

# RELATIONSHIP BETWEEN RELATIVE INTERDIALYTIC WEIGHT GAIN WITH SERUM LEPTIN LEVELS, NUTRITION AND INFLAMMATION IN CHRONIC HAEMODIALYSIS PATIENTS

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## Objectives:

Excessive relative interdialytic weight gain (RIDWG, %) is an important risk factor for long term adverse cardiovascular outcomes in chronic haemodialysis (HD) patients. On the other hand it may be an index of good appetite and nutritional status. The aim of the present study was to assess the relationship between RIDWG and appetite, nutrition, inflammation parameters and to determine short term survival of chronic HD patients.

## Methods:

One-hundred, chronic anuric HD patients were enrolled in this prospective study between January 2013 to January 2014. Patients with hospitalization, major surgery, obvious infections, inflammatory disease, end stage liver disease, metastatic malignancies and malabsorption syndromes were excluded. To determine nutrition, inflammation and appetite status of patients body mass index (BMI), dry weight, triceps scinfold thickness (mm), malnutrition inflammation score (MIS), serum albumin, prealbumin, leptin, hs-CRP and TNF- $\alpha$  levels were obtained from all patients. All-cause deaths in 1 year were recorded to determine short time patients survival. Patients were divided into 3 groups according to their RIDWG levels; Group 1= RIDWG < %3, Group 2= RIDWG: %3-%5 and Group 3= RIDWG > %5.

Table 1. Demographic, anthropometric and laboratory data of all patients and RIDWG (%) groups.

	All patients (n:100)	RIDWG (%) $\leq$ 3 (n:10)	RIDWG (%) 3-5 (n:47)	RIDWG (%) > 5 (n:43)	P
<b>Demographics</b>					
Age (y)	52.3 $\pm$ 17.4	55.6 $\pm$ 22.2	57.0 $\pm$ 17.4	46.3 $\pm$ 14.7	0.011
Sex (male/female)	52/48	3/7	22/25	27/16	NS
Duration on HD (months)	70.2 $\pm$ 64.3	72.2 $\pm$ 87.8	63.0 $\pm$ 58.1	77.7 $\pm$ 65.4	NS
Dry weight (kg)	61.2 $\pm$ 14.7	68.2 $\pm$ 22.5	61.8 $\pm$ 13.0	58.8 $\pm$ 14.2	NS
Body mass index (kg/m <sup>2</sup> )	23.4 $\pm$ 4.6	27.5.8	23.6 $\pm$ 3.8	22.3 $\pm$ 4.9	0.014
Interdialytic weight gain(kg)	2.87 $\pm$ 0.92	1.64 $\pm$ 0.82	2.48 $\pm$ 0.54	3.58 $\pm$ 0.69	0.001
RIDWG (%)	4.83 $\pm$ 1.59	2.35 $\pm$ 0.59	4.05 $\pm$ 0.59	6.25 $\pm$ 1.14	0.001
Systolic BP (mm Hg)	117 $\pm$ 24.7	103 $\pm$ 22.1	114.7 $\pm$ 23.2	122.6 $\pm$ 25.6	NS
Diastolic BP (mm Hg)	74 $\pm$ 14.8	66.5 $\pm$ 15.6	73.8 $\pm$ 14.4	76.0 $\pm$ 14.9	NS
<b>Etiology of ESRD</b>					
Diabetic nephropathy	22	3	10	9	
Hypertensive nephropathy	19	2	8	9	
Chronic glomerulonephritis	24	2	10	12	NS
Others	18	1	10	7	
Undetermined	17	2	9	6	
<b>Delivered dose of dialysis</b>					
spKt/V	1.59 $\pm$ 0.33	1.67 $\pm$ 0.48	1.56 $\pm$ 0.30	1.61 $\pm$ 0.32	NS
<b>Anthropometry</b>					
Triceps skinfold thickness (mm)	14.5 $\pm$ 6.5	15.8 $\pm$ 7.0	14.9 $\pm$ 6.8	13.7 $\pm$ 6.2	NS
<b>Laboratory</b>					
Predialysis urea (mg/dl)	137.9 $\pm$ 30.5	121.4 $\pm$ 23.1	137.2 $\pm$ 27.5	142.4 $\pm$ 34.1	NS
Predialysis creatinine (mg/dl)	8.8 $\pm$ 2.2	8.1 $\pm$ 2.1	8.6 $\pm$ 2.2	9.1 $\pm$ 2.3	NS
Hemoglobin (g/dl)	10.5 $\pm$ 1.6	10.7 $\pm$ 1.4	10.5 $\pm$ 1.5	10.5 $\pm$ 1.8	NS
Uric acid (mmol/L)	6.1 $\pm$ 1.2	6.2 $\pm$ 1.1	6.0 $\pm$ 1.2	6.1 $\pm$ 1.2	NS
Na (mmol/l)	137.9 $\pm$ 2.8	138.5 $\pm$ 2.5	138.3 $\pm$ 2.7	137.3 $\pm$ 2.8	NS
K (meq/L)	5.5 $\pm$ 4.4	4.7 $\pm$ 0.9	5.0 $\pm$ 0.5	6.2 $\pm$ 0.7	NS
Ca (mg/dl)	8.6 $\pm$ 0.9	8.8 $\pm$ 1.3	8.6 $\pm$ 0.8	8.7 $\pm$ 0.8	NS
P (mg/dl)	5.5 $\pm$ 1.4	5.2 $\pm$ 1.4	5.4 $\pm$ 1.3	5.7 $\pm$ 1.5	NS
CaxP	48.8 $\pm$ 14.4	45.6 $\pm$ 11.6	47.6 $\pm$ 14.0	50.8 $\pm$ 15.5	NS
intact PTH (pg/ml)	610.2 $\pm$ 698	460.3 $\pm$ 385.2	529.7 $\pm$ 616.8	733.1 $\pm$ 819.6	NS
Total cholesterol (mmol/L)	175.6 $\pm$ 40.8	188.4 $\pm$ 41.7	179.5 $\pm$ 41.8	168.4 $\pm$ 39.2	NS
Triglyceride (mmol/L)	164.9 $\pm$ 89.9	156.8 $\pm$ 53.1	179.9 $\pm$ 96.9	150.5 $\pm$ 87.7	NS
Ferritin (ng/ml)	703.7 $\pm$ 465.5	681.3 $\pm$ 222.8	735.0 $\pm$ 476.8	674.7 $\pm$ 498.9	NS
Bicarbonate (mEq/L)	22.3 $\pm$ 2.1	22.7 $\pm$ 1.5	22.4 $\pm$ 2.4	22.1 $\pm$ 1.8	NS

