

# ARE THERE ANY RISK FACTORS TO DEVELOP HIGH FLOW ARTERIOVENOUS ACCESSSES IN HAEMODIALYSIS PATIENTS?

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## INTRODUCTION

- A 400-600 mL/min flow in an arteriovenous (AV) access is usually sufficient for an effective haemodialysis (HD)<sup>1</sup>
- Some accesses continue to mature leading to a high-flow access (HFA)
- Although a HFA allows easy needling, chronic high flow potentially has local, peripheral and central effects
- Problems related to HFA are frequently overlooked
- Risk factors for the development of a HFA remain unknown

## AIM

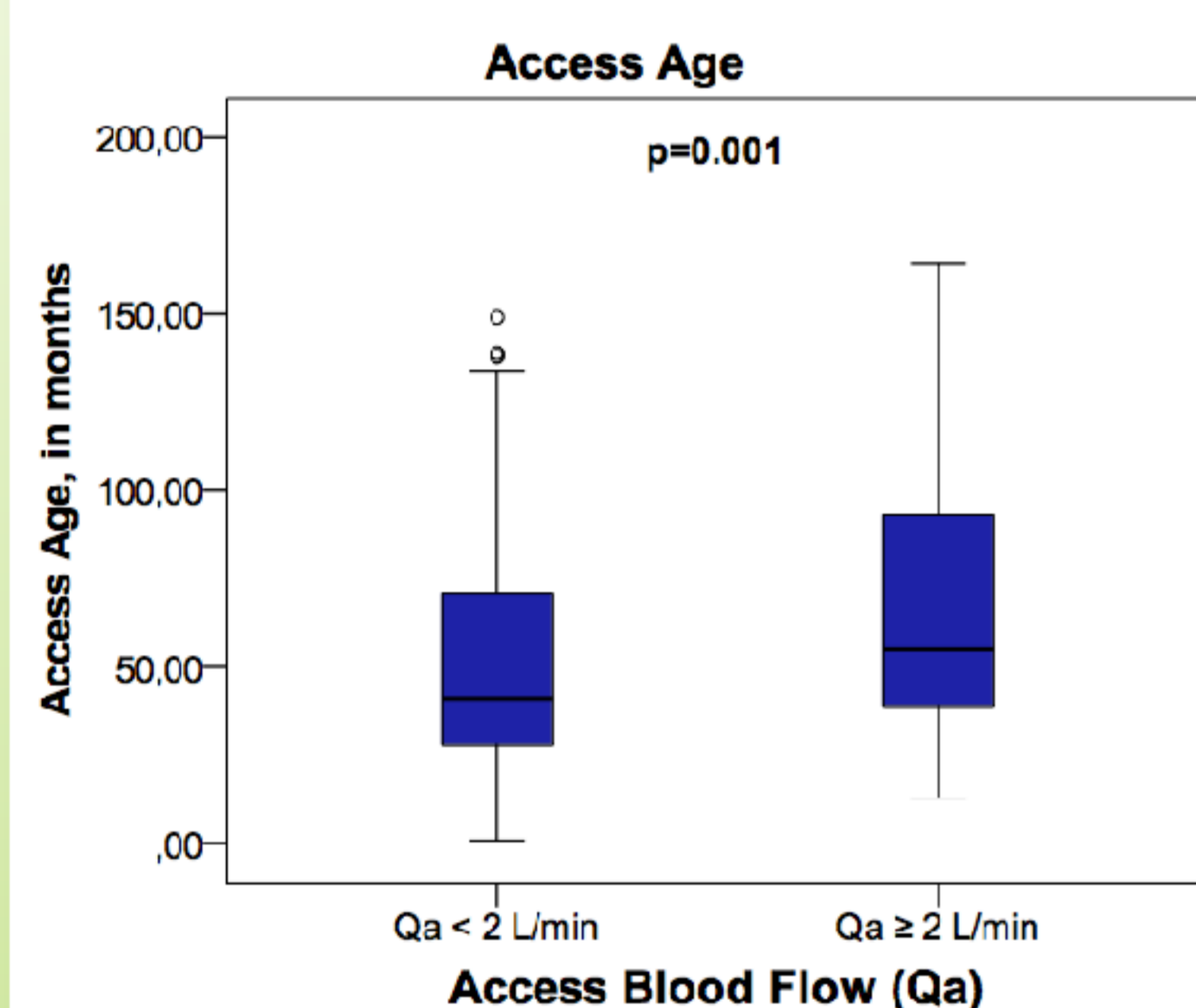
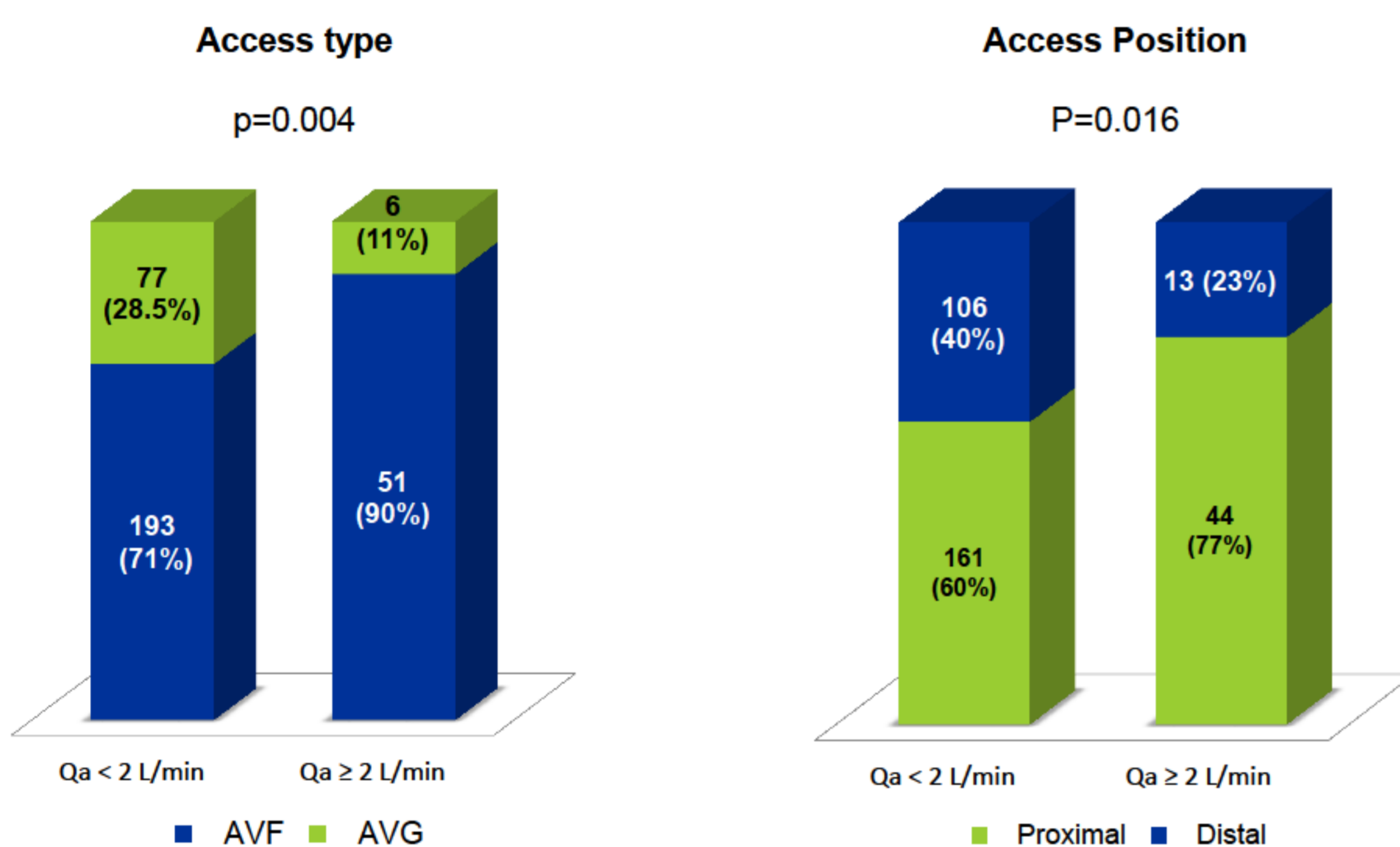
The aim of this study was to evaluate patient and access characteristics that can be related to the development of a HFA.

## PATIENTS AND METHODS

- Cross-sectional study performed in 336 prevalent haemodialysis (HD) patients with AV access (fistula or graft).
- All patients were dialysed with high flux helixone filters (Fresenius®), ultrapure water dialysate and on-line haemodiafiltration (post dilution).
- Access flow (Qa) was evaluated by termodilution using the Fresenius Medical Care Blood Temperature Monitor at 300 ml/min.
- Laboratory and Clinical data were collected from Euclid®
- Statistical analysis (Student,  $\chi^2$  or Wilcoxon test to compare groups and linear regression for multivariate analysis), was performed with SPSS 21.0 and a  $p < 0.05$  was considered significant.

