# ASSOCIATION OF CONICITY INDEX AS A MEASURE OF ABDOMINAL ADIPOSITY WITH CARDIOVASCULAR RISK FACTORS AND INFLAMMATION IN KIDNEY TRANSPLANT RECIPIENTS

Hernández Vargas H, Artamendi Larrañaga M, Gil Catalinas F, Ramalle Gómara E*, Bello Ovalles A.E, Pimentel Guzmán G.I, Coloma López A, Dall Anese C, Gil Paraíso A, Beired Val I, Sierra Carpio M, Huarte Loza E. Departament of Nephrology, Hospital San Pedro, Logroño, Spain. *Department of Epidemiology, La Rioja Regional Authority, Logroño, Spain.

## INTRODUCTION AND AIMS

The renal transplant recipients have a high risk of premature cardiovascular disease, which is the leading cause of death in patients with a functioning graft. Many studies have described the impact of obesity in renal transplant patients, and the association between central obesity with an increased risk of cardiovascular and metabolic diseases, worse graft survival and increased overall morbidity and mortality rates. Moreover, the deposition of abdominal fat is a major risk factor for inflammation, both in general population and patients with renal transplantation.

The aim of this study was to analyze the association of adiposity using the conicity index (Ci) with markers of inflammation, nutrition, and cardiovascular risk in a cohort of patients with a functioning renal transplant.
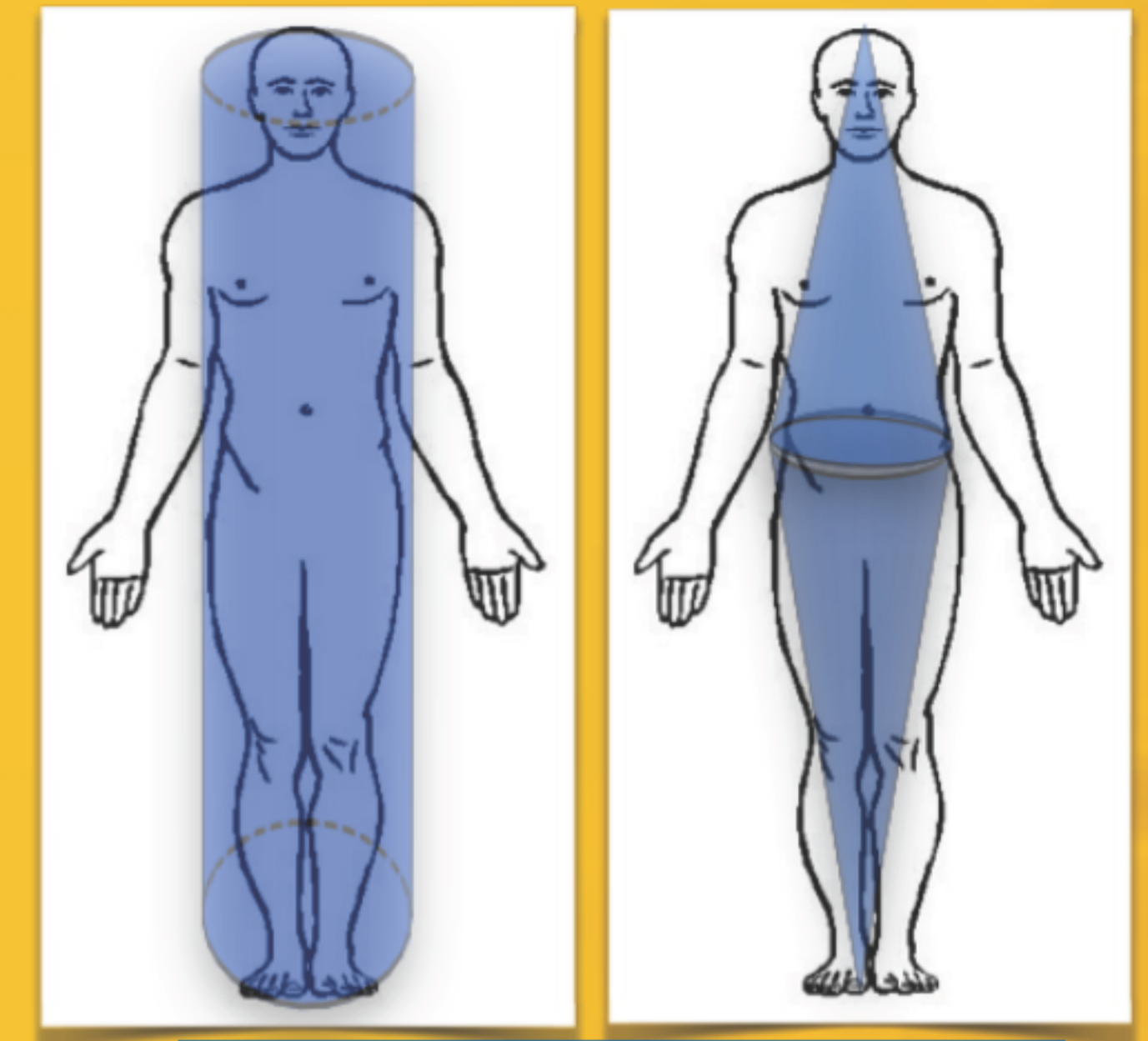
$$Ci = \frac{Waist\ Circunference\ (m)}{0.109\ \sqrt{\dfrac{Weight\ (Kg)}{Height\ (m)}}}$$

