Effect of aging in the perception of health related quality of life, dialysis adequacy, iron status, inflammation and nutritional markers in end stage renal disease patients under online hemodiafiltration

Alexandra Moura[1], José Madureira[2], Pablo Alija[2], João Carlos Fernandes[3], José Gerardo Oliveira[4], Martin Lopez[5], Madalena Filgueiras[6], Leonilde Amado[7], Maria Sameiro-Faria[7], Vasco Miranda[7], Alice Santos-Silva[8,9], Elísio Costa[8,9]

1- Instituto de Ciências da Saúde, Universidade Católica Portuguesa, Porto, Portugal; 2- Clínica de Hemodiálise NefroServe, Barcelos, Portugal; 3- Clínica de Hemodiálise NefroServe, Viana do Castelo, Portugal; 4- Centro Hospitalar do Porto, Porto, Portugal; 5- Clínica de Hemodiálise de Felgueira, Felgueiras, Portugal; 6- Clínica de Hemodiálise de Gondomar, Gondomar, Portugal; 7 – Clínica de Hemodiálise NephroCare, Maia, Portugal; 8- Laboratório de Bioquímica, Departamento de Ciências Biológicas, Faculdade de Farmácia, Universidade do Porto, Portugal; 9- Instituto de Biologia Molecular e Celular, Universidade do Porto, Portugal.

Introduction

A high proportion of dialysis patients are older, raising a major challenge to health care systems, as they often show several comorbidities, poor functional status, depression and they often avoid personal and social involvement. There is a lack of information about the effect of aging in patients' perception of health quality of life (HRQOL), and in clinical and analytical characteristics of dialysis patients, particularly in end-stage renal disease (ESRD) patients under online-hemodiafiltration (OL-HDF). We aimed to evaluate how aging could influence patients' perception of HRQOL, as well as, the effect of aging on dialysis adequacy and in hematological, iron status, inflammatory and nutritional markers.

Material and Methods

Patients and study design

A descriptive transversal observational study was conducted to assess the HRQOL in ESRD patients on OL-HDF, by using Kidney Disease Quality of Life-Short Form (KDQOL-SF) instrument, in order to study the impact of age on HRQOL. Patients were grouped into four categories based on age quartiles, the first quartile included patients with less than 56 years old (*n* = 77), the second quartile included patients between 57 to 68 years old (*n* = 86), the third quartile included patients between 69 and 75 years old (*n* = 70), and the last quartile included patients with more than 75 years old (*n* = 72).

This work had the collaboration of five dialysis units from the north of Portugal. A total of 322 patients (59,63% males), with a mean (±SD) age of 64,9 ± 14,3 years old, were evaluated. Patients were under therapeutic dialysis three times per week for the duration of 3-5 hours each session. The main causes of renal failure, in our group of patients, were diabetic nephropathy (n=116), hypertensive nephrosclerosis (n=45), other diseases or uncertain etiology (n=136).

For OL-HDF procedure, Fresenius Medical Care dialysis machines (model 5008) and synthetic high-flux polysulfone dialyzers (Fresenius Medical Care, Bad Hamburg, Germany) were used. Patients were excluded if they were under 18 years old, cognitively impaired, had a severe speech or hearing impairment, malignancy, autoimmune disease, inflammatory or infectious diseases, and if they were in the dialysis program for less than three month.

At starting the study, the patients were clinically evaluated and blood samples were collected for analytical evaluation; KDQOL-SF questionnaire was self-administered to all patients. This survey collected data on age, gender, time under dialysis, etiology of kidney disease, hematological data, iron status, inflammatory and nutritional markers, as well as data on dialysis adequacy. Laboratory data were obtained by using standard techniques. The study was approved by the Ethic Committee of the Institute of Health Sciences of Portuguese Catholic University. All patients gave written informed consent to participate in this study. The study was conducted in accordance with the Declaration of Helsinki.

Kidney Disease Quality of Life Questionnaire-Short Form

KDQOL-SF became the most widely used QOL measure for ESRD patients. It was developed in the United States of America for dialysis patients [16], and has been translated into several languages, to be used in several large studies involving dialysis patients [17,18]. In the present work, HRQOL was assessed with the validated instrument KDQOL-SF version 1.3 for Portuguese population [19]. This query was given to the patients at starting of the dialysis session, and they were helped to fill out the forms, if necessary.

