

# Very elderly patients on haemodialysis: Evolution and its relation with comorbidities

## Doentes muito idosos em hemodiálise: Evolução e sua relação com as comorbilidades

Cláudia Bento, Mónica Fructuoso, Rui Costa, Rui Castro, Teresa Morgado

Department of Nephrology, Centro Hospitalar de Trás-os-Montes e Alto Douro. Vila Real, Portugal.

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### ABSTRACT

**Introduction:** The population ageing has conditioned a progressive increase of very old patients on haemodialysis. These patients present multiple comorbidities that worsen the prognosis in dialysis and have an impact on their quality of life. **Material and Methods:** A retrospective observational study was performed, analysing all patients over 80 years of age that started regular haemodialysis between January 2004 and December 2011. The comorbidities were stratified using the Charlson score and correlated with mortality. Survival analysis was performed with Kaplan-Meier curves. **Results:** Fifty-nine patients were included, 35 females and 24 males, with a mean age of  $84 \pm 3$  years. At the start of dialysis, the estimated glomerular filtration rate calculated using the modification of diet in renal disease (MDRD) formula was  $10.8 \pm 2.5$  mL/min/1.73 m<sup>2</sup>. The initial Charlson score was  $8 \pm 3$  and became higher at the end of follow-up ( $11.5 \pm 2.9$ ;  $p < 0.01$ ). A Charlson score  $\geq 8$  was associated with more hospitalization days (878 vs. 360;  $p < 0.005$ ). The survival rate was 56 % at 12 months and 31% at 24 months. The mortality rate at the end of follow-up (20.4  $\pm$  15.7 months) was 55.9%, with a mortality rate of 27.3% at 3 months. The patients with early death presented a higher Charlson score ( $13.0 \pm 1.7$  vs.  $6.4 \pm 1.2$ ;  $p < 0.01$ ) at the beginning of dialysis. **Conclusion:** The benefits of dialysis in survival and quality of life in very elderly patients have been questioned. In our series, more than 1/4 of the patients died in the first 3 months of dialysis, corresponding to higher comorbidity scores. The use of comorbidity scores like the Charlson's may assist in the assessment of the short-term prognosis, but the individualized decision should prevail in all cases.

**Key-Words:** Charlson score; chronic renal disease; comorbidities; elderly patients; haemodialysis; survival.

### RESUMO

**Introdução:** O envelhecimento populacional tem condicionado um aumento progressivo de doentes muito idosos em hemodiálise. Estes doentes apresentam múltiplas comorbilidades que agravam o prognóstico em

diálise e que têm impacto na sua qualidade de vida. **Material e Métodos:** Estudo observacional retrospectivo de doentes integrados em programa regular de hemodiálise com idade igual ou superior a 80 anos entre janeiro/2004 e dezembro/2011. As comorbilidades foram estratificadas utilizando o score de Charlson e relacionadas com a mortalidade. Na análise de sobrevida foram utilizadas as curvas de Kaplan-Meier. **Resultados:** Foram avaliados 59 doentes, 35 do sexo feminino e 24 do sexo masculino, com  $84 \pm 3$  anos. À data de inclusão em programa regular de hemodiálise a taxa de filtração glomerular calculada pela fórmula MDRD era de  $10,8 \pm 2,5$  ml/minuto. O score inicial de Charlson era de  $8 \pm 3$  e aumentou no final do *follow-up* para  $11,5 \pm 2,9$ ;  $p < 0,01$ . Um score de Charlson igual ou superior a 8 associou-se a maior número de dias de internamento (878 vs. 360;  $p < 0,005$ ) e a uma sobrevida de 56% aos 12 meses e 31% aos 24 meses. A mortalidade até ao final do *follow-up* ( $20,4 \pm 15,7$  meses) foi de 55,9 %, com uma mortalidade precoce ( $< 3$  meses) de 27,3 %. Este último grupo apresentava um score de Charlson mais elevado no início de diálise ( $13,0 \pm 1,7$  vs.  $6,4 \pm 1,2$ ;  $p < 0,01$ ). **Conclusão:** Os benefícios da diálise na sobrevida e qualidade de vida dos doentes muito idosos têm sido questionados. Na nossa série, mais de ¼ dos doentes faleceram nos primeiros 3 meses, correspondendo a scores de comorbilidade mais elevados. Índices de comorbilidade como o de Charlson podem auxiliar na determinação do prognóstico vital a curto prazo, mas a decisão individualizada deve sempre prevalecer.