Table 2. Nutrition, appetite, inflammation status and mortality of all patients and RIDWG (%) groups.

	All patients (n:100)	RIDWG (%) $\leq$ 3 (n:10)	RIDWG (%) 3-5 (n:47)	RIDWG (%) > 5 (n:43)	P
<b>Nutrition</b>					
Albumin (g/L)	3.8 $\pm$ 0.3	3.8 $\pm$ 0.5	3.8 $\pm$ 0.3	3.8 $\pm$ 0.4	NS
Prealbumin (mg/dl)	28.9 $\pm$ 8.7	27.2 $\pm$ 6.4	30.0 $\pm$ 10.1	28.2 $\pm$ 7.5	NS
TIBC (g/L)	210.6 $\pm$ 42.1	198.3 $\pm$ 25.1	214.1 $\pm$ 46.4	209.7 $\pm$ 40.3	NS
MIS	6.1 $\pm$ 3.2	6.0 $\pm$ 2.9	6.1 $\pm$ 3.3	6.2 $\pm$ 3.1	NS
<b>Appetite</b>					
Leptin (ng/dL)	10.5 $\pm$ 12.3	25.9 $\pm$ 16.4	10.8 $\pm$ 11.3	6.6 $\pm$ 9.2	0.001
Leptin/BMI	0.40 $\pm$ 0.43	0.93 $\pm$ 0.52	0.42 $\pm$ 0.42	0.25 $\pm$ 0.35	0.001
<b>Inflammation</b>					
hsCRP (mg/L)	16.8 $\pm$ 25.4	11.7 $\pm$ 9.3	15.8 $\pm$ 19.2	19.1 $\pm$ 33.0	NS
TNF- $\alpha$ (pg/mL)	23 $\pm$ 8.07	20.5 $\pm$ 4.4	24.8 $\pm$ 8.8	21.5 $\pm$ 7.4	NS
<b>Exitus (n)</b>					
	8	2	4	2	NS

Figure 1. Association between RIDWG and Leptin/BMI.