Statistical analysis

All variables are reported as mean ± standard deviation or as proportions. Data were analyzed using the program SPSS 20.0 for Windows (SPSS, Inc., Chicago, IL). The Normality of data was tested using the Kolmogorov-Smirnov test. Multiple comparisons between groups were performed by one- way ANOVA supplemented with Tukey´s HSD Post Hoc test. Differences between groups were analyzed by using Student t-test or Mann-Whitney test, according to the results obtained in the Kolmogorov-Smirnov test. The association between categorical variables was analyzed using the chi-squared test or Fisher's exact test. Pearson´s rank correlation coefficient was used to evaluate relationships between sets of data. P<0.05 was accepted as statistically significant.

Results

Analyzing the results according to quartiles of age, significant differences were found for some parameters evaluated by the KDQOL-SF instrument, namely for work status, physical functioning and role-physical, which decreased with increasing age. We also found a higher proportion of diabetic patients, a decrease in creatinine, iron, albumin serum levels, transferrin saturation and nPCR, with increasing age. Moreover, significant negative correlations were found between age and MCHC (r=-0.190; p=0.001), iron (r=-0.207; p<0.001), transferrin saturation (r=-0.166; p=0.004), albumin (r=-0.190; p<0.001), nPCR (r=-0.191; r=0.001), work status (r=-0.199; p<0.001), physical functioning (r=-0.323; p<0.001) and role-physical (r=-0.182; p=0.001).

Table I – Clinical data, hematological and biochemical data, nutritional markers and dialysis adequacy for Total ESRD patients on OL-HDF, according to age (quartiles).

	ESRD patients 1st quartile (< 56 years old) (n=82)	ESRD patients 2nd quartile (57-68 years old) (n=88)	ESRD patients 3rd quartile (69-75 years old) (n=72)	ESRD patients 4th quartile (>75 years old) (n=76)	P value (ANOVA analysis)
Clinical data, and dialysis adequacy markers					
CVC use, n (%)	14 (17,1)	18 (20,5)	11 (15,3)	26 (34,2)	
AVF use, n (%)	68 (82,9)	70 (79,5)	61 (84,7)	50 (65,8)	0,02#
Diabetic patients, n (%)	21 (25,6)	35 (39,7)	33 (45,8)	27 (35,5)	0,04#
Hypertensive patients, n (%)	16 (19,5)	9 (10,2)	10 (13,9)	11 (14,4)	0,40#
Previous time on dialysis, months	73,45 (153,70)	59,24 (100,67)	64,53 (139,66)	58,13 (91,28)	0,85
URR, %	76,75 (5,08)	76,99 (5,93)	76,34 (6,64)	76,93 (7,56)	0,92
KT/Ve	1,55 (0,34)	1,54 (0,32)	1,47 (0,25)	1,55 (0,38)	0,41
Creatinine, mg/dL	9,16 (2,81)	7,88 (2,92)	7,14 (2,76)	6,22 (2,41)	<0,001
Darbepoeitin, µg/kg/week	0,32 (0,43)	0,41 (0,69)	0,39 (0,44)	0,36 (0,40)	0,70
Hematological data					
Hemoglobin, g/dL	11,67 (1,46)	11,61 (1,44)	11,69 (1,20)	11,56 (1,38)	0,93
Hematocrit, %	35,70 (4,50)	35,81 (4,37)	36,24 (3,74)	35,88 (4,31)	0,88
Erythrocytes, $x10^{12}$ /L	3,75 (0,49)	3,77 (0,54)	3,85 (0,45)	3,74 (0,52)	0,56
MCV, fl	95,47 (5,46)	95,61 (5,87)	94,46 (5,81)	96,31 (6,10)	0,28
MCH, pg	31,21 (2,01)	30,27 (5,05)	30,05 (4,17)	30,99 (2,14)	0,13
MCHC, g/dL	32,69 (0,97)	32,39 (1,12)	32,26 (1,16)	32,18 (1,08)	0,20
RDW, %	14,60 (1,50)	14,46 (1,36)	14,93 (1,49)	14,99 (1,64)	0,30
White blood cells ($x10^9$/L)	6,76 (1,95)	6,26 (1,81)	7,17 (2,78)	6,65 (2,79)	0,11
Neutrophil/Lymphocyte ratio	2,68 (1,62)	2,98 (1,42)	2,90 (1,27)	2,84 (1,29)	0,55
Iron status					
Iron (mg/dL)	74,53 (31,99)	74,91 (33,09)	63,04 (24,52)	61,91 (23,51)	0,01
Transferrin (mg/dL)	194,26 (43,18)	209,59 (121,84)	185,62 (40,21)	204,12 (97,38)	0,31
Transferrin saturation (%)	28,94 (14,81)	30,34 (13,80)	25,23 (11,53)	24,47 (9,64)	0,01
Ferritin (ng/mL)	355,69 (213,85)	430,21 (238,55)	408,79 (267,16)	413,11 (239,42)	0,22
Inflammatory markers					
CRP (mg/dL)	6,53 (11,28)	10,02 (18,36)	13,77 (19,67)	8,72 (12,04)	0,13
Nutritional markers					
Albumin (g/dL)	45,04 (13,61)	43,59 (10,52)	41,57 (7,92)	39,37 (8,01)	0,01
BMI, Kg/m2	24,80 (4,33)	26,46 (5,05)	26,54 (4,08)	24,82 (4,08)	0,01
nPCR, g/kg/day	1,51 (0,75)	1,43 (0,61)	1,34 (0,62)	1,17 (0,35)	0,01