## METHODS

A Cross-sectional study of 147 patients (57.8% males and 57.7 ± 14.2 years) with functioning kidney transplant, followed by a period between November 2011 and August 2013. 98.6% cadaveric donor and halftime functioning graft 10.6 ± 7.3 years. The deposition of abdominal fat was assessed by Ci according to the method of Valdez. The Ci was analyzed in relation to baseline inflammatory markers, anthropometric and nutritional.

The global cardiovascular risk was calculated by Charlson Comorbidity Index (CCI). Patients were divided into groups according to tertiles of Ci distribution.

## RESULTS

In overall analysis the percentages of patients with high blood pression was 87.7%, diabetes 21.9%, dyslipidemia 68%, overweight and obesity 66%. 26.5% of patients non diabetics had a positive result in test oral glucose tolerance (OGTT). Mean Ci (p= 0.037) and WC (p= 0.007) was significantly greater in men, but non gender-significant differences were found for BMI or WHR.

Across increasing tertiles of the Ci, patients was older (p< 0.001), rise men (p= 0.012), was fatter and they has more comorbility (p < 0.001).

With increasing tertiles of Ci patients are older (p <0.001) increase percent of men (p = 0.012), are more obese (p <0.001) and have more comorbidity (p <0.001). We also observed a significant increase in inflammatory parameters as B2 microglobulin, interleukin 6 (IL-6), and homeostasis model assessment (HOMA) index.

