

CAROTID ATHEROSCLEROSIS PROGRESSION AND REVERSE DIPPER PATTERN IN KIDNEY TRANSPLANTATION

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Introduction:

Subclinical atherosclerosis is associated with cardiovascular events. The aim is to describe the prevalence and progression of subclinical carotid plaques in stable kidney transplants during 18 months in comparison with patients with CKD and similar renal function.

Methods:

Between June and September 2011, 92 consecutive kidney transplants and 96 CKD patients with an estimated glomerular filtration rate (e-GFR) <60 ml/min/1.73m², and without previous history of cardiovascular events were included. At entry, carotid ultrasound, 24h ambulatory blood pressure monitoring (ABPM) and pulse wave velocity (PWV) were performed. A serum sample to determinate interleukin 6 (IL-6), soluble tumor necrosis factor receptor 2 (sTNFR2) and intercellular adhesion molecule 1 (ICAM-1) levels was obtained. These cohorts were followed during at least 18 months.

Results :

	Transplant N=92	CKD N=96	p
Age (years)	52.5±11.3	53.5±9.9	0.511
Gender male (% of male)	68 (73.9)	68 (71.9)	0.637
Time of renal disease (months)	199.4±119.8	125.5±128.9	0.0001
Dialysis treatment, n (%)	86 (93.5)	-	
Dialysis vintage (months)	22.7±26.1	-	
Time since transplantation (months)	73.7±78.1	-	
Body mass index (kg/m ²)	26.8±4.7	27.6±4.4	0.270
Smoking status, yes (%)	14 (15.2)	28 (29.2)	0.022
Diabetes mellitus, yes (%)	18 (19.6)	26 (27.1)	0.224
24 h SBP (mmHg)	133.9±14.3	126.1±16.2	0.001
24 h DBP (mmHg)	79.8±10.4	77.5±10.4	0.141
24 h pulse pressure (mmHg)	54.1±10.3	48.6±10.3	0.0001
Dipper, non dipper vs reverse dipper	67/25	79/17	0.119
Antihypertensive medication (0,1,2, ≥3)	13/36/26/17	13/27/35/31	0.151
Use of ACEI/ARB, n (%)	48 (52.2)	65 (67.7)	0.03
Total cholesterol (mg/dL)	189.4±34.6	192.8±37.2	0.509
Triglycerides (mg/dL)	169.8±95.6	161.2±115.4	0.578
Use of statins (%)	61 (66.3)	62 (64.6)	0.804
Glycated haemoglobin (%)	5.7±0.7	5.8±0.9	0.253
Calcium x phosphate product (mg ² /dL ²)	32.2±6.5	34.6±7.0	0.019
PTH (pg/mL)	87.±45.1	91.2±76.6	0.649
e-GFR(ml/min/m ²)	45.2±13.2	38.8±13.1	0.003
Urinary P/C ratio (g/g)	0.5±0.9	1.4±2.0	0.0001
Log IL-6	0.89±0.33	0.73±0.37	0.003
Log TNFR2	3.87±0.16	3.91±0.18	0.141
Log ICAM-1	5.36±0.17	5.39±0.19	0.251

	Kidney trasplants	CKD	p
Prevalence of carotid plaques (%)	55.4	38.5	0.020
Total number of carotid plaques	1.17±1.48	0.88±1.50	0.035
IMT (mm)	0.767±0.140	0.781±0.170	0.560
Pulse wave velocity (m/s)	7.98±1.75	8.37±2.04	0.141

Table 2. Basal carotid ultrasound and pulse wave velocity characteristics. CKD, chronic kidney disease ; IMT, intima media thickness.

• The number of carotid plaques increased during follow up in 25 out of 90 kidney transplant recipients (27.8%) and in 24 out of 83 CKD patients (28.9%) (p=0.868).