**Palavras-Chave:** Comorbilidades; doença renal crónica; hemodiálise; pacientes idosos; score de Charlson; sobrevida.

## ■ INTRODUCTION

The ageing of the population has conditioned a progressive increase of elderly patients on dialysis. In Portugal, 61.6% of the incident dialysis patients, in 2012, were over 65 years and the mean age of the prevalent patients was 66.8 years<sup>1</sup>. According to the Portuguese Ministry of Health, in 2010 36% of the prevalent dialysis patients were aged over 74 years<sup>2</sup>. Elderly patients present multiple comorbidities that worsen the prognosis in dialysis and have an impact on their quality of life. Age *per se* is a strong predictor of mortality<sup>3,4</sup> and the mortality rate is considerably higher for elderly patients on dialysis than for elderly patients who are not<sup>4-7</sup>. Therefore, it is often a challenge to decide whether starting dialysis is the best option for those patients. Assessment of the overall comorbidities may be helpful to identify the patients whose condition will probably evolve poorly. The Charlson score, an index of comorbidity that includes age, has proven to correlate well with survival and is divided into four groups according to punctuation: low ( $< 3$  points), moderate (4-5 points), high (6-7 points) and very high ( $\geq 8$  points)<sup>8</sup>. The survival probability will be lower with higher scores (with a score  $\geq 8$ , the survival probability at 12 months is 64% and 35% at 24 months)<sup>8</sup>.

Our study intends to analyse the evolution of a group of elderly patients ( $\geq 80$  years) with chronic kidney disease after starting haemodialysis (HD), according to the Charlson score.

## ■ MATERIALS AND METHODS

A retrospective, observational study was performed, analysing all patients aged 80 years or more at the start time of regular haemodialysis, between January 2004 and December 2011, in our Nephrology Department. The information was obtained through consultation of the hospital and dialysis centers records. The follow-up period was  $20.4 \pm 15,7$  months [1.3 – 70.6]. The comorbidities were stratified using the Charlson score at HD beginning and at the end of follow-up and were related with mortality. Statistical analysis was performed using the *t*-test for quantitative variables, Chi squared for qualitative variables and Kaplan-Meier curves for survival analysis.

## ■ RESULTS

We evaluated 59 patients, 35 female and 24 male, with a mean age of  $84 \pm 3$  years [80-93] at dialysis

start. The prevalence of diabetes was 37.7% and the main aetiology of chronic kidney disease (CKD) was diabetic nephropathy (37.7%). The vast majority of patients had been previously followed by a nephrologist (91.5%).

At the time of HD beginning, the glomerular filtration rate calculated using the Modification of Diet in Renal Disease (MDRD) formula was  $10.8 \pm 2.5$  mL/min/1.73 m<sup>2</sup>. The criteria for starting haemodialysis were uremic symptoms in 47 cases (79.7%) and hypervolemia or refractory hiperkaliemia in the remaining (20.3%). Analysing the vascular access type at the first dialysis session, 32 patients (54%) started haemodialysis with a central venous catheter (CVC) and an arteriovenous fistula (AVF) in the remainder. In the group of patients that started haemodialysis with a CVC, the vasculature was not appropriate for the creation of an autologous vascular access in 28%, 18% were waiting arteriovenous fistula maturation and 8% were not previously followed by a nephrologist. The vast majority of our patients (71%) had some dependence on the daily activities routine (29% were totally dependent for daily living activities and 42% had partial dependence).

The results of our study demonstrate a high prevalence of dependence among these elderly patients. We also observed a high rate of mortality in this population, with a positive correlation between mortality and level of dependence (those with a higher grade of dependence had higher mortality during follow-up) – Table I, which is in accordance with other published studies.

The use of a catheter as a vascular access was higher (mentioned above) and like other studies it was observed a relationship between central venous catheter and a higher risk of mortality – Table II.

The Charlson score at HD start was  $8 \pm 3$ , with 54% of the patients having a score equal or greater than 8. At the end of follow-up, the score was significantly higher ( $11.5 \pm 2.9$  [6-17];  $p < 0.01$ ).

**Table I**

Relation between dependence level and mortality

Mortality	Autonomous	Some degree of Dependence	p
	23.5 % (n = 4)	69.0 % (n =29)	0,001

**Table II**

Relation between vascular access and mortality

Mortality	CVC	AVF	p
	78.9 % (n = 26)	26.9 % (n = 7)	0.001

We have registered 130 hospitalizations (2.2/patient), mostly related with CVC infection (30.8%) – Fig. 1. The patients with a higher score ( $\geq 8$ ) had more hospitalization days (878 vs. 360;  $p < 0.005$ ) – Table III.