| | All patients n= 147 | Low Ci n=49 | Middle Ci n=45 | Hight Ci n=53 | p value |
|---|---|---|---|---|---|
| Conicity Index | 1,35 ± 0,098 | 1,24± 0,045 | 1,34 ± 0,027 | 1,45 ± 0,061 | |
| Conicity Index range | (1,07-1,65) | (1,07-1,30) | (1,30-1,39) | (1,39-1,65) | |
| Age (years) | 57,71 ± 14,18 | 48,06 ± 15,12 | 60,69 ± 10,80 | 64,11 ± 10,84 | 0,001 |
| Male n (%) | 85 ( 57,8) | 20 (40,8) | 29 (64,4) | 36 (67,9) | 0,012 |
| Waist Circumference(m) | 0,97 ± 0,12 | 0,865 ± 0,081 | 0,985 ± 0,084 | 1,077 ± 0,111 | 0,001 |
| Weight (kg) | 72,44 ± 14,16 | 66,04 ± 11,98 | 74,22 ± 13,28 | 76,84 ± 13,28 | 0,001 |
| BMI (Kg/m2) | 27,17 ± 4,87 | 25,18 ± 4,00 | 27,87 ± 4,96 | 28,42 ± 5,04 | 0,002 |
| WHR (cm/cm) | 0,600 ± 0,078 | 0,535 ± 0,0504 | 0,605 ± 0,061 | 0,656 ± 0,068 | 0,001 |
| Diabetes n (%) | 32 (21,9) | 7 (21,9) | 11 (34,4) | 14 (43,8) | 0,256 |
| HBP  n (%) | 128 (87,7) | 37 (28,9) | 42 (32,8) | 49 (38,3) | 0,009 |
| Smoking history n (%) | 40 (27,2) | 13 (32,5) | 13 (32,5) | 14 (32,5) | 0,955 |
| Dyslipidemia n (%) | 100 (68) | 29 (29) | 33 (33) | 38 (38) | 0,269 |
| CVD n (%) | 45 (30,6) | 9 (20) | 12 (26,7) | 24 (53,3) | 0,010 |
| Charlson comorbidity Index | 1,35 (0,098) | 1,30 ± 0,075 | 1,36 ± 0,101 | 1,38 ± 0,098 | 0,001 |
| OSAHS n (%) | 12 (8,2) | 0 (0) | 4 (33,3) | 8 (66,7) | 0,004 |
| LVH n (%) | 116 (78,9) | 29 (25) | 39 (33,6) | 48 (41,4) | 0,001 |
| C-RP (mg/L) | 5,25 ± 9,39 | 3,21 ± 5,31 | 7,14 ± 13,43 | 5,51 ± 7,62 | 0,011 |
| B2mg (mg/L) | 4,26 ± 3,20 | 3,61 ± 2,10 | 3,55 ± 1,55 | 5,47 ± 4,52 | 0,001 |
| IL-6 (pg/ml) | 78 (57,8) | 16 (36,4) | 28 (65,1) | 34 (70,8) | 0,002 |
| Prealbumin (g/L) | 0,27 ± 0,08 | 0,28 ± 0,08 | 0,26 ± 0,09 | 0,28 ± 0,08 | 0,746 |
| Procalcitonin  (ng/ml) | 0,08 ± 0,07 | 0,07 ± 0,05 | 0,09 ± 0,10 | 0,07 ± 0,04 | 0,013 |
| Fibrinogen (mg/dl) | 444,79 ± 90,25 | 425,46 ± 85,15 | 443,32 ± 103,72 | 461,51 ± 80,65 | 0,113 |
| Homocysteine (umol/L) | 19,44 ± 16,17 | 17,1 ± 6,94 | 23,09 ± 28,27 | 18,76 ± 6,20 | 0,102 |
| HOMA Index mg/dl-μU/ml | 2,60 ± 1,91 | 2,15 ± 1,03 | 2,48 ± 1,70 | 3,10 ± 2,52 | 0,045 |

