

IS THERE A RELATIONSHIP BETWEEN ARTERIOVENOUS ACCESS FLOW AND CARDIOVASCULAR RISK FACTORS IN HAEMODIALYSIS PATIENTS?

Ivo Laranjinha (1,3), Patrícia Matias (1,2,3), Ana Azevedo (1,3), David Navarro (2,3), Carina Ferreira (1,3), Tiago Amaral (1,3), Inês Aires (1,2,3), Cristina Jorge (1,2,3), Célia Gil (1,2,3), Aníbal Ferreira (1,2,3)

(1) - Dialverca, Dialysis Clinic, Forte da Casa, Portugal;
 (2) - Nephrocare Vila Franca de Xira, Dialysis Clinic, Vila Franca de Xira, Portugal;
 (3) - NIDAN, Department of Investigation and Development in Nephrology, Lisbon, Portugal.

INTRODUCTION

- Cardiovascular (CV) disease is the most common cause of death in chronic haemodialysis (HD) patients¹.
- The higher CV morbidity and mortality in this population can not be fully explained by traditional CV risk factors (like diabetes, hypertension, dyslipidaemia), suggesting that other factors may also play a role¹.
- Given that arteriovenous (AV) accesses are specific to HD patients, it is important to explore the relationship between vascular accesses and CV disease^{2, 3}.
- An unanswered question is if AV accesses with higher blood flow (Qa) can contribute to the worse CV outcomes in HD patients.

AIM

To evaluate the relationship between access blood flow and CV risk factors, like pulse pressure (PP), left ventricular mass index (LVMI), left ventricular ejection fraction (LVEF) and vascular calcifications, in prevalent HD patients.

