 $\pm$ 4.3	26.6 $\pm$ 3.6	<.0001
Hemoglobin (g/dL) at baseline			
• Men	14.6 $\pm$ 1.5	14.4 $\pm$ 1.4	.290

	Participants with metabolic syndrome (n =263) n (%) or mean $\pm$ SD	Participants without metabolic syndrome (n =773) n (%) or mean $\pm$ SD	P
• Women	13.3 $\pm$ 1.2	13.1 $\pm$ 1.1	.027
Hemoglobin (g/dL) at follow-up			
• Men	14.2 $\pm$ 2.2	14.4 $\pm$ 1.5	.191
• Women	13.3 $\pm$ 1.2	13.0 $\pm$ 1.1	.027
Serum osmolality at baseline	302.6 $\pm$ 7.4	301.5 $\pm$ 6.3	.021
Serum osmolality at follow-up	301.6 $\pm$ 9.0	300.6 $\pm$ 7.2	.153

^a Number of wine glasses per week.

^b Total lifetime pack years.

^c Angiotensin-Converting Enzyme inhibitors.

^d Nonsteroidal antiinflammatory agents.

Table 2

Association (B coefficients, and 95% confidence intervals, CI) of hemoglobin levels with the variables of interest according to the initial (age and sex- adjusted), and the summary (fully adjusted) regression models. All the covariates were entered simultaneously into the regression models.

	Age- and sex-adjusted models			Summary model		
	B	95% CI	P	B	95% CI	P
<i>Demographics & lifestyle habits</i>						
Age (years)	-.09	-.13 - .05	<.0001	-.02	-.03 - .01	<.0001
Sex (female)	-1.29	-2.12 - -.46	.003	-1.13	-1.27 - -.10	<.0001
Education (years)	.04	-.04 - .12	.298			
Current alcohol consumption	.02	-.02 - .02	.857			
Smoking ^a	.04	-.01 - .01	.482			
Energy (kcal/day/Kg)	-.06	-.08 - .07	.880			
Dietary proteins (g/die)	1.77	-.06 - 3.61	.058			
Dietary iron (mg/die)	-3.53	-15.07 - 8.01	.545			
Dietary folate (mcg/die)	-.24	-.57 - .09	.152			
<i>Comorbid conditions</i>						
Chronic pulmonary disease	.48	.06 - .89	.023	.17	-.22 - .56	.390
Heart failure	-.10	-.42 - .23	.557			
Peptic disease	-.25	-.45 - -.04	.020	-.16	-.34 - .02	.085
Cancer	.10	-.05 - .25	.188			
Hepatic disease	.44	-.45 - 1.33	.331			
Dysthyroidism	-.12	-.39 - .15	.395			
Diabetic nephropathy	-.38	-1.35 - .58	.438			
Metabolic syndrome	.21	.03 - .38	.019	.18	.03 - .33	.022
<i>Medications</i>						
ACE-I ^b	-.27	-.48 - -.05	.014	-.08	-.27 - .11	.394
NSAIDs ^c	.33	-.24 - .91	.258			
Antiplatelets	.06	-.18 - .30	.616			
Antisecretives	.15	-.26 - .57	.462			
Corticosteroids	-.22	-.78 - .34	.443			
Anticoagulants	.13	-.56 - .81	.714			
<i>Objective tests</i>						
Glomerular Filtration Rate (mL/min)	.01	.01 - .01	<.0001	.01	.01 - .02	<.0001
Interleukin 6 (pg/mL) ^d	.06	-.02 - .15	.129			
Serum iron (µg/dL)	.29	.14 - .44	<.0001	.01	.01 - .02	<.0001
Total serum proteins (g/dL)	.01	.01 - .01	<.0001	.29	.15 - .44	<.0001
Serum folate (ng/mL)	-.01	-.04 - .03	.774			
Erythropoietin (mU/mL)	-.05	-.06 - -.04	<.0001	-.05	-.06 - -.04	<.0001
Serum ferritin (ng/mL) ^d	.04	-.04 - .11	.307			
Serum vitamin B12 (pg/mL) ^d	.02	-.10 - .14	.708			

^aTotal lifetime pack years.

^bAngiotensin-Converting Enzyme inhibitors.

^cNonsteroidal antiinflammatory agents.

^dLog-transformed.

Table 3

Association (Odds ratios, OR, and 95% confidence intervals, CI) of decreased hemoglobin levels after six-years of follow-up with the metabolic syndrome, in the whole population and in the oldest age tertile (83+) of participants. All the covariates were entered simultaneously into the regression models.

	All participants (n=658)			Oldest participants (n=156)		
	OR	95% CI	P	OR	95% CI	P
<i>Demographics & lifestyle habits</i>						
Age (years)	1.07	1.03 - 1.10	<.0001	1.05	.93 - 1.18	.432
Sex (female)	1.32	.86 - 2.03	.201	.75	.30 - 1.89	.547
Chronic pulmonary disease	2.65	.67 - 10.54	.166	1.00	.99 - 1.01	.998
Peptic disease	1.15	.70 - 1.88	.583	.74	.26 - 2.05	.559
ACE-I ^a	.66	.38 - 1.14	.138	.41	.14 - 1.22	.108
Glomerular Filtration Rate (mL/min)	.99	.98 - 1.00	.163	1.00	.96 - 1.03	.915
Serum iron (µg/dL)	1.01	1.00 - 1.01	.095	1.00	.98 - 1.02	.928
Serum total proteins (g/dL)	1.81	1.18 - 2.77	.007	.94	.41 - 2.16	.889
Erythropoietin (mU/mL)	1.02	.99 - 1.05	.186	1.02	.96 - 1.10	.487
Baseline hemoglobin (g/dL)	1.50	1.23 - 1.82	<.0001	1.52	1.01 - 2.29	.042
Variation in serum osmolality ^b	1.03	1.00 - 1.05	.022	1.03	.98 - 1.07	.215
Metabolic syndrome	.80	.53 - 1.20	.282	.34	.15 - .79	.012

^a Angiotensin-Converting Enzyme inhibitors.

^b Follow-up – baseline values.