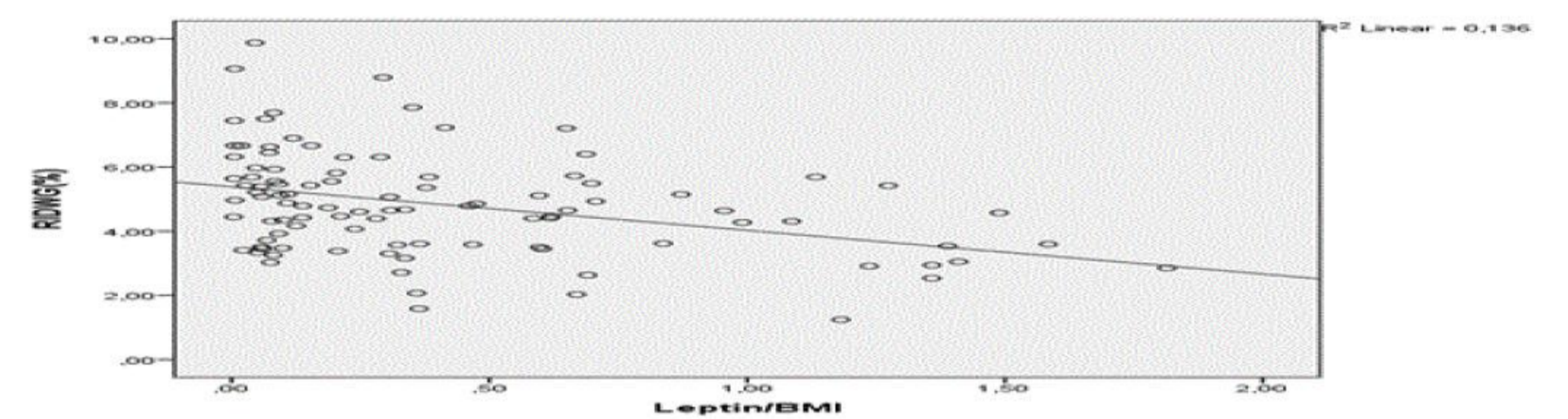
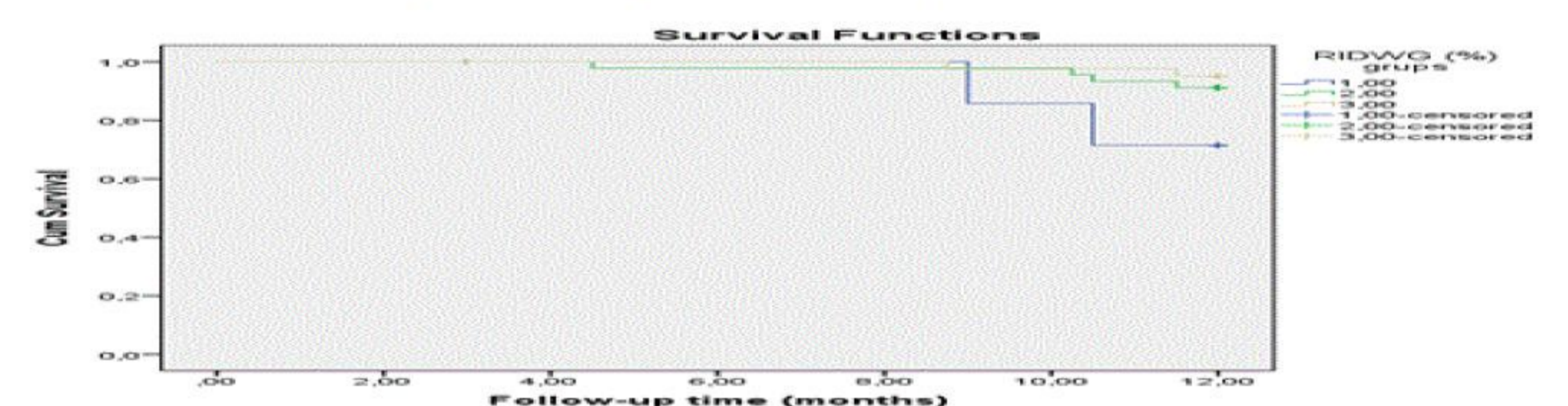


Figure 2. Survival analysis according to the RIDWG groups.



## Results:

Mean age of 100 patients (Male/Female: 52/48) were 52.3 $\pm$ 17.4 years. Group 1, group 2 and group 3 were consisted of 10, 47, 43 patients, respectively. There were no differences regarding gender, duration on HD, etiology, dialysis dose, dry weight, systolic and diastolic blood pressures between the groups. Group 3 patients were younger ( $p=0.011$ ) with lower BMI ( $p=0.014$ ). No significant differences determined between groups about nutrition and inflammation parameters including MIS, serum albumin, prealbumin, triceps scinfold thickness, hs-CRP and TNF- $\alpha$ . Leptin and Leptin/BMI levels were significantly lower in group 3 ( $p=0.001$ ). RIDWG were negatively correlated with age ( $p=0.001$ ,  $r=-0.371$ ), BMI ( $p=0.001$ ,  $r=-0.372$ ), leptin ( $p=0.001$ ,  $r=-0.369$ ), leptin/BMI ( $p=0.001$ ,  $r=-0.369$ ). After adjustment for BMI in the linear regression analyse, leptin/BMI remained significantly correlated with RIDWG ( $p=0.024$ ,  $r=0.427$ ,  $R^2=0.183$ , %95 CI lower: -1.674, upper: -0.119). Eight patients died during the follow-up period. There were no difference between the RIDWG groups about 1 year survival rates (group 1, 2 and 3 were %71.4, %91.1 and %95, respectively ( $p=0.105$ ).

## Conclusions:

Although higher RIDWG levels seems to be related with low serum leptin levels, there were no link with malnutrition, inflammation and short-term survival.

## References:

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