METHODS

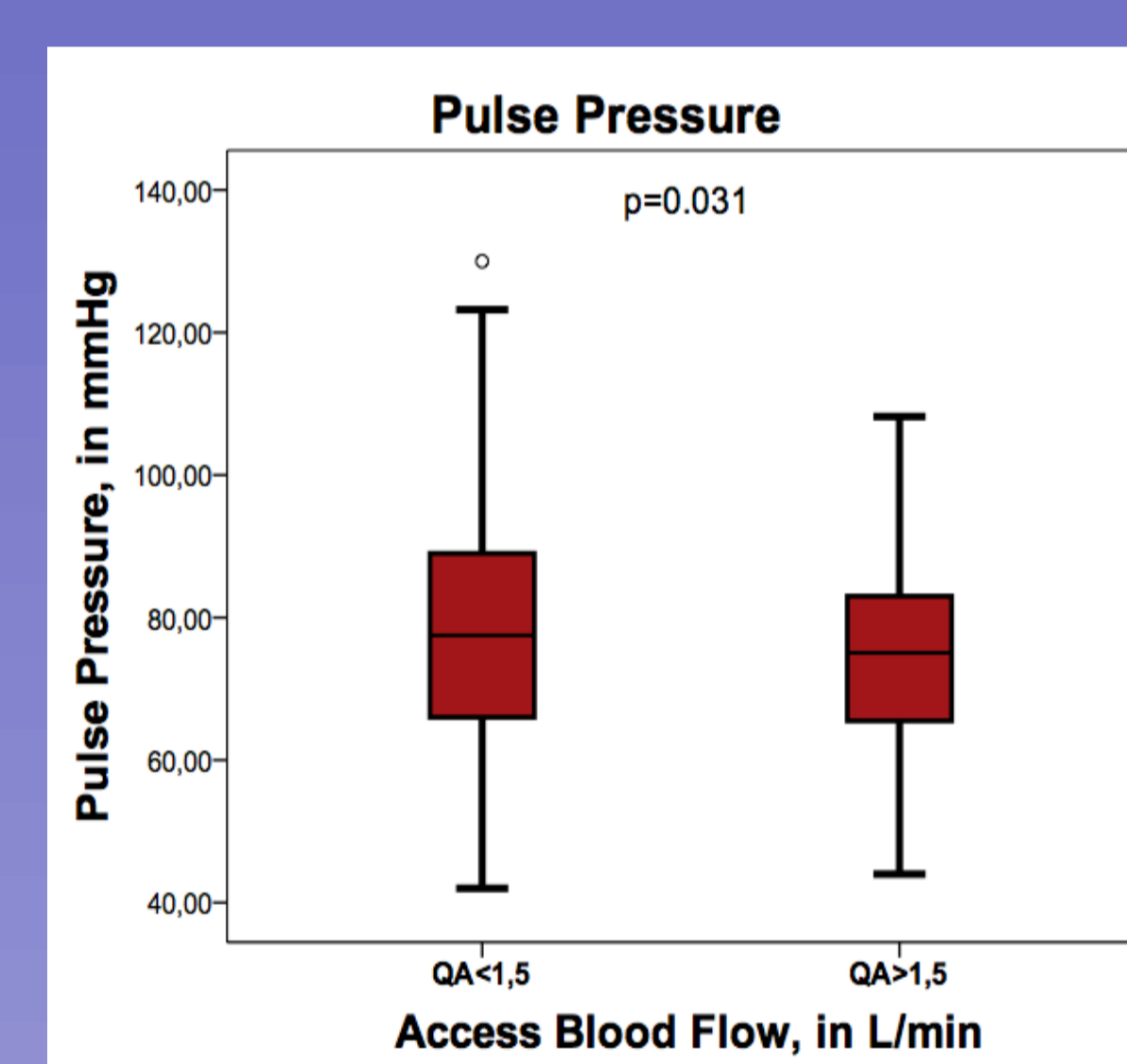
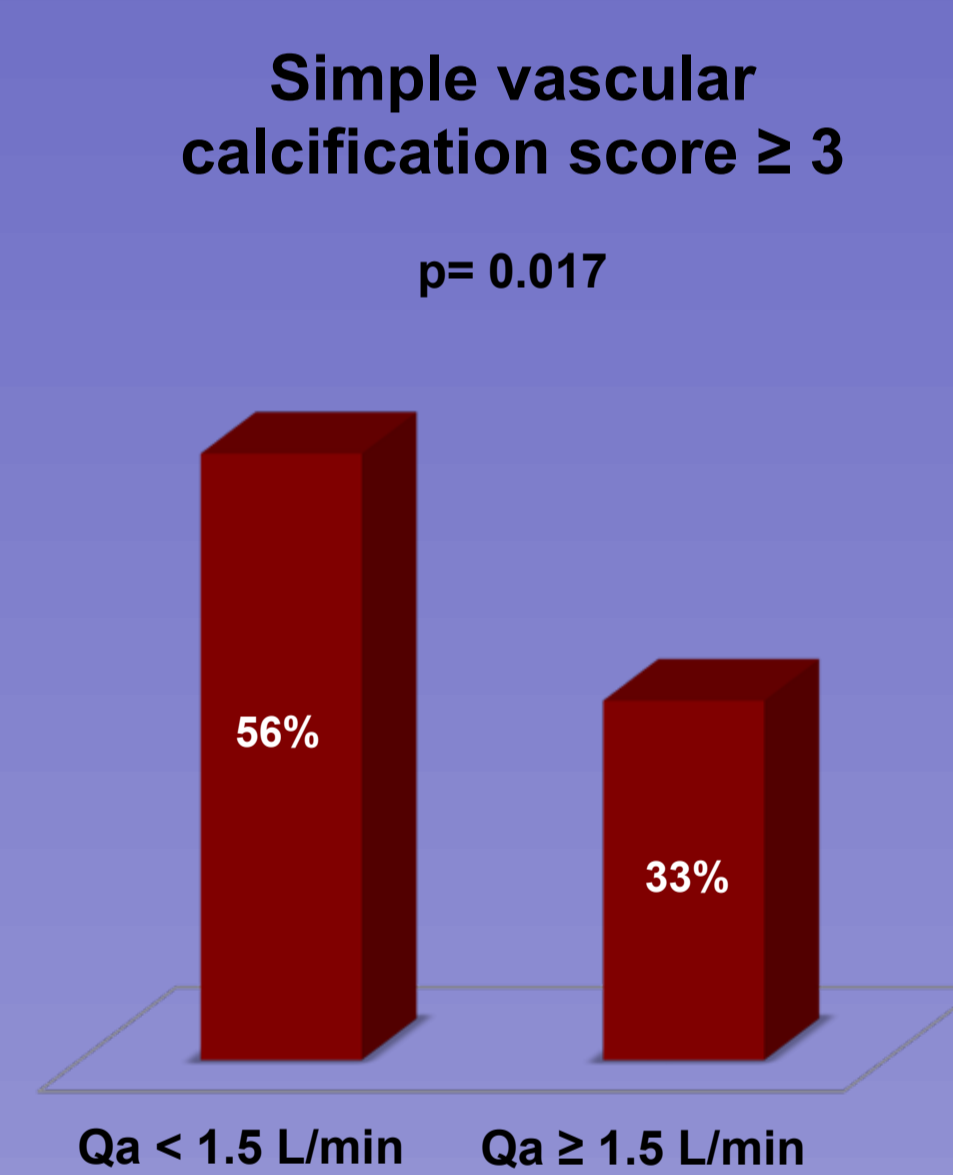
- Cross-sectional study in prevalent HD patients with AV access (fistula or graft).
- Patients were all dialysed with high flux helixone filters (Fresenius®), ultrapure water dialysate and on-line haemodiafiltration (post-dilution).
- Access flow (Qa) was evaluated by thermodilution using the Fresenius Medical Care Blood Temperature Monitor®.
- Patients underwent:
 - Echocardiographic examination;
 - Pulse pressure and ankle-brachial index determination;
 - Vascular calcifications evaluation by using a simple vascular calcification score (SVCS)⁴ based on plain radiographic films of pelvis and hands.
- The population was divided in two groups according to the Qa (< 1.5 L/min and ≥ 1.5 L/min).
- Statistical analysis: Student, χ^2 or Wilcoxon test were used to compare groups and linear regression was used for multivariable analysis. A $p < 0.05$ was considered significant.