POPULATION	Variable	Value
	Age, years (mean $\pm$ SD)	66.4 $\pm$ 15.4
	Gender, male [n (%)]	210 (62.5)
	Race, caucasian [n (%)]	319 (96.1)
	HD time, months (median)	48
	Hours of HD per week (mean $\pm$ SD)	12.7 $\pm$ 1.6
	Diabetes [n (%)]	122 (36.3)
	Access type, fistula [n (%)]	250 (74.4)
	Access with Qa $\geq$ 2 L/min [n (%)]	57 (17.4)

## Access Characteristic



**Qa  $\geq$  2L/min was more frequent in:**

- Fistulas comparatively to grafts;
- Proximal accesses than in distal;
- Older vascular accesses.

## RESULTS

## Demographic and Clinic Characteristic

Variable	Qa < 2 L/min (n=279)	Qa $\geq$ 2 L/min (n=57)	P
Age, years (mean $\pm$ SD)	69.15 $\pm$ 11.9	63.65 $\pm$ 10.39	0.001
Age at HD beginning, years (mean $\pm$ SD)	64.56 $\pm$ 12.54	58 $\pm$ 11.21	< 0.001
Gender, male [n(%)]	166 (61.5)	39 (68.4)	0.368
Race, caucasians [n(%)]	259 (95.9)	51 (89.5)	0.091
HD time, months (median)	48	60	0.020
Hours of HD per week (mean $\pm$ SD)	12.53 $\pm$ 1.23	13.22 $\pm$ 2.42	0.056
Hypertension [n (%)]	193 (71.5)	45 (78.9)	0.326
Diabetes [n (%)]	106 (39.3)	11 (19.3)	0.004
Coronary artery disease [n (%)]	81 (30)	13 (22.8)	0.335
Cerebrovascular disease [n (%)]	59 (21.9)	8 (14)	0.210
BMI (Kg/m <sup>2</sup> ) (mean $\pm$ SD)	26.7 $\pm$ 4.16	26.6 $\pm$ 4.12	0.618
Ankle-brachial index (mean $\pm$ SD)	1.13 $\pm$ 0.26	1.15 $\pm$ 0.19	0.628
Primary renal disease [n (%)]			
Diabetes mellitus	68 (25.2)	8 (14)	0.084
Hypertension/Ischaemic	52 (19.3)	10 (17.5)	0.854
Glomerulonephritis	13 (4.8)	3 (5.3)	0.747
Other/Unknown	137 (50.7)	36 (63.2)	0.108

UNIVARIATE ANALYSIS

Dependent Variable	Independent Variables	$\beta$	CI 95%	p	R <sup>2</sup>
Qa $\geq$ 2 L/min	Diabetes mellitus	0.997	1,27 to 5,789	0.01	0.25
	Access Age	0.015	1,007 to 1,024	<0.001	
	Access Type, fistula	1,251	1,366 to 8,943	0.009	
	Access position, proximal	1,274	1,604 to 7,97	0.002	
	Patient age	-0,04	0,941 to 0,981	<0.001	

**Patients with high flow accesses were younger, were in HD for a longer time, were younger at HD beginning and had lower prevalence of diabetes.**

## DISCUSSION

To date there are few studies to assess predictors of HFA. We believe one of the few studies to assess clinical predictors of a Qa  $\geq$  2 L/min in a cohort of prevalent HD patients, however some factors associated to Qa have been described.

- According to our findings, there is an important evidence<sup>3</sup> that the proximal anastomosis and fistulas are important predictors of higher Qa.
- Although the literature was not consistent, the majority of studies, including our, found that diabetic<sup>4</sup> and older<sup>3</sup> patients had a lower Qa  $\rightarrow$  could more frequent peripheral vascular disease in these patients affect arterial inflow to the access?
- Similar to our results the majority of studies did not find any association between access flow and gender<sup>5</sup>.
- The access age, as a determinant of Qa, was studied once and was described as an independent predictor for Qa<sup>5</sup>. However, we found that older accesses and patients longer HD vintage had more frequently a Qa  $\geq$  2 L/min.

## CONCLUSION

Our study shows that younger patients, non-diabetics, with longer time in HD and with longer duration proximal fistulas may develop high flow accesses more frequently.

The knowledge of the factors related to the development of a high flow accesses could be of crucial importance mostly in patients who can not tolerate this hyperdynamic state.

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