Results are presented as median (SD). # Chi-squared test or Fisher's exact test.*p<0.05 vs. women. CVC: central venous catheter; AVF: arteriovenous fistula; URR: urea reduction ratio; MCV: mean cell volume; MCH: mean cell hemoglobin; MCHC: mean cell hemoglobin concentration; RDW: red blood cell distribution width; CRP: C-reactive protein; BMI: body mass index; nPCR: normalized protein catabolic rate.

Table II - HRQOL results based on the KDQOL-SF instrument for ESRD patients on OL-HDF, according to age (quartiles).

	ESRD patients 1st quartile (< 56 years old) (n=82)	ESRD patients 2nd quartile (57-68 years old) (n=88)	ESRD patients 3rd quartile (69-75 years old) (n=72)	ESRD patients 4th quartile (>75 years old) (n=76)	P value (ANOVA analysis)
ESRD–targeted Areas					
Symptoms/problem list	76.68 (17.83)	76.60 (14.63)	74.35 (16.80)	76.39 (17.02)	0.81
Effects of kidney disease	65.22 (23.33)	63.28 (21.51)	66.32 (22.04)	71.78 (15.79)	0.09
Burden of kidney disease	29.01 (26.60)	23.22 (22.40)	26.19 (25.65)	22.86 (23.27)	0.35
Work status	21.95 (36.09)	10.67 (26.67)	7.97 (22.07)	8.90 (22.58)	0.01
Cognitive function	80.78 (19.38)	78.25 (16.89)	74.62 (22.04)	77.37 (22.04)	0.31
Quality of social interaction	82.81 (18.90)	83.94 (17.01)	80.99 (19.10)	77.74 (22.42)	0.20
Sexual function	83.23 (23.15)	68.94 (30.16)	85.00 (21.23)	75.00 (34.46)	0.09
Sleep	36.10 (13.62)	41.93 (15.30)	42.33 (16.56)	40.02 (15.29)	0.07
Social support	77.71 (29.37)	82.01 (27.94)	82.63 (28.79)	83.56 (28.26)	0.58
Dialysis care					
Staff encouragement	86.09 (25.78)	90.59 (17.09)	91.12 (19.66)	89.93 (19.97)	0.42
Patient satisfaction	63.62 (24.86)	57.30 (22.47)	55.71 (24.22)	60.31 (20.90)	0.15
36-item health survey (SF-36)					
Physical functioning	59.39 (28.70)	44.61 (29.77)	40.69 (32.21)	32.17 (26.39)	<0.001
Role-physical	36.97 (37.90)	23.37 (28.47)	20.71 (30.68)	26.40 (31.23)	0.01
Pain	69.55 (26.34)	60.92 (29.93)	64.36 (28.39)	57.33 (33.49)	0.06
General health	34.94 (22.48)	33.45 (21.35)	35.41 (22.86)	37.43 (20.96)	0.72
Emotional well-being	62.80 (24.28)	61.07 (23.83)	59.08 (26.16)	63.11 (26.10)	0.75
Role-emotional	49.14 (30.41)	43.18 (34.08)	47.89 (30.43)	42.02 (31.33)	0.42
Energy/ Fatigue	50.73 (19.66)	47.87 (17.60)	49.30 (21.63)	45.75 (20.54)	0.45
Social function	70.78 (33.49)	74.15 (31.93)	64.06 (36.15)	63.82 (35.51)	0.15

Results are presented as median (SD).