RESULTS

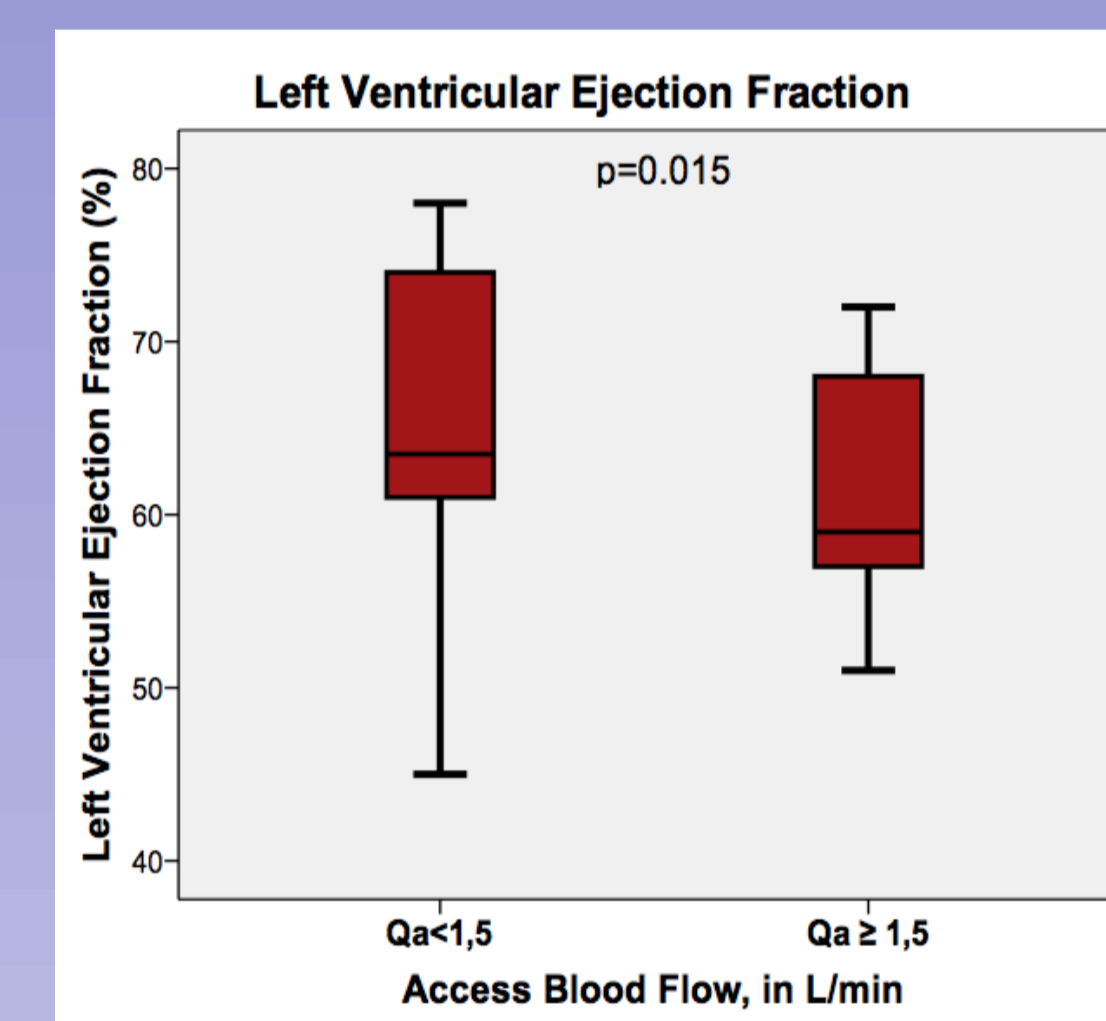
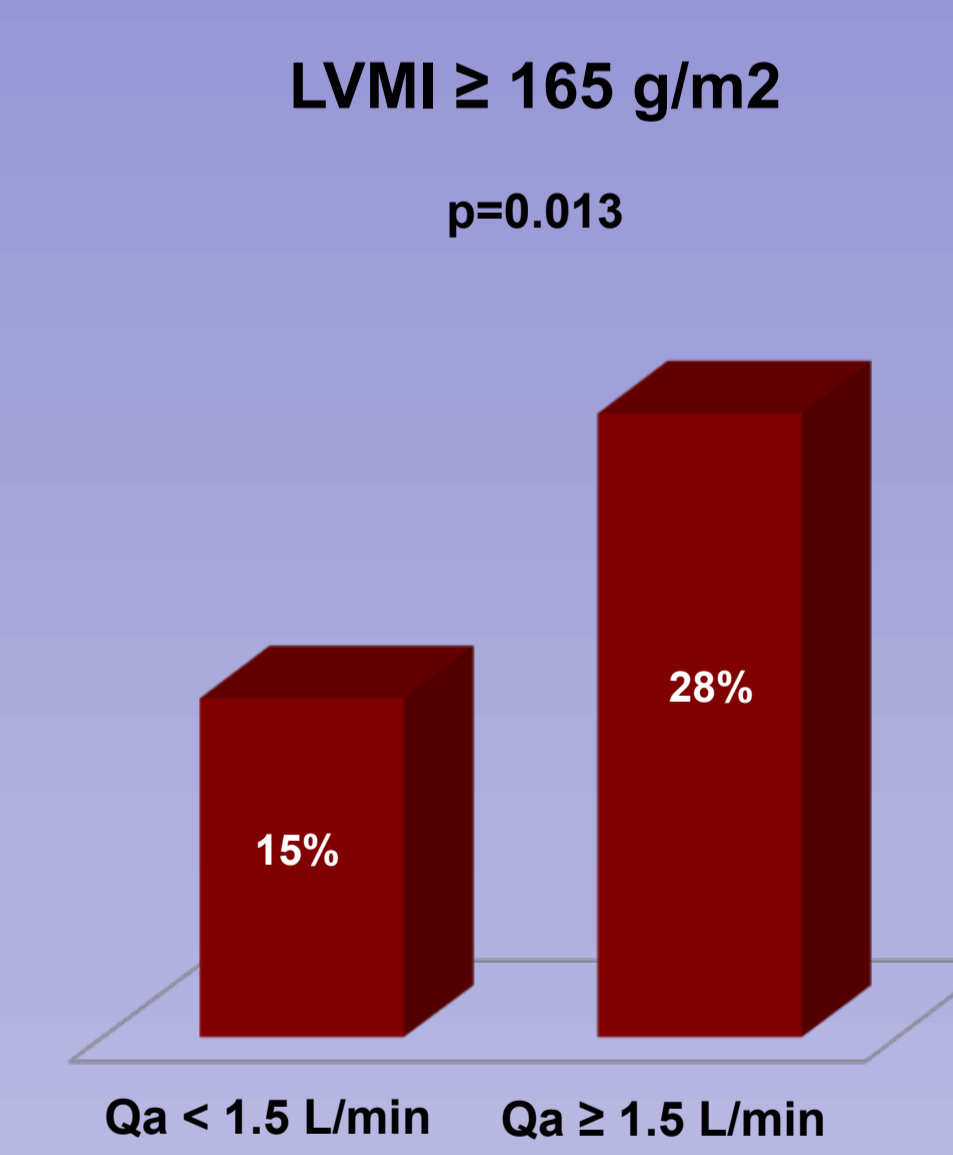
POPULATION	Variable	Value
	Age, years (mean \pm SD)	66.4 \pm 15.4
	Gender, male [n (%)]	210 (62.5)
	Race, Caucasian [n (%)]	319 (96.1)
	Diabetes [n (%)]	122 (36.3)
	Access type, fistula [n (%)]	250 (74.4)
	Access with Qa \geq 1.5 L/min [n (%)]	103 (31.5)
	Simple vascular calcification score \geq 3	61 (47.7)
	Pulse Pressure (mmHg)	76.8 \pm 16.3
	LVMI (g/m ²)	131.8 \pm 34.8
	FEVE (%)	59.2 \pm 14.4