Ci: Conicity Index BMI: Body mass Index. WHR: : Waist to Height ratio . HBP: High blood pressure CVD: Cardiovascular disease OSAHS :Obstructive sleep apnea hypopnea syndrome LVH: left ventricular hypertrophy C-RP: C-reactive protein B2mg: Beta-2 microglobulin IL-6: Interleukin 6 HOMA Index: Homeostasis Model Assessment Index
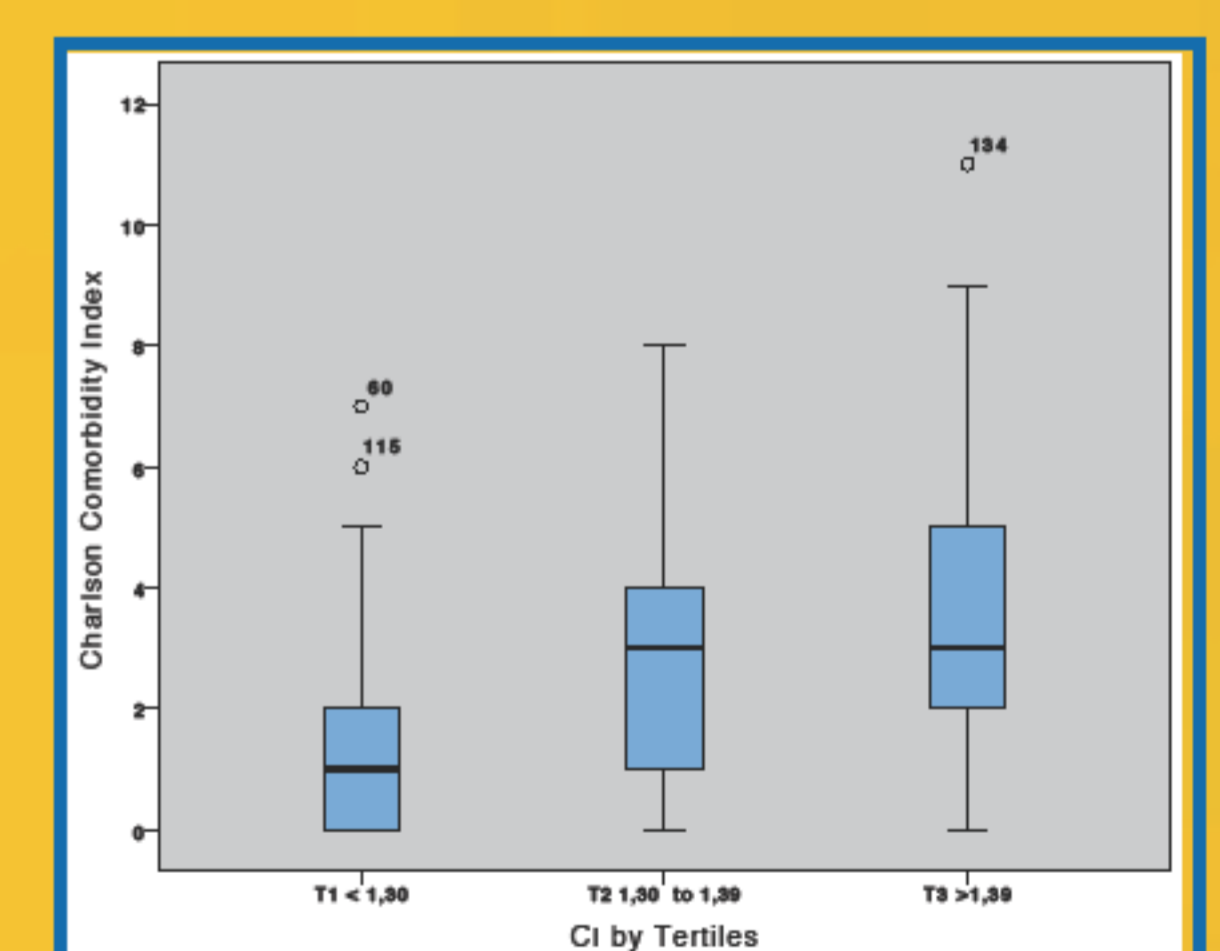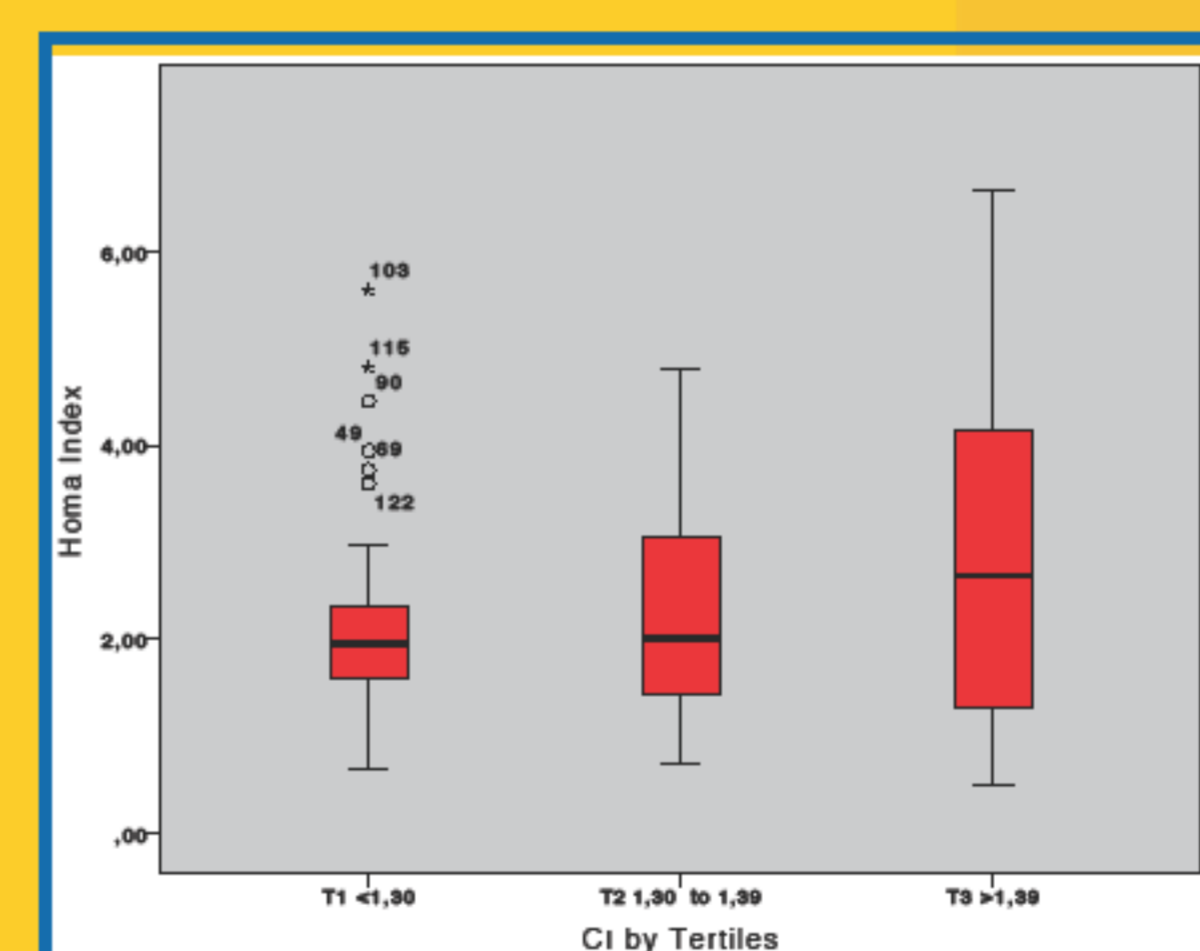