

Vascular perfusion, body composition and muscle strength in chronic kidney disease patients on regular hemodialysis program

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INTRODUCTION

Hemodialysis is a technique that effectively replaces some functions of the human kidney, allowing the survival of such patients, since loss of kidney function is incompatible with life. In most patients with chronic kidney disease, the level of renal function tends to gradually decrease over time. The most serious outcome of chronic kidney disease is renal failure. The vascular access is vital in patients with chronic renal failure undergoing dialysis and their dysfunction is a major cause of morbidity and hospitalization. Adequate vascular access for hemodialysis defines not only a better therapeutic outcome and patient survival. The flow of arteriovenous fistula (AVF) is an important factor in the successful execution of the hemodialysis.

METHOD

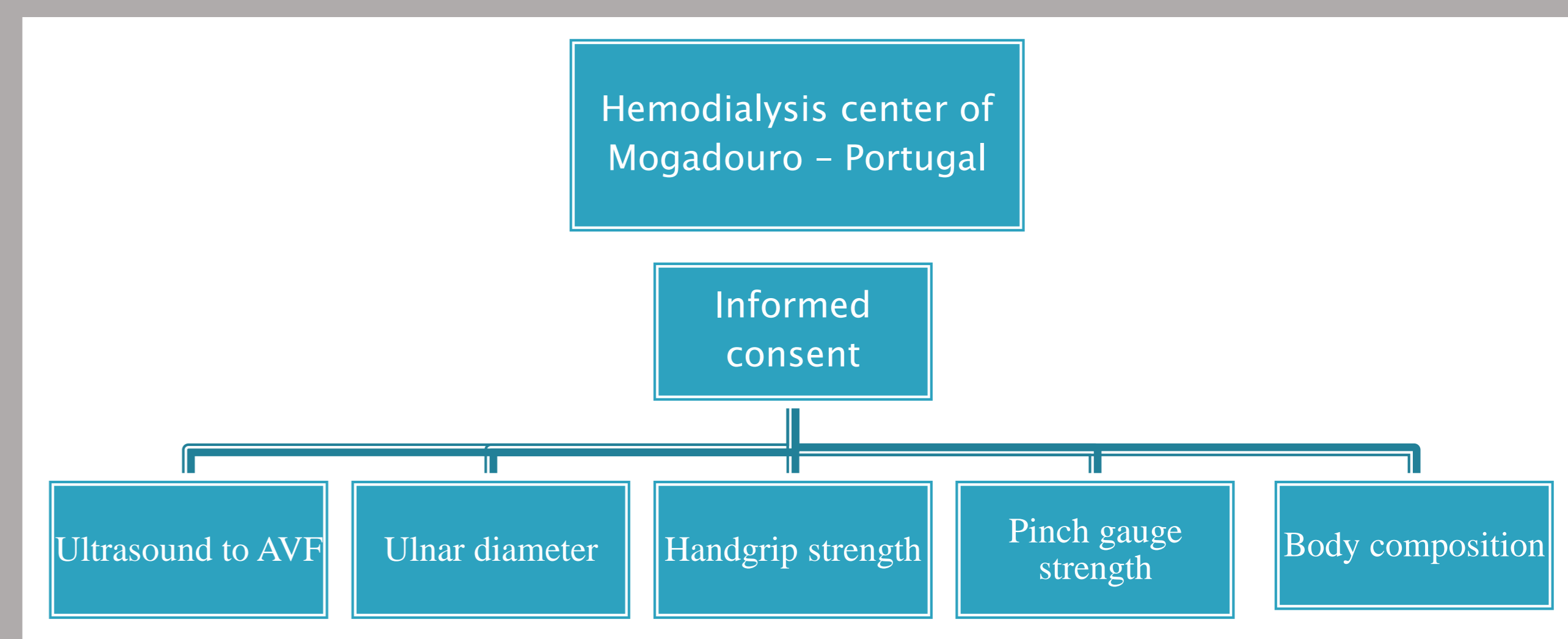
Were studied 27 patients, 20 males and 7 females, with ages between 39 and 94 years old. The diameter and the flow of the draining vein were evaluated by ultrasound flow. Were also carried out the Hand Grip Test, the Pinch Gauge Test and it was done an anthropometric evaluation using a bioimpedance scale.

RESULTS

The average flow of the arteriovenous fistula was 1340.096±304.615ml/min and the diameter of the arteriovenous fistula was, on average, 0.57±0.06mm. To check for significant differences between the variables we used the Spearman correlation coefficient test. When correlated left handgrip strength and average flow ($r = -0.576$, $p = 0.01$), pinch gauge test of the opposite side of the fistula and average flow ($r = -0.450$, $p = 0.059$) and visceral fat and average flow ($r = -0.444$, $p = 0.05$), there were statistically significant negative correlations. Individuals with higher results in the pinch gauge test in left finger showed lower flow, lower diameter and lower area of the draining vein.

OBJECTIVE

This study aimed to identify the relationship between vascular perfusion, body composition and muscle strength in chronic kidney disease patients on regular hemodialysis program.



