PROGRESSION OF PERIPHERAL ARTERY DISEASE IN CHRONIC RENAL IMPAIRMENT: THE NEFRONA PROJECT

AUTHORS: D. Arroyo[1], M. Abajo[2], M. Gracia[2], À. Betriu[2], J.M. Valdivielso[2], E. Fernández[1, 2]

[1] *Nephrology Department, Arnau de Vilanova University Hospital, Lleida, SPAIN.*
[2] *Biomedical Research Institute, Lleida, SPAIN.*

INTRODUCTION

Peripheral artery disease (PAD) is a frequent comorbidity to chronic kidney disease (CKD), indicative of chronic vascular injury. Most patients are asymptomatic, and there is evidence that screening through non invasive tools, such as measuring the ankle-brachial index (ABI), provides a good selection of subjects at a higher cardiovascular risk. However, there is a lack of evidence regarding the evolution of PAD in CKD, or the factors affecting it.

METHODS

NEFRONA is an observational prospective multicenter study. 2445 CKD patients without a previous cardiovascular history were included from 2010 to 2012 and will be followed for four years. Clinical and laboratory data were recorded, and carotid and femoral ultrasounds and ABI measurements were performed by a single expert team.

The modified ABI was chosen for a higher sensitivity: this is the most pathologic of the four measured values (right and left tibial and pedal indexes). ABI was considered pathologic if ≤0.9 or ≥1.4. Patients who did not have a cardiovascular event or underwent transplantation during follow-up were reexplored after 24 months.

Patients were classified as PAD progressors if they had an increase in the number of territories with pathologic ABI.

Table 1. Factors significantly related to PAD progression.

Variable	Progressors	Non progressors	p
Age (years)	**60.5±11.7**	57.8±12.4	0.002
Diabetes (%)	**35.4**	19.4	<0.001
Systolic blood pressure (mmHg)	**146.05±19.96**	141.25±19.56	0.001
Body mass index (Kg/m^2)	**29.44±5.93**	28.38±5.04	0.004
Waist perimeter (cm)	**100.67±13.41**	98.00±12.19	0.003
Dialysis treatment (%)	**23.0**	13.5	<0.001
Plaque pressence (%)	**74.7**	65.0	0.003
Number of areas with plaque (n)	**2.69±2.46**	1.84±1.99	<0.001
Hemoglobin (g/dL)	12.68±1.66	**13.14±1.75**	<0.001
Urea (mg/dL)	**105.23±44.09**	93.16±47.37	<0.001
Phosphate (mg/dL)	**4.13±1.09**	3.77±0.89	<0.001
Total cholesterol (mg/dL)	177.21±41.55	**183.19±38.18**	0.030
hsCRP (mg/L)	**5.51±11.50**	3.51±5.81	0.009

Figure 1. Progression rate according to baseline ABI
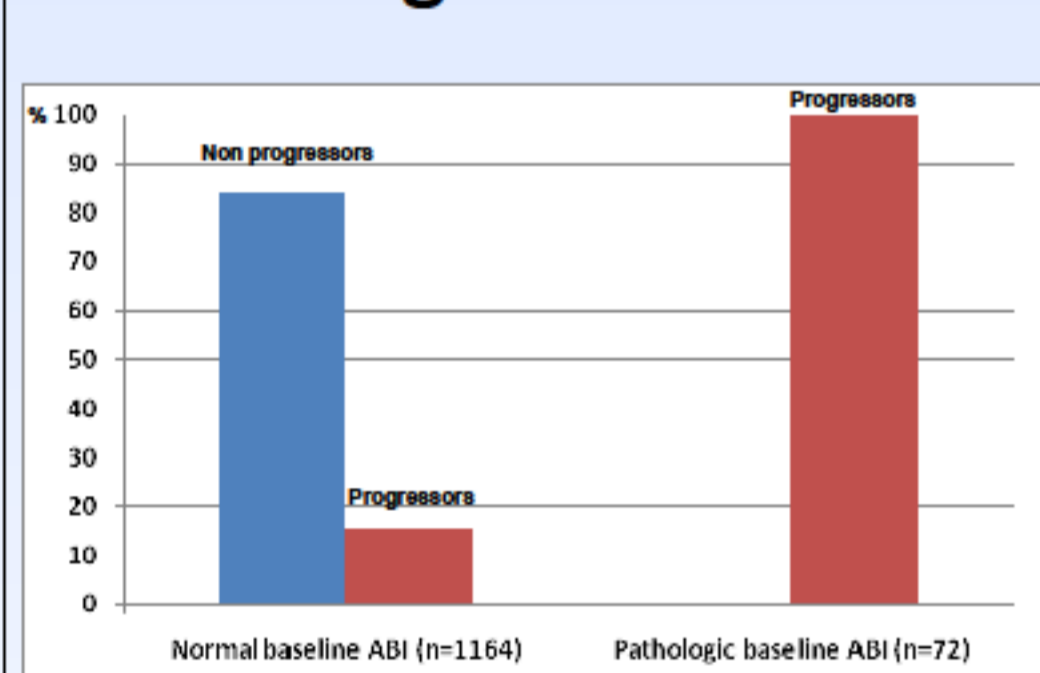
Table 2. Multivariate logistic regression model of factors associated to PAD progression.

Variable	Odd ratio	95% C. I.	p
Diabetes	2.05	1.46 – 2.89	<0.001
Phosphate (mg/dL)	1.51	1.28 – 1.78	<0.001
Plaque pressence	1.14	1.06 – 1.22	0.001
hsCRP (mg/L)	1.03	1.01 – 1.04	0.005
Age (years)	1.02	1.01 – 1.03	0.032

RESULTS

1236 patients were included in the study (62% male, mean age 58.4±12.3 years), classified according to their CKD in stage 3 (46.5%), 4-5 (38.0%) and dialysis (15.5%). Frequent comorbidities were hypertension (92.2%), dyslipidemia (68.9%), smoking (55.4%) and diabetes (22.7%). The rate of baseline pathologic ABI was 5.8%. Presence of atheromatous plaques in carotid and/or femoral arteries was found in 67.0% of patients.

PAD progression at 2 years happened in 257 patients (20.8%), 185 of which (15.0%) had a normal ABI value at baseline. Clinical and laboratory variables associated to PAD progression in the bivariate analysis are summarized in **table 1**.

A multivariate model showed that factors significantly associated to PAD progression were age, diabetes, vascular atheromatous plaques, serum phosphate and hsCRP (**table 2**). These factors maintained their statistically significant predictive value independent of antiaggregant, vitamin D or phosphate binder treatments.

CONCLUSIONS

In patients with chronic kidney disease, progression of peripheral artery disease is relatively frequent (about 1 in 5 patients at 2 years). Factors related to progression include traditional vascular risk factors, such as older age, diabetes and presence of atheromatous plaques, but also more specific factors related to CKD, such as higher phosphate and hsCRP. The prognostic value of PAD progression for the incidence of cardiovascular events, and the efficacy of therapeutic measures to avoid this progression are yet to be determined in this population.

REFERENCES

Arroyo D, et al. **Observational multicenter study to evaluate the prevalence and prognosis of subclinical atheromatosis in a Spanish chronic kidney disease cohort: baseline data from the NEFRONA study**. BMC Nephrol, 2014;15:168.