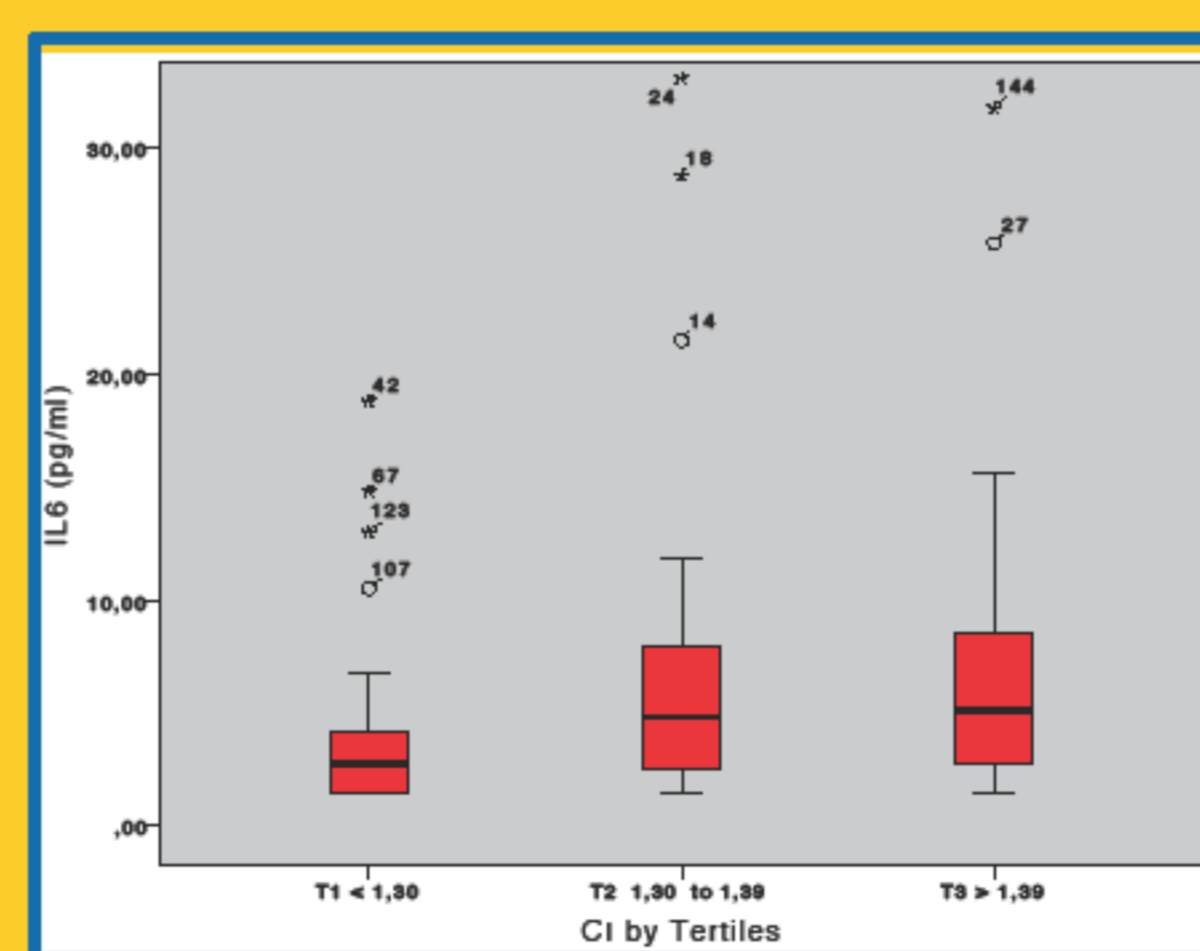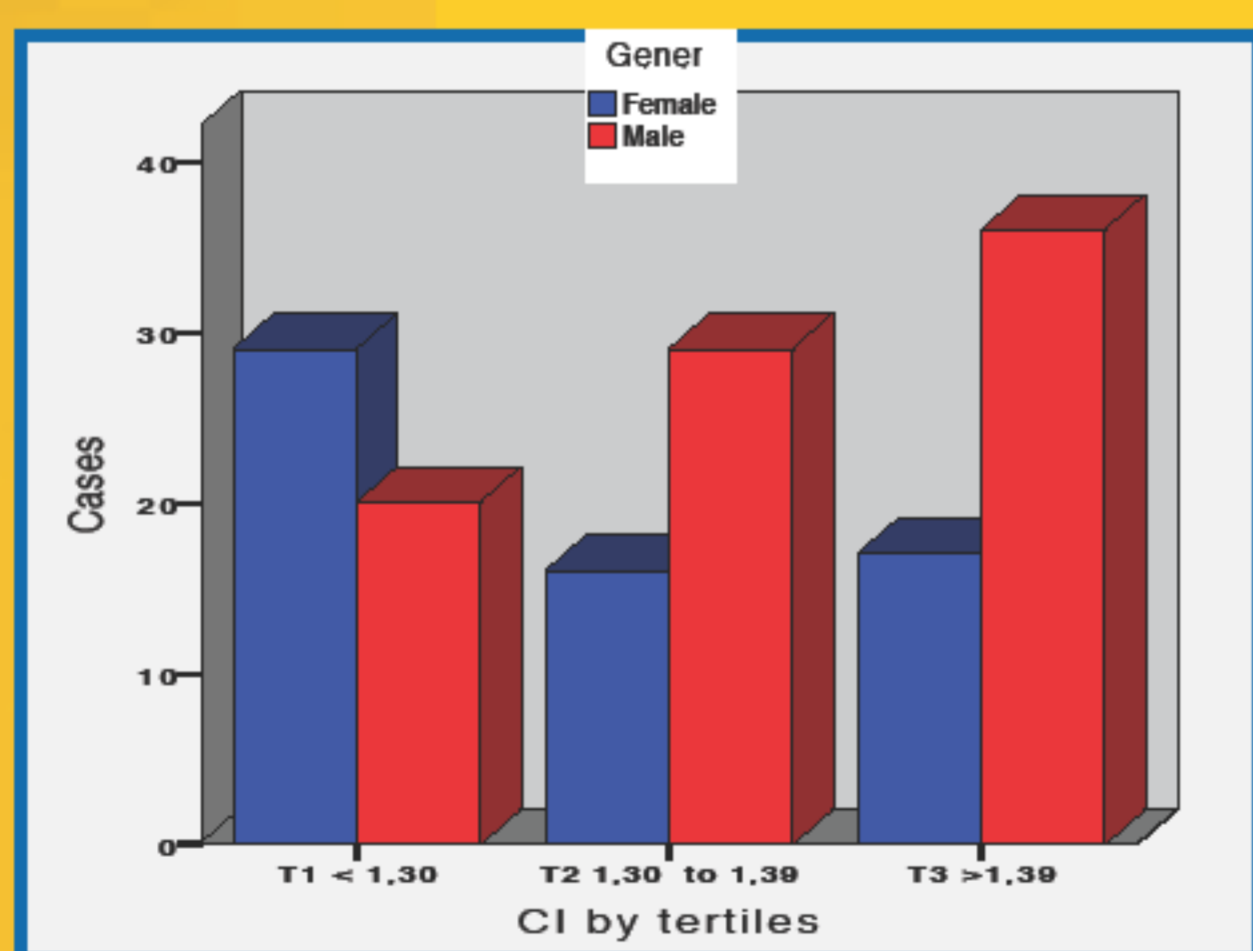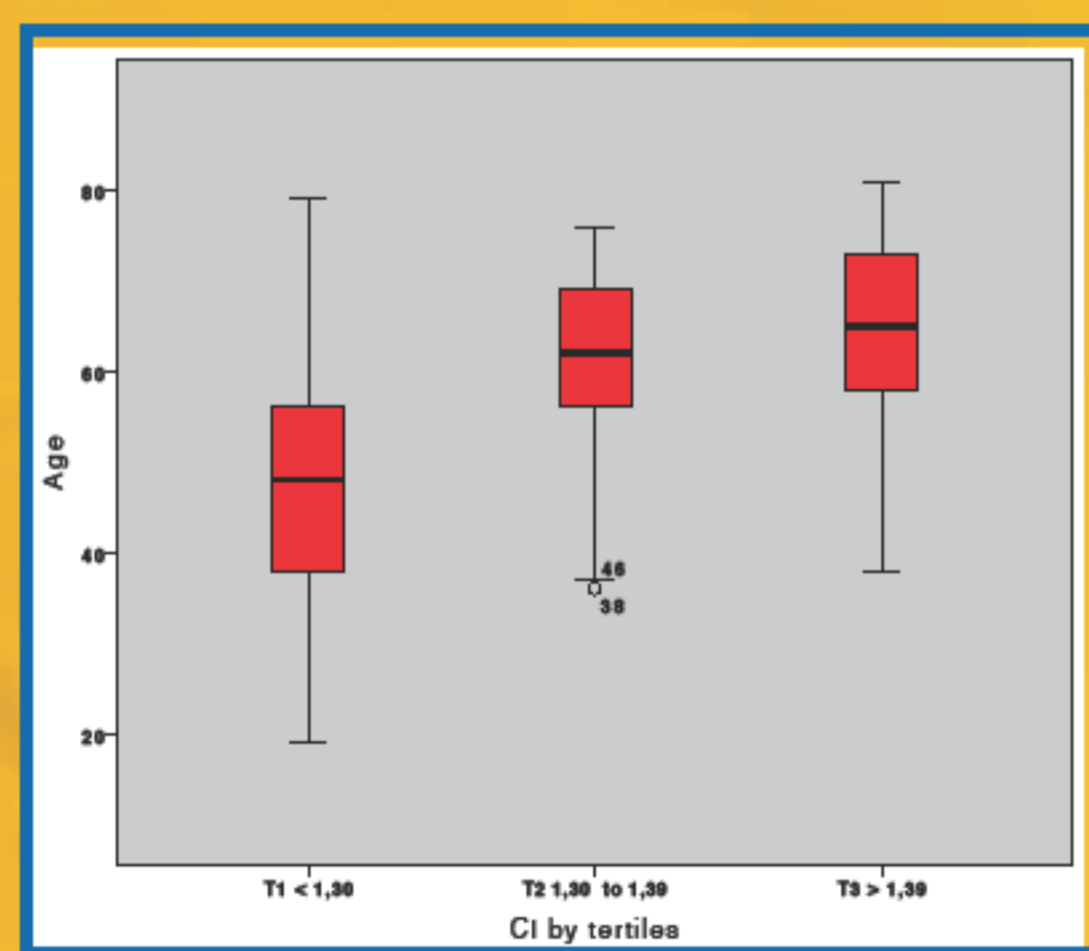


## CONCLUSIONS

The Ci discriminate patients with more inflammation, increased insulin resistance, increased incidence of cardiovascular events and risk of overall mortality.

Inflammatory markers such as IL-6, may be predictors of future cardiovascular events and all-cause mortality in renal transplant recipients, their determination allows us to identify high-risk patients. These parameters should be considered in the design of intervention trials in the future

## BIBLIOGRAPHY

- Valdez R. A simple model-based index of abdominal adiposity. J Clin Epidemiol. 1991;44(9):955-6.
- Johnson CP, Gallagher-Lepak S, Zhu YR, Porth C, Kelber S, Roza AM, Adams MB. Factors influencing weight gain after renal transplantation. Transplantation. 1993 Oct;56(4):822-7
- Cordeiro AC, Qureshi AR, Stenvinkel P, Heimbürger O, Axelsson J, Bárány P, Lindholm B, Carrero JJ. Abdominal fat deposition is associated with increased inflammation, protein-energy wasting and worse outcome in patients undergoing haemodialysis. Nephrol Dial Transplant. 2010 Feb;25(2):562-8.