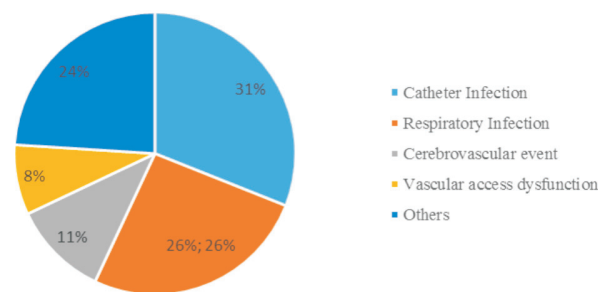
**Table III**

Days of hospitalization

Days of Hospitalization	Score Charlson <8	Score Charlson $\geq 8$	p
	13.3 $\pm$ 12	27.4 $\pm$ 26	0.005
	TOTAL -360	TOTAL - 878	

**Figure 1**

Causes of hospitalization



The global mortality rate in our study was 55.9% until the follow-up end. The mortality rate in the first 3 months after HD start was 27.3% and at 12 months was 45.4%. The patients that survived less than 3 months on dialysis presented a higher Charlson score ( $13.0 \pm 1.7$  vs.  $6.4 \pm 1.2$ ;  $p < 0.01$ ). Patients with a very high score ( $\geq 8$ ) had a survival rate of 56 % at 12 months and 31 % at 24 months- Fig. 2/Table IV.

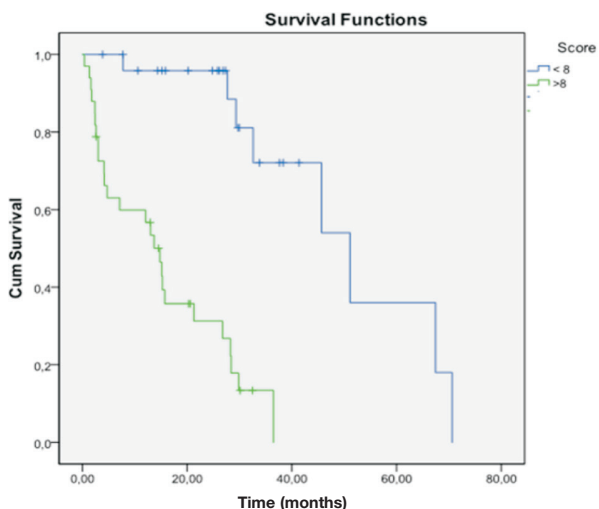
**Table IV**

Survival according to Charlson score

Survival	Score < 8	Score $\geq 8$
12 months	96%	56%
24 months	92%	31%

**Figure 2**

Kaplan Meyer curves – Survival on dialysis and relation with Charlson score



## DISCUSSION

The benefits of dialysis in terms of survival and quality of life in very old patients with chronic kidney disease have been questioned, mainly because of the high morbidity and mortality of these patients<sup>9-11</sup>. This morbidity may be increased by additional burdens imposed by dialysis like time spent on dialysis, loss of autonomy, neurological impairment, complications of the vascular access (mainly infection), pain and hospitalization days. Although patients may live longer with dialysis, the extension of lifetime may be associated with a poor quality of life and degradation of its basal state.

Some studies have demonstrated that the survival of elderly patients on dialysis may actually be considerably reduced, compared to that of the population at the same age<sup>4-7</sup>. One study showed that the survival advantage of dialysis in patients over 75 years with multiple comorbidities is unlikely to be more than four months<sup>12</sup> and more recently Murtagh *et al.* reported that dialysis might not offer a survival benefit in patients over 75 years with multiple comorbidities, especially in those with ischemic heart disease<sup>10,13,14</sup>. On the other hand, Munshi *et al.* reported a mortality rate at one year of 46.5% in patients over 75 years, being hospitalized 20% of these days<sup>15</sup>.

Based on this reality, some authors consider that dialysis may not be of benefit for all elderly patients and the conservative approach may be the best option in some cases<sup>14</sup>.

In our study, we found a significant raise in the comorbidities score between the beginning of dialysis and the end of follow-up. It is possible that the dialysis procedure itself or its complications, like vascular access-related infections (the main cause of hospitalization) may have contributed. This may reflect a functional decline and a disability increase, higher levels of dependence and quality of life deterioration. It is well known that the use of an AVF provides better quality of life, improved blood flows, results in fewer hospital admissions for access failure or related infections, and is associated with better survival and reduced health care costs than central venous catheters<sup>16</sup>. As demonstrated in our study, CVC is a clinically and statistically significant variable associated with mortality and it is a potentially modifiable independent predictor of mortality.

About 1/4 of our patients died in the first 3 months and in 45% the life expectancy was inferior to 12 months, as described in other studies<sup>8,17</sup>. Like in other reports<sup>8,9,18,19</sup> we demonstrated that survival and hospitalizations correlated with the Charlson score. The individualized decision should always prevail but the use of a comorbidity index score may assist in the assessment of prognosis at the short term and help identify the patients that would benefit from dialysis. A more complete score that includes: Charlson score, level of dependence for daily activities in association with modifiable independent predictors of early mortality on dialysis (presence of CVC, lack of attendance at a nephrology) should be thought.

**Conflict of interest statement:** None declared

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**Correspondence to:**

Dr<sup>a</sup> Cláudia Bento  
 Department of Nephrology, Centro Hospitalar de Trás-os-Montes e Alto Douro.  
 Avenida da Noruega, 5000-508 Lordelo,Vila Real Portugal  
 E-mail: claudiaqbento@gmail.com