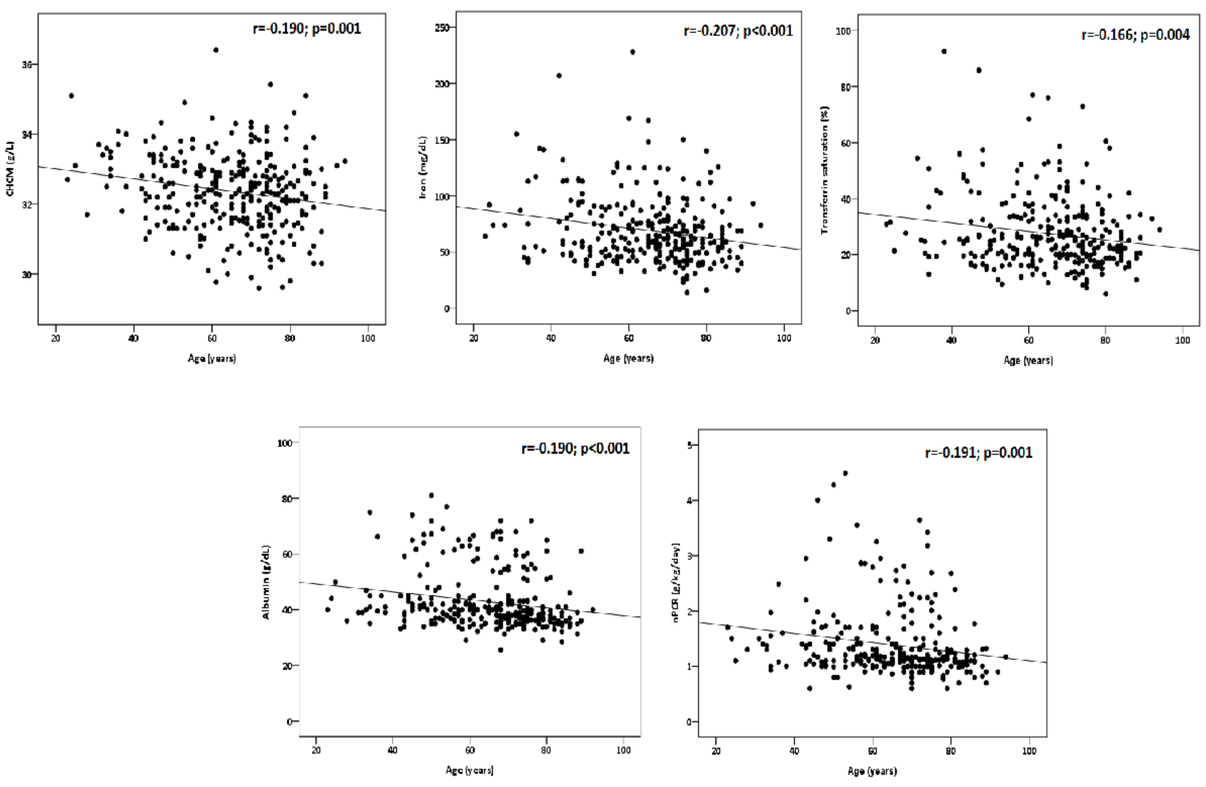

Fig. 1 – Significant correlation between age and MCHC, iron, transferrin saturation, albumin and nPCR in ESRD patients.

Conclusion

Our results showed that aging is associated with a decreased work status, physical functioning and role-physical, with a decreased dialysis adequacy, iron availability and nutritional status, and with diabetes and with the use of central venous catheter, as the vascular access. The knowledge of these changes associated with aging, which have impact in the quality of life of the patients, could be useful in their management.

Bibliography

Mazairac HA, et al (2012). Blood Purif, 33:73-79.
Mapes DL, *et al*. (2003). Kidney Int, 64:339–349.
Lowrie EG, et al. (2003). Am J Kidney Dis, 41: 1286–1292.
Knight EL, et al (2003). Kidney Int 63:1843–1851.
Schmid H, et al (2012). Int Urol Nephrol, 44:1435-1440.
Maduell F, et al (2013). J Am Soc Nephrol, 24:487-497.

51ERA–EDTA
676--SP
M) Dialysis. M8) Epidemiology, outcome research, health services research in CKD 5D.
Elisio Costa
DOI: 10.3252/pso.eu.51era.2014
Poster presented at: 51 ERA-EDTA CONGRESS AMSTERDAM THE NETHERLANDS MAY 31 - JUNE 3 2014
PosterSessionOnline.com