Long-term evaluation of coronary calcifications in kidney transplanted patients: a follow up of 5 years

Alfieri C.[1], Forzenigo L.[2], Zanoni F.[1], Danilovic B.[2], Cresseri D.[1], Meneghini M.[1], Regalia A.[1], Messa P.[1]

[1]Unit of Nephrology, Dialysis and transplantation, Fondazione I.R.C.C.S. Ca' Granda Ospedale Maggiore Policlinico Milano – Italy
[2]Department of Radiology- Fondazione IRCCS Ca' Granda Ospedale Policlinico Maggiore

Background

Patients with chronic kidney disease (CKD) have a relevant cardiovascular (CV) risk. Vascular calcification, particularly at coronary levels, have been related to the increased CV mortality. Few data are available on the long term behavior of coronary artery calcifications(CAC) in kidney transplantation (KTx). Using coronary CT performed at 1 month and 5years after KTx we evaluated: 1) the prevalence of CAC; 2) the clinical and biochemical factors related with CAC; 3) the factors implicated with CAC progression.

Material and Methods

We evaluated 87 pts (M=51;mean age 47±12 years) transplanted in our unit between 2007 and 2008. Clinical parameters, blood and urinary samples were collected for five years (table 1). For the statistical analysis the mean values of these evaluations were considered. At baseline and after 5 years from KTx, coronary TC for the evaluation of CAC using Agatson score (Figure 1) was performed. According to the score obtained, patients were categorized in 4 groups both at baseline and at 5th year: 1) 0-10; 2) 10-100; 3) 100-400; 4) >400. The progression of CAC was determined using the formula proposed by Sevrukov (AJR, 2005 Dec;185(6):1546-53) and was defined as simple increase and/or increase of category.

Parameter	Mean ± SD
Baseline CAC (score)	299±744
Five year CAC (score)	405±854
Age at KTx (yrs)	47±11
Time of Dialysis (mths)	55±33
BMI (kg/m^2)	24±3
Average Creatinine (mg/dL)	1,48±0,87
Average Hb (mg/dL)	12,1±1,3
Average Glucose (mg/dL)	84±18
Average PTH (pg/mL)	137±107
Average Ca (mg/dL)	9,90±0,5
Average P (mg/dL)	3,0±0,5
Average ALP (mg/dL)	92±38
Average U-Prot (g/24h)	0,26±0,18

Patients (n)	*87*
Gender (M/F)	51/37
Type of dialysis (%) (HD/PD)	72/21
Type of KTx (Deceased/Living)	21
Previous Steroid Therapy (%)	37
Progression of CAC (%)	20
Increase of Cathegory (%)	27
Restart of dialysis (%)	4
Death (n)	1

Table I: Characteristics of the cohort.: CAC: Coronary arterial calcifications, BMI: Body mass index, eGFR: estimated gòlomerular filtration rate estimated using MDRD formula; PTH: Parathormone; ALP: Alkaline Phosphatase; U-Prot: urinary protein escection, HD: hemodialysis, PD: Peritoneal Dialysis

Results

At baseline and at 5 yrs after KTx, 43% and 33 % of pts were in the 1st group, 15% and 17 % in the 2nd, 24% and 23% in the 3rd and 13% and 26% in 4th, respectively. CAC at 5yrs were significantly higher than baseline (p<0.0001-figure 2A). Both at baseline and after 5yrs CAC correlated directly with age (p=0.0001; p=0.0006 resp.) and with each other (p<0.0001). Twenty-two percent of patients had a significant progression of CAC. They had lower levels of PTH and alkaline phosphatase all five years long (Figure 2 C-D). Moreover also in the 27 % of patients, who worsened their category of CAC, PTH was significantly less. In a logistic model, PTH was the only independent factor inversely related with CAC progression. During the 5 year of KTx only one patient dead for cerebral hemorrhage and 4 patients restarted dialysis all for chronic rejection.

