RISK FACTORS FOR PROGRESSION OF ATHEROMATOUS PLAQUE IN CHRONIC KIDNEY DISEASE. THE NEFRONA STUDY.

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BACKGROUND

Cardiovascular disease (CVD) remains the main cause of morbility and mortality in patients with chronic kidney disease (CKD) and risk factor profile seems to be different in CKD compared to general population. Intima Media Thickness (IMT) and atheromatous plaque are well-known factors of cardiovascular risk scoring, especially useful in CKD. Limited longitudinal data exist regarding the relationship between CKD stages and progression of subclinical atheromatosis. The objectives of this study were to:

1. Assess the progression of atheromatous plaque in CKD.
2. Evaluate the risk factors related to atheromatosis progression.

METHODS

Multicenter, prospective and observational cohort study in Spanish CKD patients without previous cardiovascular events (NEFRONA). A carotid and femoral ultrasound was performed by an itinerant team of professionals at baseline and after 12 months The analysis of the presence of atheromatous plaques was performed by a unique reader. Atheromatosis progression was defined as formation of new atherosclerotic plaques in patients without or with a single plaque at baseline. CKD progression was defined as doubling of baseline serum creatinine or the onset of end stage renal disease. The statistical level of significance was fixed to 0.05.

RESULTS

We included 476 CKD patients [CKD 3 (193), CKD 4-5 (149) and CKD 5D (134)]. 26.9% were diabetics and 33.4% were former or habitual smokers. Prevalence of atheromatous plaque at baseline was 68.7 % (Fig 1a and Fig 1b). Plaque progression after 12 months occurred in 38.7% patients, without differences between CKD stages (Fig. 2). Variables significantly and positively related to atheromatous progression after 12 months are shown in Table 1 and Fig 3. In a multiple regression model, including all univariate predictors of plaque formation, only the age and CKD progression maintained an independent association with the formation of new plaques (Table 2).

Fig. 1 Prevalence of plaque at baseline: Fig. 1a Prevalence of plaque stratified by CKD stages. Fig. 1b Atheromatosis severity.

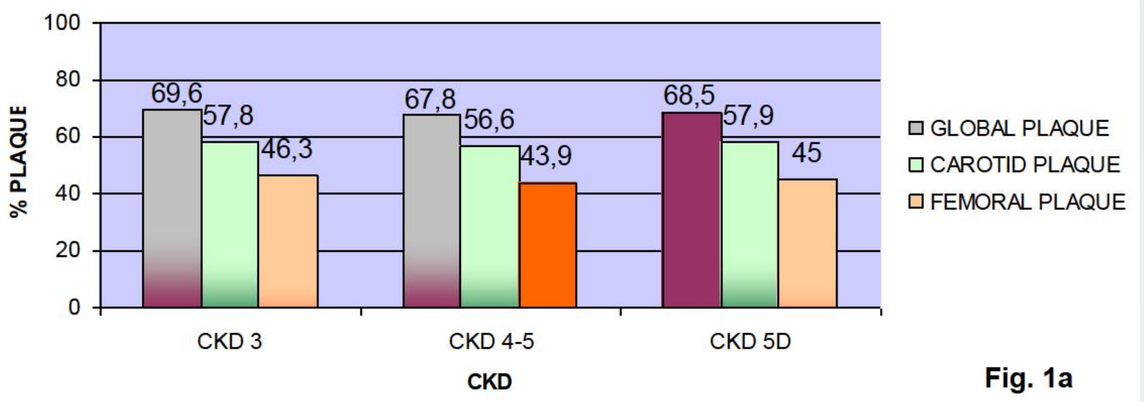

Fig. 1a

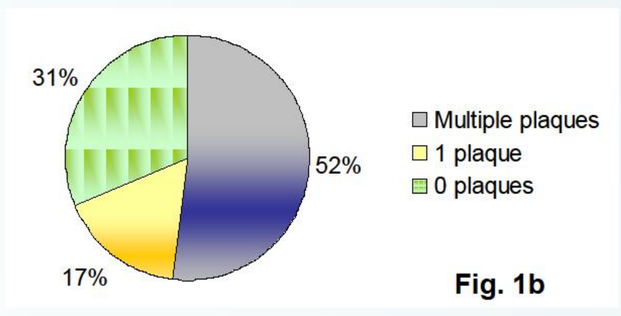

Fig. 1b

Fig. 2 Progression of atheromatosis stratified by CKD Stages.