UNIVARIATE ANALYSIS	Variable	Qa < 1.5 L/min (n=224)	Qa \geq 1.5 L/min (n=103)	p
	Age (years)	69.0 \pm 14.6	60.8 \pm 15.6	<0.001
	Gender, male	140 (62.5)	65 (63.1)	ns
	Hypertension	159 (71)	79 (76.7)	ns
	Diabetes	95 (42.4)	22 (21.4)	<0.001
	Coronary Artery Disease	74 (33)	20 (19.4)	0.012
	Cerebrovascular Disease	50 (22.3)	17 (16.5)	ns
	Peripheral vascular disease	56 (25)	17 (16.5)	ns
	Serum albumin (g/dL)	4.0 \pm 0.3	4.1 \pm 0.4	0.015
	C-reactive protein (mg/dL)	2.3 \pm 2.2	1.7 \pm 1.8	ns
	Haemoglobin (g/dL)	11.1 \pm 1.1	11.2 \pm 1.1	ns
	Ankle-brachial index	1.1 \pm 0.3	1.1 \pm 0.2	ns
	Systolic blood pressure (mmHg)	144.1 \pm 19.5	141.0 \pm 25.3	ns
	Diastolic blood pressure (mmHg)	65.7 \pm 12.6	68.4 \pm 15.5	0.017
	Heart rate (bpm)	71.5 \pm 10.0	73.5 \pm 11.3	ns

* Values expressed as mean \pm SD, median or frequencies [n (%)]



Patients with an access with Qa \geq 1.5 L/min had lower SVCS and lower PP. Although, these patients presented a significantly higher LVMI and lower LVEF.



In a multivariable analysis, a Qa \geq 1.5 L/min was negatively associated with LVEF in a model adjusted for age, diabetes, coronary disease and LVMI.

CONCLUSIONS

Our study shows that:

- Higher Qa accesses were more frequent in non-diabetic⁴ and younger³ patients.
- Higher Qa accesses (\geq 1.5 L/min) may have an adverse cardiac impact by leading to an increase in LVMI and to a decrease in LVEF.
- Vascular calcifications and arterial stiffness were not significantly different between groups.
- This study emphasizes the need for a routine echocardiography evaluation in patients with higher Qa accesses.
- Although there is rising evidence and awareness about the potential cardiac and systemic toxicity of high flow AV accesses, it is still unknown when and who will benefit with access blood flow reduction^{2, 5, 6}.

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Contact of first author: ivolaranjinha@gmail.com