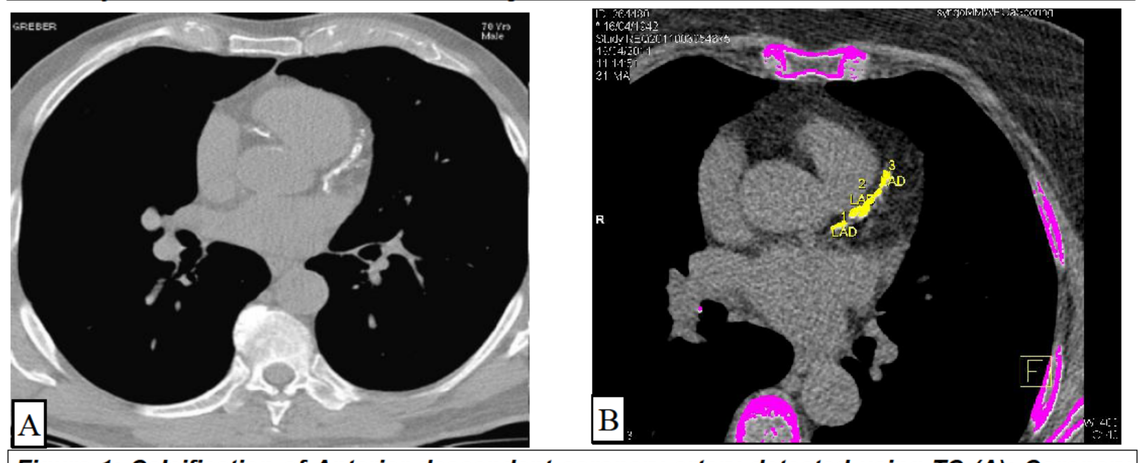

Figure 1: Calcification of Anterior descendent coronary artery detected using TC (A); Coronary arterial calcifications evvaluated using Agatson score (B)

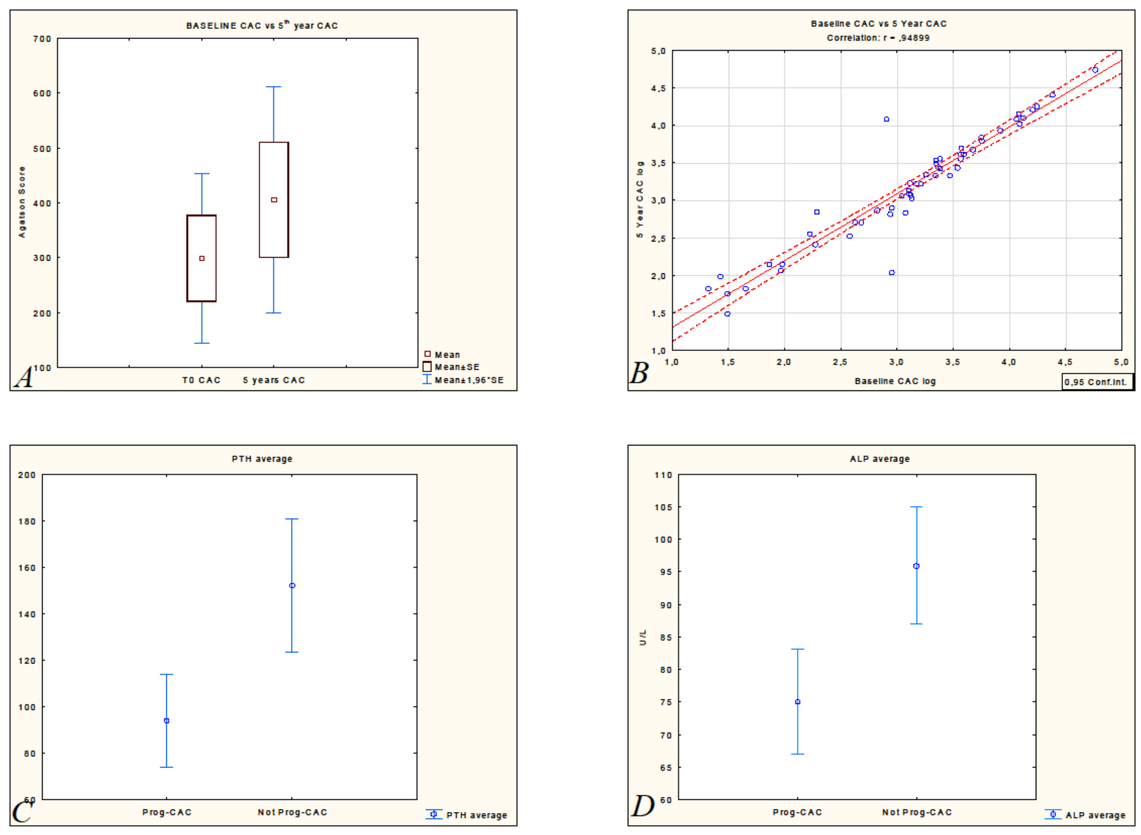

***Figure 2**: A) CAC at baseline and after 5 years; B) Univariate regression between CAC at baseline and after 5 years; C) ANOVA: PTH average distribution in Prog-CAC and not Prog-CAC; D) ANOVA ALP average distribution in Prog-CAC and not Prog-CAC; PTH: Parathormone; ALP: Alkaline Phosphatase*

Conclusions

The prevalence of CAC in CKD patient is quite high, and is related with their age. CAC worsening was observed only in a small part of patients with higher baseline CAC score. CAC progression resulted related with lower PTH and ALP levels.

Email address of the author:

carlo.alfieri1@gmail.com

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