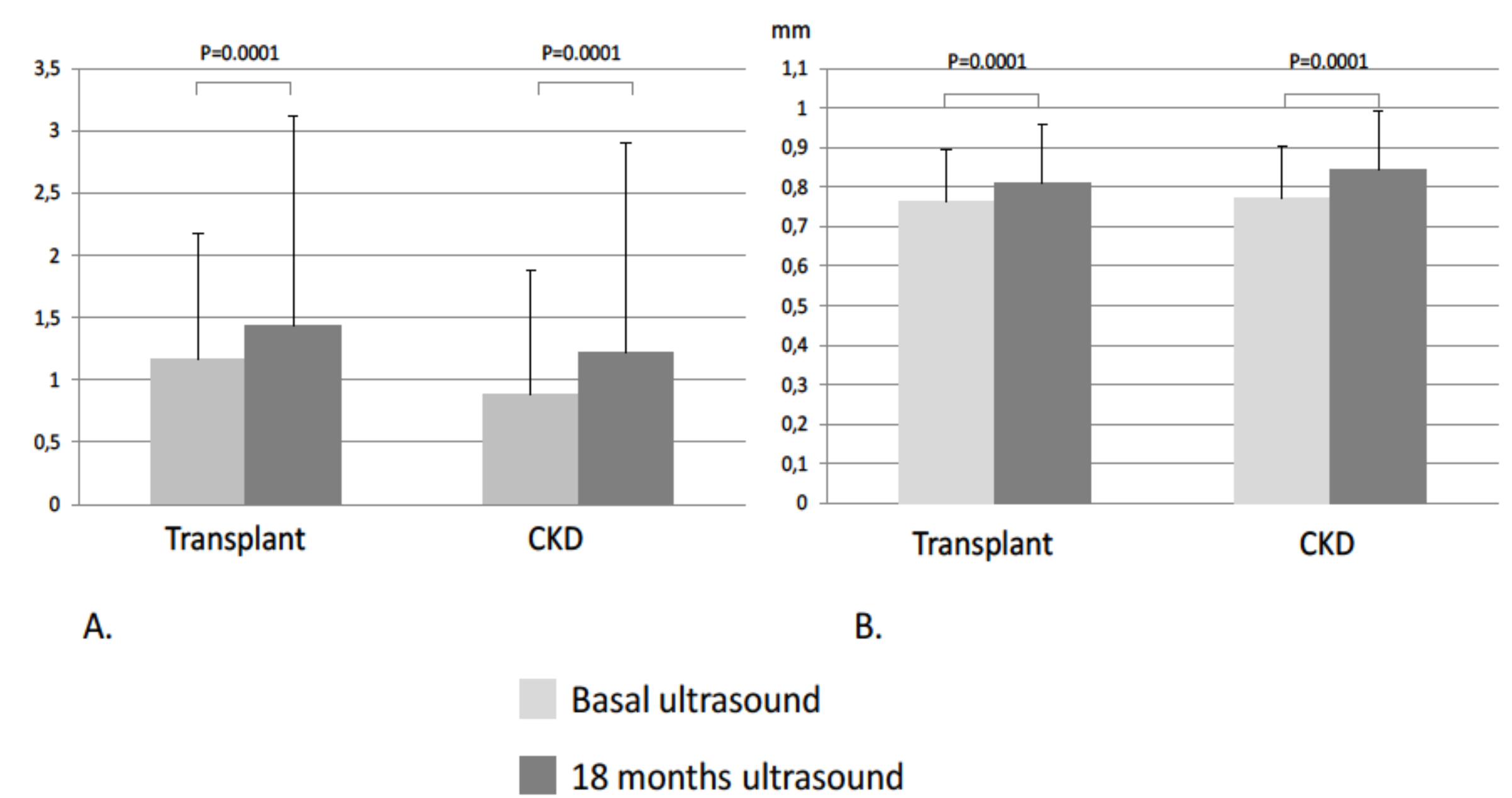


Figure 1. Progression of total number of carotid plaques (A) and intima media thickness (B) at 18 months follow-up in kidney transplants and CKD patients.