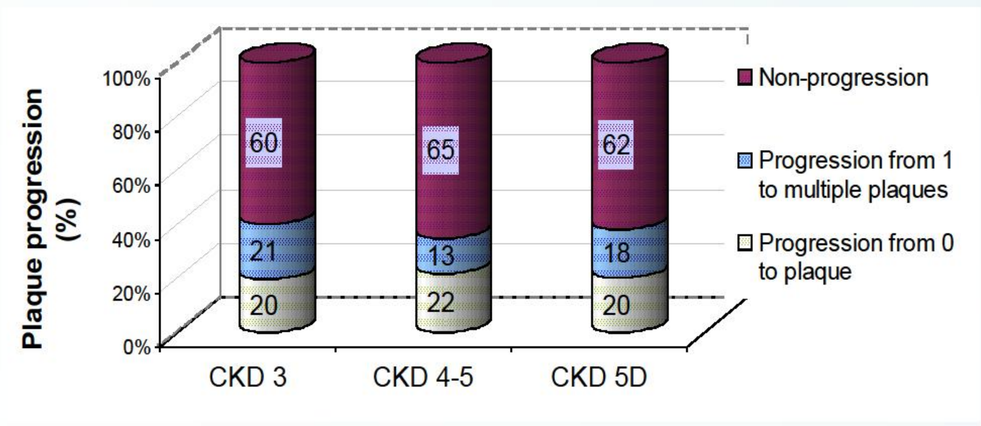

Table 1 Univariate analisis of factors related to plaque progression.

	PROGRESSION	NO PROGRESSION	p
N	75	122	
Age (years)	62 [50.2, 69.7]	50 [37.7, 62]	**< 0.001**
Male (%)	49.3	51.6	ns
White race (%)	96	91.8	ns
Diabetes (%)	24	18	ns
Abdominal obesity (%)	44.1	37.3	ns
Smoking (%)	41.3	37.7	ns
SBP (mm Hg)	147.4 (21.5)	137.1 (20.2)	**0.01**
Pulse pressure (mm Hg)	63 [54, 75]	51 [45, 60]	**< 0.001**
Carothid IMT (mm)	0.71 (0.11)	0.62 (0.1)	**< 0.001**
Biochemical data			
Transferrin (mg/dL)	235 (53.2)	216.4 (43.9)	**0.021**
Ferritin (mg/dL)	152.7 [99.2, 310]	111.5 [63.2, 295.3]	0.079
Microalbuminuria (mg/L)	202.2 [34.7, 357]	109 [11, 328.7]	0.083
CRP (mg/L)	1.9 [0.74, 5.5]	1.3 [0.7, 2.8]	0.092
PTH (pg/mL)	111.1 [73, 213]	112 [63.5, 202.2]	ns
Glucose (mg/dL)	94 [87, 110]	95.4 [87, 108.5]	ns
Δ Glucose (mg/dL)	3 [-5, 8]	-2 [-9, 6]	0.047
CKD progression (%)	11.3	3.4	0.063

Abdominal obesity (Abdominal perimeter > 102 cm in men and > 88 cm in women), Smoking (former/current),IMT: Intima Media Thickness

Fig. 3 Age and plaque progression.

Table 2 Multivariate analisis of factors related to plaque progression

	Sig.	HR	95% C.I.	
Age	0.004	1.109	1.034	1.190
CKD progression	0.010	28.3	2.24	357.8

CONCLUSIONS

In CKD (Stage 3, 4-5 & 5D), atheromatous disease progression after 12 months is notorius. Main factors related to atheromatosis progression are age and CKD progression. Longitudinal ultrasound monitoring of plaque formation can be useful for an early diagnosis of subclinical atheromatosis disease and prevention of atheromatosis progression.

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