		Age (years)	Time in hemodialysis (months)
Women	N	7	7
	Mean	67,14	71,71
	Std. Deviation	17,639	62,678
Men	N	20	20
	Mean	68,3	67,45
	Std. Deviation	13,167	69,038

		Flow (mL/min)	Diameter (cm)	Area (cm ²)	Right ulnar diameter (cm)	Left ulnar diameter (cm)	Right handgrip strength (Kg/f)	Left handgrip strength (Kg/f)	Right pinch gauge strength (bar)	Left pinch gauge strength (bar)	Body fat (%)	Weight (kg)	Height (m)	Water (%)
Diameter (cm)	Correlation Coefficient	-.130**	1											
	Sig. (2-tailed)	0.519												
Area (cm ²)	Correlation Coefficient	-.105**	-.944**	1										
	Sig. (2-tailed)	0.604	0											
Right ulnar diameter (cm)	Correlation Coefficient	0.325	0.249	0.3	1									
	Sig. (2-tailed)	0.098	0.21	0.129										
Left ulnar diameter (cm)	Correlation Coefficient	0.31	0.082	0.138	-.839**	1								
	Sig. (2-tailed)	0.115	0.684	0.492	0									
Right handgrip strength (Kg/f)	Correlation Coefficient	0.327	-0.306	-0.236	0.145	0.12	1							
	Sig. (2-tailed)	0.096	0.121	0.235	0.471	0.552								
Right pinch gauge strength (bar)	Correlation Coefficient	0.25	-0.293	-0.214	0.173	0.253	-.787**	1						
	Sig. (2-tailed)	0.209	0.138	0.285	0.388	0.202	0							
Left pinch gauge strength (bar)	Correlation Coefficient	0.171	-0.185	-0.146	0.223	-.464*	-.405*	-.401*	1					
	Sig. (2-tailed)	0.395	0.356	0.468	0.264	0.015	0.036	0.038						
Body fat (%)	Correlation Coefficient	-.177**	-.492**	-.385*	0.297	-.691**	-.543**	-.441*	-.441*	1				
	Sig. (2-tailed)	0.378	0.009	0.047	0.133	0	0.003	0.021	0.021					
Weight (kg)	Correlation Coefficient	-.508**	0.033	0.074	-0.072	-0.063	-0.367	-0.174	-0.2	-0.102	1			
	Sig. (2-tailed)	0.007	0.871	0.713	0.721	0.754	0.06	0.384	0.316	0.613				
Water (%)	Correlation Coefficient	0.143	-0.058	0.003	0.356	-.396*	-0.197	0.051	-0.161	-0.012	-.494**	1		
	Sig. (2-tailed)	0.476	0.773	0.99	0.069	0.041	0.326	0.799	0.421	0.952	0.009			
Height (m)	Correlation Coefficient	0.091	0.074	0.118	-.438*	0.295	0.195	0.248	-0.014	0.209	-0.304	0.078	1	
	Sig. (2-tailed)	0.651	0.713	0.557	0.022	0.135	0.33	0.213	0.945	0.295	0.124	0.701		
BMI (Kg/m ²)	Correlation Coefficient	-.417*	-0.084	-0.081	0.018	0.046	-.465*	0.335	0.295	0.209	-.626**	-.535**	0.129	1
	Sig. (2-tailed)	0.03	0.678	0.688	0.928	0.822	0.015	0.088	0.135	0.295	0	0.004	0.521	
Water (%)	Correlation Coefficient	0.124	-0.086	-0.05	0.195	0.29	-0.194	0.008	-0.097	-0.048	-.554**	-.923**	-0.278	-.486*
	Sig. (2-tailed)	0.537	0.671	0.806	0.33	0.143	0.332	0.968	0.63	0.813	0.003	0	0.161	0.01
BMI (Kg/m ²)	Correlation Coefficient	0.537	0.671	0.806	0.33	0.143	0.332	0.968	0.63	0.813	0.003	0	0.161	0.01
	Sig. (2-tailed)	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

		Evaluation of the arteriovenous fistula			
		Time of the arterio venous fistula (months)	Flow (mL/min)	Diameter (cm)	Area (cm ²)
Women	N	7	7	7	7
	Mean	44	1487,643	0,57286	0,25929
	Std. Deviation	56,451	283,9549	0,035338	0,031149
Men	N	20	20	20	20
	Mean	57,2	1288,455	0,57975	0,29125
	Std. Deviation	63,691	301,1423	0,072936	0,126708

		Right ulnar diameter (cm)	Left ulnar diameter (cm)	Right handgrip strength (Kg/f)	Left handgrip strength (Kg/f)	Right pinch gauge strength (bar)	Left pinch gauge strength (bar)
Women	N	7	7	7	7	7	7
	Mean	15,9286	15,8643	11,1429	9,7143	3,8571	4,1429
	Std. Deviation	0,93223	1,11232	8,93362	7,43223	1,34519	1,34519
Men	N	20	20	20	20	20	20
	Mean	17,5475	17,325	17,05	16,1	5,45	5,45
	Std. Deviation	1,22275	1,10245	6,11706	7,68389	2,11449	1,60509

CONCLUSION

Taking into account the results obtained, we can see that the sample is relatively small, which means that the conclusions of this study are not extrapolated to the Portuguese population in regular hemodialysis program, but just be confined to the group of patients evaluated. The results suggest that there is a negative relationship between the flow of the arteriovenous fistula and muscle strength and body composition. For higher values of muscle strength correspond lower flow values of the draining vein.

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