Table 1. Clinical characteristics of patients. CKD, chronic kidney disease; SBP, systolic blood pressure; DBP, diastolic blood pressure; ACEI/ARB, angiotensin converting enzyme inhibitor/angiotensin receptor blocker; PTH, parathormone; e-GFR, estimated glomerular filtration rate; urinary P/C ratio, urinary protein/creatinine ratio; log IL-6, log-transformed interleucine 6 levels; log TNFR2, log-transformed tumor necrosis factor receptor 2 levels ; log ICAM-1, log-transformed intercellular adhesion molecule 1 levels.

A	Kidney transplant				CKD patients			
	Univariate analysis		Multivariate analysis		Univariate analysis		Multivariate analysis	
	OR (IC95%)	p	OR (IC95%)	p	OR (IC95%)	p	OR (IC95%)	p
Age (years)	1.128 (1.069-1.191)	0.0001	1.106 (1.032-1.186)	0.004	1.142 (1.066-1.224)	0.0001	1.132 (1.041-1.231)	0.004
PWV (m/s)	1.770 (1.264-2.479)	0.001	Reverse dipper (1.430-31.710)	0.016	1.352 (1.079-1.694)	0.009		
IMT high (mm)	3.949 (1.649-9.456)	0.002	T. Transp (months) (1.000-1.016)	0.048	2.971 (1.217-6.990)	0.016		
HbA1c (%)	3.362 (1.393-8.116)	0.007			0.932 (0.869-0.999)	0.046		
Reverse dipper	4.645 (1.580-13.834)	0.006			3.737 (1.244-11.226)	0.019		
24 h PP (mmHg)	1.061 (1.013-1.113)	0.013			1.050 (1.006-1.096)	0.024		
T. Transp (months)	1.095 (0.999-1.011)	0.076			Log IL-6 (1.745-23.637)	0.005		
					Log ICAM-1 (0.863-11.728)	0.066		

B	Kidney transplant				CKD patients			
	Univariate analysis		Multivariate analysis		Univariate analysis		Multivariate analysis	
	OR (IC95%)	p	OR (IC95%)	p	OR (IC95%)	p	OR (IC95%)	p
Presence of carotid plaque	3.694 (1.307-10.445)	0.014	Reverse dipper (1.326-18.979)	0.017	1.100 (1.025-1.181)	0.008	1.141 (1.018-1.280)	0.024
24 h SBP	1.039 (1.005-1.073)	0.025			4.472 (1.197-16.708)	0.026		
24 h PP (mmHg)	1.064 (1.014-1.116)	0.012			3.117 (1.098-8.845)	0.033		
Reverse dipper	4.077 (1.494-11.128)	0.006			4.146 (1.448-11.875)	0.008		
PWV (m/s)	1.292 (0.982-1.701)	0.067			2.106 (1.209-3.669)	0.009		
					1.462 (1.126-1.898)	0.004		
					Presence of carotid plaque (1.404-10.268)	0.009		
					24 h SBP (mmHg) (1.007-1.071)	0.016		
					24 h PP (mmHg) (1.022-1.128)	0.005		
					Log ICAM-1 (1.350-586.092)	0.031		

Table 3. Univariate and multivariate analysis of prevalence (A) and progression (B) of carotids plaques in kidney transplants and patients with CKD. CKD, chronic kidney disease; OR, odds ratio; PWV, pulse wave velocity; HbA1C, glycated hemoglobin; ; 24 h PP, 24 h pulse pressure; T.Transpl, time since transplantation; IMT high, high intima media thickness; CaxP, calcium phosphate product; log IL-6, log-transformed interleucine 6 levels; log ICAM-1, log-transformed intercellular adhesion molecule 1 levels; 24h SBP, 24 h systolic blood pressure.

Conclusion: Subclinical carotid plaque are increased in kidney transplants and reverse dipper patter is a risk factor to prevalence and progression in kidney transplants recipients.